Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

Genesis Solar Energy Project
Eastern Riverside County, California

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PREFACE

This Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) for the Genesis Solar Energy Project (Project) complies with the Biological Resources Condition of Certification (COC) BIO-7, as required by the California Energy Commission's (CEC) Final Decision issued in September 2010 (CEC-800-2010-011-CMF, 09-AFC-8) and the Bureau of Land Management's Record of Decision issued in October 2010. The purpose of the BRMIMP is to identify all mitigation, monitoring, and compliance measures related to biological resources that will be implemented during Project construction and operation. Table 1 identifies each COC (BIO-1 through BIO-29) and the location of each measure within this document.

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ABBREVIATIONS AND ACRONYMS

APLIC	Avian Power Line Interaction Committee
BEPTL	Blythe Energy Project Transmission Line
BLM	Bureau of Land Management
BM	Biological Monitor
BMP	best management practice
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
COC	Condition of Certification
CPM	Compliance Project Manager
CRS	Colorado River Substation
DB	Designated Biologist
dBA	decibels, A-scale
ECM	Environmental Compliance Manager
ESA	Environmentally Sensitive Area
Genesis Solar	Genesis Solar, LLC
I-10	Interstate 10
MCR	Monthly Compliance Report
MW	megawatt
PAR	Property Analysis Record
Project	Genesis Solar Energy Project
REAT	Renewable Energy Action Team
TBD	to be determined
USFWS	U.S. Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program

1.0 INTRODUCTION

Genesis Solar, LLC (Genesis Solar) a wholly owned subsidiary of NextEra Energy Resources, LLC, is proposing to develop a 250-megawatt (MW) solar thermal power generating facility located in Riverside County, CA, between the community of Desert Center and the city of Blythe. The Genesis Solar Energy Project (Project) is located on land managed by the Bureau of Land Management (BLM) (Figure 1). The Project Disturbance Area, which includes both permanent and temporary disturbance, will be approximately 1,819.5 acres, which includes approximately 1,727 acres for the Plant Site and approximately 92.5 acres for Linear Facilities. The Plant Site includes the solar arrays, power blocks, power generating equipment, support facilities, and evaporation ponds. The Linear Facilities include a transmission line, distribution line, natural gas pipeline, and a main access road that would be mostly co-located for approximately 6.5 miles (Figure 2).

1.1 Project Description

The Project is a concentrated solar electric generating facility which uses parabolic trough technology. The Project consists of two independent concentrated solar electric generating facilities (a.k.a. power plants or Plant Site) with a nominal net electrical output of 125 MW each, for a total net electrical output of 250 MW. Electrical power would be produced using steam turbine generators fed from solar steam generators. The solar steam generator receives heated heat transfer fluid from solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun.

The Project will use dry cooling for power plant cooling. In dry-cooling systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (instead of once-through cooling or evaporative heat transfer). In the direct dry-cooling system, also known as an air-cooled condenser, steam from the steam turbine exhausts directly to a manifold radiator system that rejects heat to the atmosphere, condensing the steam inside the radiator. Project cooling water blowdown will be piped to lined, onsite evaporation ponds.

Each 125 MW unit will have two to four double-lined evaporation ponds located within the Plant Site. Each pond will have a nominal surface area of one to three acres. The total acreage required for evaporation ponds for the dry-cooled alternative will be approximately 10 acres for both 125 MW units. The average pond depth will be approximately 8 feet and residual precipitated solids will be removed approximately every seven years to maintain a solids depth no greater than approximately three feet for operational and safety purposes. The ponds will be designed and permitted as Class II Surface Impoundments in accordance with Colorado River Regional Water Quality Control Board requirements, as well as the requirements of the California Integrated Waste Management Board. Each pond will have enough surface area so the evaporation rate exceeds the cooling tower blowdown rate at maximum design conditions and annual average conditions.

A transmission line (also referred to as a generation tie-line), distribution line, access road, and a natural gas pipeline will be co-located in one linear corridor to serve the Plant Site. A primary fiber-optic communication line will be mounted on the transmission line poles. A secondary fiber-optic communication line will be mounted on the distribution line poles and/or buried underground within existing, disturbed access/maintenance roads. The generation tie-line would extend an additional mile to the south, cross Interstate 10 (I-10), and tie into the Blythe Energy

Project Transmission Line (BEPTL). The generation tie-line would extend an additional mile to the south, cross I-10, and use the existing pole structures of the BEPTL to interconnect with Southern California Edison's Colorado River Substation (CRS) to the east. To tie into the CRS, there will be six new transmission line poles from the BEPTL to the CRS.

1.2 Project Schedule

Project construction is expected to occur over a total of approximately 37 months. Project construction will begin in the fourth quarter of 2010, with commercial operation expected to commence in the second quarter of 2013 for the first 125 MW unit and the second quarter of 2014 for the second 125 MW unit. Table 2 provides estimates for key Project events.

Table 2. Genesis Solar Project Key Events List

Event Description	Date[1]
Certification Date	September 29, 2010
Obtain Site Control	to be determined (TBD)
Online Date	TBD
Groundwater Well Activities (phase 1)	
Pre-Construction Groundwater Monitoring	November 1, 2010
Mobilization to Existing Well near I-10	December 1, 2010
Distribution Line to Test Well	December 1, 2010
Conversion of Test Well	December 5, 2010
Access Road Activities (phase 1)	
Start Site Mobilization for Access Road	December 15, 2010
Start Ground Disturbance (Grading)	January 3, 2011
Paving	February 28, 2011
Start Distribution Line to Plant Site	January 3, 2011
Pre-Construction Clearance Surveys: Bio & Cultural (Phase 1)	
Mobilize Desert Tortoise Fence Contractor at Plant Site (phase 1)	January 3, 2011
Erect Desert Tortoise Fence	January 5, 2011
Conduct Desert Tortoise Clearance Surveys[2]	March 1, 2011
Power Plant Site Activities (Phase 2)	
Start Site Mobilization for Plant Site	May 1, 2011
Start Grading and Ground Disturbance	May 27, 2011
Start Construction	May 27, 2011
Begin Pouring Major Foundation Concrete	July 26, 2011
Begin Installation of Major Equipment	July 1, 2011
Completion of Installation of Major Equipment (Unit 1)	November 1, 2012
Completion of Installation of Major Equipment (Unit 2)	December 23, 2013
Obtain Building Occupation Permit	TBD
Start Commercial Operation (Unit 1)	May 1, 2013
Start Commercial Operation (Unit 2)	April 1, 2014
Complete All Construction	July 1, 2014
Transmission Line Activities	
Start Transmission Line Construction	July 25, 2012
Synchronization with Grid Interconnection	January 2, 2013
Complete Transmission Line Construction	December 31, 2012
Fuel Supply Line Activities	
Start Gas Pipeline Construction and Interconnection	July 5, 2011
Complete Gas Pipeline Construction	September 5, 2011

[1] Dates are approximate and are subject to change as the detailed schedule is developed.

[2] Desert tortoise clearance surveys will take place when tortoises are active, typically no sooner than March 15.

1.3 Summary of Biological Resources

Comprehensive biological resource surveys were conducted of the Project Disturbance Area and vicinity in 2009 and 2010. Special-status species known to occur or potentially occurring in the Project Area are presented in Table 3 (from California Energy Commission [CEC] 2010). A detailed summary of the biological resource surveys and the species that occur and are likely to occur can be found in Appendix A. The observation locations of the special-status species and jurisdictional waters can be found on the figures in Figures 3a, 3b, 4a, and 4b.

Table 3. Special-Status Species Known or Potentially Occurring in the Project Area (from CEC 2010)

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
Plants		
Chaparral sand verbena	*Abronia villosa* var. *aurita*	__/__/1B.1/__/G5T3T4/S2 .1
Angel trumpets	*Acleisanthes longiflora*	__/__/2.3/__/G5/S1.3
Desert sand parsley	*Ammoselinum giganteum*	__/__/2.3/__/G2G3/SH
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2/__/G5/S2
Harwood's milk-vetch	***Astragalus insularis* var. *harwoodii***	**__/__/2.2/__/G5T3/S2.2?**
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	__/FE/1B.2./S/G5T2/S2.1
California ayenia	*Ayenia compacta*	E/__/2.3/__/G4/S3.3
Pink fairy duster	*Calliandra eriophylla*	__/__/2.3/__/G5/S2.3
Sand evening-primrose	*Camissonia arenaria*	__/__/2.2/__/G4?/S2
Crucifixion thorn	*Castela emoryi*	__/__/2.3/__/G3/S2.2
Abram's spurge	*Chamaesyce abramsiana*	__/__/2.2/__/G4/S1.2
Arizona spurge	*Chamaesyce arizonica*	SR/__/2.3/__/G5/S1.3
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/S/G3/S1.2?
Las Animas colubrina	***Colubrina californica***	**__/__/2.3/__/G4/S2S3.3**
Spiny abrojo/bitter snakeweed	*Condalia globosa* var. *pubescens*	__/__/4.2/__/G5T3T4/S3. 2
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3.2
Ribbed cryptantha	***Cryptantha costata***	**__/__/4.3/__/G4G5/S3.3**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3/__/G3G4/S3?
Wiggins' cholla	*Cylindropuntia wigginsii (syn=Opuntia wigginsii)*	__/__/3.3/__/G3?Q/S1.2?
Utah vining milkvine	*Cynanchum utahense*	__/__/4.2/__/G4/S3.2
Glandular ditaxis	*Ditaxis claryana*	__/__/2.2/__/G4G5/S1S2
California ditaxis	*Ditaxis serrata* var. *californica*	__/__/3.2/__/G5T2T3/S2. 2
Harwood's eriastrum	***Eriastrum harwoodii***	**__/__/1B.2/__/G2/S2**
California satintail	*Imperata brevifolia*	__/__/2.1__/G2/S2.1
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G4/S3.3
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2/__/G5/S2
Spearleaf	*Matelea parvifolia*	__/__/2.3/__/G5?/S2.2
Argus blazing star	*Mentzelia puberula*	__/__/__/__/__/__
Slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	__/__/2.2/__/G3G4T3?/S2 S3
White-margined penstemon	*Penstemon albomarginatus*	__/_ /1B.1/S/G2/S1
Lobed cherry	*Physalis lobata*	__/__/2.3/__/G5/S1.3
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3
Desert unicorn plant	***Proboscidea althaeifolia***	**__/__/4.3/__/G5/S3.3**
Orocopia sage	*Salvia greatae*	__/__/1B.3./S/G2/S2.2
Desert spikemoss	*Selaginella eremophila*	__/__/2.2./__/G4/S2.2?
Cove's cassia	*Senna covesii*	__/__/2.2/__/G5?/S2.2
Mesquite nest straw	*Stylocline sonorensis*	__/__/1A/__/G3G5/SX

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
Dwarf germander	*Teucrium cubense* ssp. *depressum*	__/__/2.2/__/G4G5T3T4/ S2
Jackass clover	*Wislizenia refracta* ssp. *refracta*	__/__/2.2/__/G5T5?/S1.2 ?
Palmer's jackass clover	*Wislizenia refracta* ssp. *palmeri*	__/__/?/__/__/__
Wildlife		
Reptiles/Amphibians		
Desert tortoise	***Gopherus agassizii***	**ST/FT**
Couch's spadefoot toad	*Scaphiopus couchii*	CSC/__/BLM Sensitive
Mojave fringe-toed lizard	***Uma scoparia***	**CSC/BLM Sensitive**
Desert rosy boa	*Charina (Lichanura) trivirgata*	__/__
Birds		
Western burrowing owl	***Athene cunicularia hypugaea***	**CSC/BCC/BLM Sensitive**
Golden eagle	*Aquila chrysaetos*	CFP/__/BLM Sensitive
Short-eared owl	***Asio flammeus***	**CSC**
Ferruginous hawk	***Buteo regalis***	**WL/BLM Sensitive**
Swainson's hawk	***Buteo swainsoni***	**ST**
Prairie falcon	***Falco mexicanus***	**WL**
American peregrine falcon	*Falco peregrinus anatum*	SFP
Vaux's swift	*Chaetura vauxi*	CSC
Mountain plover	*Charadrius montanus*	CSC/__/BLM Sensitive
Northern harrier	***Circus cyaneus***	**CSC**
Gilded flicker	*Colaptes chrysoides*	SE
Yellow warbler	*Dendroica petechia sonorana*	CSC
California horned lark	***Eremophila alpestris actia***	**WL**
Yellow-breasted chat	*Icteria virens*	CSC
Loggerhead shrike	***Lanius ludovicianus***	**CSC/BCC**
Gila woodpecker	*Melanerpes uropygialis*	SE
Black-tailed gnatcatcher	*Polioptila melanura*	__/__
Purple martin	*Progne subis*	CSC
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC
Brewer's sparrow	***Spizella breweri***	**BCC**
Bendire's thrasher	*Toxostoma bendirei*	CSC/__/BLM Sensitive
Crissal thrasher	*Toxostoma crissale*	CSC
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BCC/Sensitive**
Mammals		
Pallid bat	*Antrozous pallidus*	CSC/__ /BLM Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/BLM Sensitive
Spotted bat	*Euderma maculatum*	CSC/__/ BLM Sensitive
Western mastiff bat	*Eumops perotis californicus*	CSC/__/ BLM Sensitive
Hoary bat	*Lasiurus cinereus*	__/__
California leaf-nosed bat	*Macrotus californicus*	CSC/__/ BLM Sensitive
Arizona myotis	*Myotis occultus*	CSC
Cave myotis	*Myotis velifer*	CSC/__/ BLM Sensitive
Yuma myotis	*Myotis yumanensis*	__/__/BLM Sensitive
Colorado Valley woodrat	*Neotoma albigula venusta*	__/__
Pocket free-tailed bat	*Nyctinomops femorosaccus*	CSC
Big free-tailed bat	*Nyctinomops macrotis*	CSC
Burro deer	***Odocoileus hemionus eremicus***	**__/__/__**

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
Nelson's bighorn sheep	*Ovis canadensis nelson*	__/BLM Sensitive
Yuma mountain lion	*Puma concolor browni*	CSC
American badger	***Taxidea taxus***	**CSC**
Desert kit fox	***Vulpes macrotis arsipus***	**__/__**

Bold type indicates species or their sign as observed during field surveys.
Status Codes:

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE = State listed as endangered
ST = State listed as threatened
CFP = California Fully Protected
WL = State watch list
SR = State-listed rare; Plant species listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901)

California Native Plant Society
List 1B = Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management
BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all Federal Candidate species and Federal Delisted species which were so designated within the last 5 years and CNPS List 1B plant species that occur on BLM lands.
http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.4354 5.File.dat/6840.pdf.

Global Rank/State Rank
Global rank (G-rank) and **State rank (S-rank)** is a reflection of the overall condition of an element throughout its global or **State)** range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values. **State rank (S-rank)** is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical

G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals
G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals
G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals
G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 or S5= Demonstrably widespread, abundant, and secure.

Threat Rank
.1 = very threatened
.2 = threatened
.3 = no current threats known

1.4 Purpose of the Biological Resources Mitigation Implementation and Monitoring Plan

This Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) is a plan to mitigate potential impacts to biological resources from the construction and operation of the Genesis Solar Energy Project. These biological resources include state- and federally listed species, other non-listed special-status species (Table 3), and their habitats. The mitigation measures are intended to minimize or avoid impacts to these species and habitats. The BRMIMP is a CEC Condition of Certification (COC BIO-7) and BLM mitigation measure.

1.5 Applicable Permits

In addition to the CEC License and the BLM Record of Decision, the Project has obtained the following federal and state permits.

1.5.1 Federal

Endangered Species Act (ESA) (16 United States Code [USC] Section 1531 et seq.) Potential take of the desert tortoise, listed as threatened by the U.S. Fish and Wildlife Service (USFWS), requires compliance with the federal ESA (16 USC § 1531 et seq.). "Take" of a federally-listed species is prohibited without an Incidental Take Permit, which was obtained through the Section 7 consultation between BLM and the USFWS. The USFWS issued their Biological Opinion for the Project to BLM on November 2, 2010 (FWS-ERIV-08B0060-10F0878; Appendix B). Project take limits are summarized in Table 4.

Table 4. Desert Tortoise Incidental Take Authorized Under USFWS Biological Opinion

Project Activities		Harassment	Direct Injury/Mortality
Construction – all activities associated with Project construction		Exempt	1 tortoise/year, no overall limit
Operation – all activities associated with Project operations & maintenance		Exempt	1 tortoise/year, no overall limit
Relocation/Translocation	Handling (trapping, capture, and collection of tortoises)	Exempt	0
	Transmittering and Monitoring of Transmittered Tortoises	Exempt[1]	0
	Blood Draw	Exempt	0
Tortoise Habitat Disturbance Acreage		n/a	1,774 acres

[1] Per the terms and conditions of the Biological Opinion (page 36), the Project Owner will notify the FWS if more than 5 tortoises are found within the Project site to determine the need for reinitiating consultation.

1.5.2 State

Under the Warren-Alquist Act (Pub. Res. Code § 25500) the CEC's certificate for thermal power plants 50 MW and more is "in lieu of" other state, local, and regional permits (*Ibid*.). All required terms and conditions that might otherwise be included in state permits have been incorporated into the CEC's certification process. COCs satisfy the following state Laws, Ordinances, Regulations and Standards and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

- **Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.)** The California Endangered Species Act (CESA) prohibits the

"take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the Project could result in the "take" of desert tortoise, listed as threatened under CESA. COC BIO-12 specifies compensatory mitigation for desert tortoise habitat loss at a 1:1 ratio. Avoidance and minimization measures described in COC BIO-6 through BIO-11 and BIO-13 will also mitigate for potential impacts to desert tortoise.

- **Streambed Alteration Agreement: California Fish and Game Code §§ 1600 1607.** Pursuant to these sections, California Department of Fish and Game (CDFG) typically regulates all changes to the natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the Project would result in direct impacts to 69 acres of waters of the state and 21 acres of indirect impacts. COC BIO-22 would minimize and offset direct and indirect impacts to state waters and would assure compliance with CDFG codes that provide protection to these waters.

2.0 INDIVIDUALS RESPONSIBLE FOR BRMIMP IMPLEMENTATION

Protection of biological resources falls under the jurisdiction of several individuals and agencies. Table 5 provides the contact information for the biological resource team, their authority and chain-of-command.

Table 5. Contact Information and Authority for Responsible Individuals

Title	Authority	Reports To	Contact Information
Designated Biologist (DB)	• Oversees Biological Monitors (BMs) • Authorized by USFWS to handle desert tortoise • May require work stoppages to avoid harm to biological resources or for any activity not in compliance with conditions in BRMIMP • Inform Project owner and construction/operation manager when to resume activities • Notify Compliance Project Manager (CPM) and BLM of work stoppages and corrective actions • Notify USFWS and CDFG if stoppage is related to listed species.	CPM and BLM Authorized Officer (AO)	Peggy Goette
DB	Oversees BMs pertaining to botany; work stoppages to avoid harm to botanical resources and ESAs.	CPM and BLM AO	Dr. Alice Karl
Authorized Biologist(s)	Authorized by USFWS to handle desert tortoise; work stoppages to avoid harm to biological resources.	DB	TBD
			TBD
			TBD
			TBD
Biological Monitor (s) (BM)	• Work stoppages to avoid harm to biological resources or for any activity not in compliance with conditions in BRMIMP • Inform Project owner and construction/ operation manager when to resume activities • Act of behalf of DB if DB is unavailable	DB	TBD
			TBD
			TBD
			TBD
			TBD
			TBD

Title	Authority	Reports To	Contact Information
Environmental Compliance Manager (ECM)	Consults with DB, agencies and staff when handling disputes, complaints, and amendments. Assists the DB in scheduling/deploying monitors.	Project Owner	April Magrane 19803 North Creek Parkway Bothell, WA 98011 425-482-7845 April.Magrane@tetratech.com
Construction/ Operation Manager	Authority of construction activities. Consults with DB on work stoppages related to biological resources.	Project Owner DB and BMs[1]	Kevin Dunn TBD
BLM AO	Administrative authority for the right-of-way grant issuance and authority for accepting and approving project-related changes.	---	Holly Roberts Palm Springs South Coast Field Office 1201 Bird Center Drive Palm Springs, CA 92262 760-833-7149 Holly_Roberts@blm.gov
CEC Compliance Project Manager (CPM)	Authority for accepting and approving project-related changes.	---	Chris Davis 1516 Ninth Street Sacramento, CA 95814 916-654-4842 CDavis@energy.state.ca.us
CEC Biologist	Approves (in consultation with CPM): changes to BRMIMP, other Project plans, changes or deviations from COC	---	Amy Golden 1516 Ninth Street Sacramento, CA 95814 916-654-4188 AGolden@energy.state.ca.us
USFWS Biologist	Measures within Biological Opinion; approves various Project plans and changes or deviations from certain COC	---	Tannika Englehard Carlsbad Fish and Wildlife Office 6010 Hidden Valley Road, Suite 101 Carlsbad, CA 92011 760-431-9440, ext. 202 Tannika_Engelhard@fws.gov
BLM Biologist	Approves various Project plans and changes or deviations from certain COC	---	Mark Massar Palm Springs/South Coast Field Office 1201 Bird Center Drive Pal springs, CA 92262 760-833-7121 Mark_Massar@blm.gov
CDFG Biologist	Approves various Project plans and changes or deviations from certain COC	---	Magdadela Rodriguez Inland Deserts Region 3602 Inland Empire Blvd Suite C220 Ontario, CA 91764 909-945-3294 mcrodriguez@dfg.ca.gov

[1] The Project owner's construction/operation manager will act on the advice of the DB and BM(s) to ensure conformance with the biological resources COC.

2.1 Designated Biologist

The CEC, BLM, USFWS, and CDFG have approved Peggy Goette as the Project's DB for Project construction. Peggy Goette meets the requirements set forth in COC BIO-1 (Appendix A). The DB will perform the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring or trenching activities. The DB may be assisted by the approved BM(s) but remains the contact for the Project owner, the CEC's CPM and the BLM AO.

1. Advise the Project owner's Construction and Operation Managers on the implementation of the biological resources COC;
2. Consult on the preparation of the BRMIMP to be submitted by the Project owner;
3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;
4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;
6. Notify the Project owner and the CPM of any non-compliance with any biological resources COC;
7. Respond directly to inquiries of the CPM regarding biological resource issues;
8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records will be submitted in the Monthly Compliance Report (MCR) and the Annual Compliance Report;
9. Train the BMs as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>; and
10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Database (CNDDB).

If the DB needs to be replaced, the name of the replacement and a USFWS Desert Tortoise Authorized Biologist Request Form (www.fws.gov/ventura/speciesinfo/protocols_guidelines) will be submitted to the USFWS, BLM, and the CPM for review and final approval at least 10 working days prior to the termination or release of the preceding DB. In an emergency, the Project owner will immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent DB is proposed to the CPM and for consideration. If actions may affect biological resources during operations, a DB will be available for monitoring and reporting.

During Project operations, a DB will be available for monitoring and reporting if actions may affect biological resources. The DB will submit summaries in the Annual Compliance Report unless his or her duties cease, as approved by the CPM.

2.2 Designated Botanist

Dr. Alice Karl has been selected to be the Project's Designated Botanist for Project construction. Dr. Karl meets the requirements set forth in COC BIO-19 (Appendix A). The Designated Botanist will perform the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring or trenching activities. The Designated

Botanist may be assisted by the BM(s) but remains the contact for the Project owner and the CPM for botany-related issues. The Designated Botanist has the following responsibilities:

1. Oversee compliance with all special-status plant avoidance, minimization, and compensation measures related to botany throughout construction and closure (during operation of the Project, the DB will be responsible for protecting special-status plant occurrences within 100 feet of the Project boundaries).
2. Oversee and train all other BMs tasked with conducting botanical survey and monitoring work.
3. Prior to the start of any ground- or vegetation-disturbing activities, establish Environmentally Sensitive Areas (ESAs) to protect the avoided special-status plants that occur outside of the Project Disturbance Areas and within 100 feet of Project Disturbance Areas.
4. Conduct weekly monitoring of the ESAs during construction and decommissioning activities.
5. Execute and enforce all measures set forth in the Weed Management and Control Plan (Appendix C).
6. Execute and enforce all measures set forth in the Revegetation Plan (Appendix C)

2.3 Biological Monitors

The BMs will be selected by the DB and will have the appropriate education and experience to accomplish the assigned biological resource tasks. The BM is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008).The BMs will assist the DB in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, fencing, grading, boring, trenching and reporting. BMs will be trained by the DB and Designated Botanist and will be familiar with the COCs, BRMIMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures (USFWS 2010).

Prior to pre-construction site mobilization, a BM will be required to monitor all ground-disturbing activities (e.g., geotechnical borings). The DB or BM will be present to monitor any actions that could disturb soil, vegetation, or wildlife.

During construction, BMs are required in areas that have not been fenced with desert tortoise exclusion fencing and cleared, including during fence construction. The DB or a BM will be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and wildlife. The DB or a BM will walk immediately ahead of equipment during brushing and grading activities in unfenced habitat (i.e., outside of the cleared and fenced Plant Site). Additionally, during construction, road killed animals or other carcasses detected by personnel on roads associated with the Project will be reported immediately to the DB or a BM, who will remove the road kill promptly for disposal (e.g., removal to a landfill or disposal at the project site).

At the end of each work day, the DB or a BM will ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations will be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert

tortoise exclusion fencing will be inspected periodically throughout the day, at the end of each workday and at the beginning of each day by the DB or a BM. Should a tortoise or other wildlife become trapped, the DB or BM will remove and relocate the individual as described in the Desert Tortoise Translocation Plan.

2.4 Environmental Compliance Manager

Genesis Solar retains final responsibility for compliance with environmental mitigation measures. Genesis Solar will designate an ECM to ensure compliance with environmental mitigation measures by preparing the WEAP (BIO-6); reviewing daily and periodic reports from onsite monitors; perform regular onsite inspections, and maintain frequent contact with onsite monitors and the Construction Manager. The ECM will communicate directly with the CEC and BLM as requested regarding environmental conditions and mitigation requirements during construction. The ECM will work for the Project owner and ensure that the environmental COC are satisfied, and will act on the advice of the Project biologists to ensure conformance with biological resources mitigation measures. The ECM will assist the Project owner in complying with post-certification changes to the Project design, compliance conditions, or ownership.

2.5 Compliance Project Manager

The CEC's CPM will oversee the compliance monitoring and will be responsible for:

- Ensuring that the design, construction, operation, and closure of the Project facilities are in compliance with the terms and conditions of the CEC decision
- Resolving complaints
- Processing post-certification changes to the COC, project description, and ownership or operational control
- Documenting and tracking compliance filings
- Ensuring that the compliance files are maintained and accessible

The CPM is the contact person for the CEC and will consult with appropriate responsible agencies when handling disputes, complaints, and amendments. All Project compliance submittals are submitted to the CPM for processing. Where a submittal required by a COC requires CPM approval, the approval will involve all appropriate staff and management.

2.6 Authorized Officer

The BLM compliance representative is the AO. The AO is the BLM official with the administrative authority for the right-of-way grant issuance and authority for accepting and approving project related changes.

3.0 PRE-CONSTRUCTION SURVEYS AND REPORTING

Table 6 includes the required pre-construction and construction surveys and the associated reporting requirements. Additional, detailed survey requirements for specific species are addressed in Sections 3.1-3.4. Surveys will be conducted by the DB, Designated Botanist, and/or BMs. Pre-construction survey results will be included in the MCRs that will be sent to the CPM and AO.

Table 6. Pre-construction Surveys and Reporting Requirements

Surveys	Timing	Required Survey Protocol	Survey and Timing Details	Reporting Requirements
Aerial Photography (BIO-7)	Pre-construction and post-construction	N/A	Prior to preconstruction site mobilization/ground disturbance. Second set of photographs to be taken post-construction to verify actual disturbance.	The second set of aerial photographs will be taken subsequent to completion of construction, and will be submitted to the CPM, BLM, USFWS and CDFG no later than 90 days after completion of construction. The Project owner will also provide a final accounting of the acreages of vegetation communities/cover types present before and after construction.
Desert Tortoise Fence Installation (BIO-9)	Pre-construction	USFWS 2009 Appendix D	Within 24-hours prior to initiation of fence construction (prior to onset of site clearing and grubbing).	Record required information for any desert tortoises handled and include in MCR.
Desert Tortoise Clearance Surveys (BIO-9)	Pre-construction	USFWS 2009 Appendix D	Following construction of the tortoise exclusion fence. Clearance surveys of the power plant site may only be conducted when tortoises are most active (April through May or September through October). Surveys outside these time periods require approval by USFWS and CDFG.	Within 30 days after completion of desert tortoise clearance surveys the DB will submit a report to the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above. The report will include the desert tortoise survey results, capture and release locations of any translocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.
Weeds (BIO-14)	Pre-construction, construction, and post-construction	See Weed Management Plan Appendix C	Pre-construction to determine baseline conditions.	No less than 10 days prior to start of any Project-related ground disturbance, the Project owner will provide the CPM with the final version of a Weed Management Plan that has been reviewed and approved by CEC staff, USFWS, and CDFG.
Nesting Birds (other than Burrowing Owl) (BIO-15 BIO-8)	Pre-construction and construction (during nesting season only: February 1 – July 31)	Martin and Geupel (1993) Appendix D	Pre-construction surveys for bird species other than burrowing owls will be conducted if construction activities occur between February 1 and July 31. Two pre-construction surveys conducted, separated by a minimum 10-day interval. One survey must be conducted within the 7-day period preceding initiation of construction activity. Follow-up surveys may be required if periods of construction inactivity exceed three weeks. See Section 3.2 for additional requirements. During construction, additional surveys required February 1 – April 15 if loud (>65dBA) construction activities are proposed for this time period.	Prior to the start of any Project-related ground disturbance activities, the Project owner will provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor (s); and a list of species observed. If active nests are detected during the survey, the report will include a map or aerial photo identifying the location of the nest and will depict the boundaries of the no-disturbance buffer zone around the nest(s) that would be avoided during Project construction. If survey identifies nesting birds, submit survey results to CPM, and Nesting Bird Monitoring and Management Plan to CPM no more than 7 days before initiating loud construction activities.
Desert Kit Fox and American Badger (BIO-17)	Pre-construction	See desert tortoise protocol	Biological Monitors will perform pre-construction surveys for badger and kit fox dens in the Project Area, including areas within 90 feet of all Project facilities, utility corridors, and access roads. Surveys may be concurrent with desert tortoise surveys. If dens are detected each den will be classified as inactive, potentially active, or definitely active. Monitor potentially and definitely active dens for three consecutive nights. See Section 3.3 for additional requirements.	The Project owner will submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report will describe survey methods, results, impact avoidance and minimization measures implemented, and the results of those measures.

Surveys	Timing	Required Survey Protocol	Survey and Timing Details	Reporting Requirements
Burrowing Owl (BIO-18)	Pre-construction	CBOC (1993) Appendix D	The Designated Biologist or Biological Monitor will conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys will be focused exclusively on detecting burrowing owls, and will be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area will include the Project Disturbance Area and surrounding 500 foot survey buffer.	If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist will provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities.
				If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner will notify the CPM, BLM, CDFG, and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary.
				Within 30 days of completion of the burrowing owl pre-construction surveys, if owls are detected, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.
Special-status Plants/ Identification of ESAs (BIO-19, Section A)	Pre-construction	N/A	Prior to the start of any ground- or vegetation-disturbing activities, the Designated Botanist will establish ESAs to protect avoided special-status plants that occur outside of the Project Disturbance Areas and within 100 feet of Project Disturbance Areas. This includes plant occurrences identified during the Spring 2009-2010 surveys.	No less than 30 days prior to construction-related ground-disturbance activities the Project owner will submit to the CPM a final agency-approved Revegetation Plan that has been reviewed and approved by the CPM.
Vegetation (for Revegetation Plan) (BIO-24)	Pre-construction and post-construction	See Revegetation Plan Appendix C	Prior to ground disturbance to determine baseline conditions.	No less than 30 days prior to construction-related ground-disturbance activities the Project owner will submit to the CPM a final agency-approved Revegetation Plan that has been reviewed and approved by the CPM.
Couch's Spadefoot Toad (BIO-27)	Pre-construction	See Couch's Spadefoot Toad Plan Appendix C	Prior to ground disturbance.	No less than 30 days prior to construction-related ground-disturbance the Project owner will submit to the CPM and CDFG a final Couch's Spadefoot Toad Protection and Mitigation Plan.
Golden Eagles (BIO-28)	Construction	Pagel et. al (2010) Appendix D	Conduct inventory within one mile of Project Disturbance Area each calendar year during construction.	No fewer than 30 days from completion of the golden eagle inventory the Project owner will submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory. If an occupied nest is detected within one mile of the Project boundary 1) contact USFWS and CDFG within one working day of detection, 2) produce a Golden Eagle Monitoring and Management Plan within 30 days of detection of the nest.

3.1 Desert Tortoise Clearance

During clearance surveys, all desert tortoise burrows and burrows constructed by other species that might be used by desert tortoises, will be examined by the DB, or a BM under the direction of the DB, to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS 2009 Desert Tortoise Field Manual. To prevent reentry by a tortoise or other wildlife, all burrows will be collapsed once absence has been determined, in accordance with the Desert Tortoise Translocation Plan. Tortoises moved from burrows and from elsewhere on

the Project Area will be relocated or translocated as described in the Desert Tortoise Translocation Plan (Appendix C).

3.2 Nesting Birds

Pre-construction nest surveys for bird species other than burrowing owls will be conducted if construction activities would occur at any time during the period of February 1 through July 31. The DB or BM conducting the surveys will be experienced bird surveyors familiar with standard nest-locating techniques such as those described in Martin and Geupel (1993). The goal of the nesting surveys will be to identify the general location of the nest sites, sufficient to establish a protective buffer zone around the potential nest site, and need not include identification of the precise nest locations. Surveyors performing nest surveys will not concurrently be conducting desert tortoise surveys. The bird surveyors will perform surveys in accordance with the following guidelines:

1. Surveys will cover all potential nesting habitat in the Project site or within 500 feet of the boundaries of the site (including linear facilities);
2. At least two pre-construction surveys will be conducted, separated by a minimum 10-day interval. One of the surveys will be conducted within the 7-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3.3 Desert Kit Fox and American Badger

Inactive kit fox and badger dens and burrows that would be directly impacted by construction activities will be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially and definitely active dens that would be directly impacted by construction activities will be monitored by the DB or a BM for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den will be excavated and backfilled by hand. If tracks are observed, and especially if high or low ambient temperatures could potentially result in harm to kit fox or badger from burrow exclusion, various passive hazing methods may be used to discourage occupants from continued use. After verification that the den is unoccupied it will then be excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den. In the event that passive relocation techniques fail for badgers, the DB will contact CDFG to explore other relocation options, which may include trapping.

3.4 Golden Eagles

Data collected during the annual golden eagle inventory within one mile of the Project will include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location, nest elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed. A nesting territory or inventoried habitat will be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season.

4.0 WORKER ENVIRONMENTAL AWARENESS PROGRAM

Genesis Solar has developed a Project-specific WEAP for implementation during construction and operations. The WEAP will be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, and subcontractors. The WEAP will be implemented during site preconstruction, construction, operation, and closure. The WEAP will be submitted as a separate document and approved by the CEC and BLM and reviewed by USFWS and CDFG prior to construction-related ground disturbance.

5.0 AVOIDANCE AND MINIMIZATION MEASURES

This Section outlines the avoidance and minimization measures required to avoid and/or minimize impacts to special-status species and their environments. Specific avoidance requirements and buffers are summarized in Table 7. Additionally, many separate management plans have been produced to supplement these measures. These plans are attached to this document and referenced throughout.

Table 7. Species-specific Measures and Avoidance Requirements

Biological Resource	Avoidance/Buffer Requirement	Separate Management Plan
Desert tortoise or tortoise burrow	Discretion of the DB or BM. Tortoises will be left to move on their own. If it does not move within 15 minutes, the DB, an Authorized Biologist, or a BM under the direct supervision of an Authorized Biologist may move it out of harm's way.	Desert Tortoise Translocation Plan Appendix C; Section 5.3.1
Burrowing Owl	February 1 – August 31: 250-foot radius around occupied burrows September 1 – January 31: 160 ft radius around occupied burrows	Burrowing Owl Relocation and Mitigation Plan Appendix C
Nesting Birds (loud construction activities)	February 1 – April 15: No loud construction activities (e.g., unsilenced high pressure steam blowing and pile driving, or other) when it would result in noise levels over 65 decibels, A scale (dBA) in nesting habitat (excludes noise from passing vehicles). If nesting birds are present, buffer distances vary (determined based on the species specific alert distance and flush initiation distance), see Nesting Bird Monitoring and Management Plan.	Nesting Bird Monitoring and Management Plan Appendix C
Drainages	Spoil sites will be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.	N/A (see Section 5.4)
	No equipment maintenance will occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.	
	No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature will be allowed to enter into, or placed where it may be washed by rainfall or runoff into waters of the state.	
ESAs	ESA boundaries: minimum 20 feet from uphill side of occurrence; 10 feet from downhill side. Where this is not possible due to construction constraints, other protection measures, such as silt-fencing and sediment controls, may be employed to protect the occurrences.	N/A (see Section 5.2)
	Spoils, equipment, vehicles, and materials storage areas; parking; equipment and vehicle maintenance areas, and wash areas will be placed at least 100 feet from any ESAs.	
	Special-status plant occurrences within 100 feet of the Project Disturbance Area will be protected from herbicide and soil stabilizer drift.	

Biological Resource	Avoidance/Buffer Requirement	Separate Management Plan
Weeds	Avoid chemical drift or residual toxicity to special-status plants consistent with guidelines such as those provided by the Nature Conservancy's The Global Invasive Species Team, the U.S. Environmental Protection Agency, and the Pesticide Action Network Database.	Weed Management Plan Appendix C
Couch's Spadefoot Toad Breeding Habitat	Borrow Pit south of I-10 – Complete avoidance with 50 ft minimum buffer between habitat and construction.	Couch's Spadefoot Toad Protection Plan Appendix C

5.1 Best Management Practices

As required by COC BIO-8, the Project owner will undertake the following measures to manage the Project site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Disturbance Areas. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) will be delineated with stakes and flagging prior to construction activities in consultation with the DB. Spoils and topsoil will be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations will similarly be located in areas without native vegetation or special-status species habitat. All disturbances, Project vehicles and equipment will be confined to the flagged areas.
2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements will not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.
3. Minimize Traffic Impacts. Vehicular traffic during Project construction and operation will be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas will be prohibited. The speed limit will not exceed 25 miles per hour on all dirt roads and 45 miles per hour on all paved roads. Signs will be established at appropriate locations (for example, at Arizona crossings of drainages) to remind drivers to be aware of the potential for desert tortoise and other wildlife occurring on the roadways.
4. Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, including during fence construction, the DB or a BM will be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and wildlife. The DB or BM will walk immediately ahead of equipment during brushing and grading activities in unfenced habitat (i.e., outside of the cleared and fenced Plant Site).
5. Minimize Impacts of Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the Plant Site will be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the Plant Site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas will be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources.
6. Implement Avian Power Line Interaction Committee (APLIC) Guidelines. Transmission lines, fiber optic lines, and all electrical components will be designed,

installed, and maintained in accordance with the APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 1994) and Mitigating Bird Collisions with Power Lines (APLIC 2006) to reduce the likelihood of large bird electrocutions and collisions.

7. Avoid Use of Toxic Substances. Soil bonding and weighting agents used on unpaved surfaces will be non-toxic to wildlife and plants.
8. Minimize Lighting Impacts. Facility lighting will be designed, installed, and maintained to prevent side casting of light towards wildlife habitat. Lighting will be kept to the minimum level for safety and security needs by using motion or infrared light sensors and switches to keep lights off when not required, and shielding operational lights downward to minimize skyward illumination. No high intensity, steady burning, bright lights such as sodium vapor or spotlights will be used. Federal Aviation Administration visibility lighting will employ only strobed, strobe-like or blinking incandescent lights, preferably with all lights illuminating simultaneously. Minimum intensity, maximum "off-phased" duel strobes are preferred, and no steady burning lights (e.g., L- 810s) will be used.
9. Minimize Noise Impacts. A continuous low-pressure technique will be used for steam blows, to the extent possible, in order to reduce noise levels in sensitive habitat proximate to the Genesis Project. Loud construction activities (e.g., unsilenced high pressure steam blowing and pile driving, or other) will be avoided from February 15 to April 15 when it would result in noise levels over 65 dBA in nesting habitat (excluding noise from passing vehicles). Loud construction activities may be permitted from February 15 to April 15 only if:
    a. the DB provides documentation (i.e., nesting bird data collected using methods described in BIO-15 and maps depicting location of the nest survey area in relation to noisy construction) to the CPM indicating that no active nests would be subject to 65 dBA noise, OR
    b. the DB or BM monitors active nests within the range of construction-related noise exceeding 65 dBA. The monitoring will be conducted in accordance with Nesting Bird Monitoring and Management Plan approved by the CPM. The Plan will include adaptive management measures to prevent disturbance to nesting birds from construction related noise. Triggers for adaptive management will be evidence of Project-related disturbance to nesting birds such as: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Bird Monitoring and Management Plan will include a description of adaptive management actions, which will include, but not be limited to, cessation of construction activities that are deemed by the DB to be the source of disturbance to the nesting bird.
10. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage will occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area will be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it will be left to move on its own. If it does not move within 15 minutes, a DB or BM under the DB's direct supervision may move it out of harm's way of the disturbed area as described in the *USFWS Desert Tortoise Field Manual* (USFWS 2009).
11. Avoid Wildlife Pitfalls: To avoid trapping desert tortoise and other wildlife in trenches, pipes or culverts, the following measures will be implemented:

a. Backfill Trenches. At the end of each work day, the DB will ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations will be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing will be inspected periodically throughout the day, at the end of each workday and at the beginning of each day by the DB or a BM. Should a tortoise or other wildlife become trapped, the DB or BM will remove and relocate the individual as described in the Desert Tortoise Translocation Plan. Any wildlife encountered during the course of construction will be allowed to leave the construction area unharmed.

b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, will be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on elevated pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

12. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement will use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises and common ravens to construction sites. A BM will patrol these areas to ensure water does not puddle and will take appropriate action to reduce water application where necessary.

13. Dispose of Road-killed Animals. During construction, road killed animals or other carcasses detected by personnel on roads associated with the Project Area will be reported immediately to the DB or a BM, who will remove the road kill promptly for disposal (e.g., removal to a landfill or disposal at the Project site). During operations, the Project ECM will be notified of any road kills and promptly remove and dispose of any road kills. For special-status species road-kill, the BM will contact the Ontario Office of CDFG and the Carlsbad Office of USFWS within 1 working day of detection of the carcass for guidance on disposal or storage of the carcass. The BM will report the special-status species record as described in Section 6.2.

14. Minimize Spills of Hazardous Materials. All vehicles and equipment will be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The DB will be informed of any hazardous spills immediately as directed in the Project Hazardous Materials Plan. Hazardous spills will be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment will take place only at a designated area. Service/maintenance vehicles will carry a bucket and pads to absorb leaks or spills.

15. Worker Guidelines. During construction all trash and food related waste will be placed in self-closing containers and removed daily from the site. Workers will not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site will bring firearms or weapons. Vehicular traffic will be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas will be prohibited. The

speed limit when traveling on dirt access routes within desert tortoise habitat will not exceed 25 miles per hour.

16. Implement Erosion Control Measures. Standard erosion control measures will be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter "Waters of the State". Sediment and other flow-restricting materials will be moved to a location where they will not be washed back into the stream. All disturbed soils and roads within the Project site will be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward drainages will be stabilized to reduce erosion potential.
17. Monitor Ground Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous waste evaluations, a DB or BM will be present to monitor any actions that could disturb soil, vegetation, or wildlife.

5.2 Special-status Plants

To protect all special-status plants[1] located outside of the Project Disturbance Area and within 100 feet of the permitted Project Disturbance Area from accidental and indirect impacts during construction, operation, and closure, the Project owner will implement the following measures:

1. Designated Botanist. An experienced botanist who is knowledgeable in the complex biology of the local flora will oversee compliance with all special-status plant avoidance, minimization, and compensation measures described in this condition throughout construction and closure. The DB will oversee and train all other BMs tasked with conducting botanical survey and monitoring work. During operation of the Project, the DB will be responsible for protecting special-status plant occurrences within 100 feet of the Project boundaries.
2. Special-Status Plant Impact Avoidance and Minimization Measures. The following measures will be implemented to protect special-status plant in close proximity to the site:
   a. Site Design Modifications: Incorporate site design modifications to minimize impacts to special-status plants along the Project linears: limiting the width of the work area; adjusting the location of staging areas, lay downs, spur roads and poles or towers; driving and crushing vegetation as an alternative to blading temporary roads to preserve the seed bank, and minor adjustments to the alignment of the roads and pipelines within the constraints of the right-of-way. Design the engineered channel discharge points to maintain the natural surface drainage patterns between the engineered channel and the outlet of the natural washes that flow toward the south and east, downstream of the Project These modifications will be clearly depicted on the grading and construction plans, and on report-sized maps in the BRMIMP.
   b. Establish ESAs. Prior to the start of any ground- or vegetation-disturbing activities, the Designated Botanist will establish ESAs to protect avoided special-status plants that occur outside of the Project Disturbance Areas and within 100 feet of Project Disturbance Areas. This includes plant occurrences identified during the spring 2009-2010 surveys and the late season 2010 surveys. The

[1] Special-status plants are those described in *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (California Natural Resources Agency, Department of Fish and Game, issued November 24, 2009).

locations of ESAs will be clearly depicted on construction drawings, which will also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs will be placed a minimum of 20 feet from the uphill side of the occurrence and 10 feet from the downhill side. Where this is not possible due to construction constraints, other protection measures, such as silt-fencing and sediment controls, may be employed to protect the occurrences. Equipment and vehicle maintenance areas, and wash areas, will be located 100 feet from the uphill side of any ESAs. ESAs will be clearly delineated in the field with temporary construction fencing and signs prohibiting movement of the fencing or sediment controls under penalty of work stoppages and additional compensatory mitigation. ESAs will also be clearly identified (with signage or by mapping on site plans) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.

c. Special-Status Plant WEAP. The WEAP will include training components specific to protection of special-status plants.
d. Herbicide and Soil Stabilizer Drift Control Measures. Special status plant occurrences within 100 feet of the Project Disturbance Area will be protected from herbicide and soil stabilizer drift. The Weed Management Plan (Appendix C) will include measures to avoid chemical drift or residual toxicity to special-status plants consistent with guidelines such as those provided by the Nature Conservancy's *The Global Invasive Species Team* (Hillmer and Liedtke 2003), the U.S. Environmental Protection Agency, and the Pesticide Action Network Database (Kegley et al. 2010).
e. Erosion and Sediment Control Measures. Erosion and sediment control measures will not inadvertently impact special-status plants (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.).
f. Avoid Special-Status Plant Occurrences. Areas for spoils, equipment, vehicles, and materials storage areas; parking; equipment and vehicle maintenance areas, and wash areas will be placed at least 100 feet from any ESAs.
g. Monitoring and Reporting Requirements. The Designated Botanist will conduct weekly monitoring of the ESAs that protect special-status plant occurrences during construction and decommissioning activities.

5.3 Species-Specific Measures

In addition to the general best management practices (BMPs) detailed above, the following sections provide additional detail for species-specific avoidance and minimization requirements that are not provided in Table 7, above.

5.3.1 Desert Tortoise

The Project owner will undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys (see Section 3.1), fence specification and installation, tortoise handling, artificial burrow construction, egg handling and other procedures will be consistent with those described in the USFWS' 2009 Desert Tortoise Field Manual <http://www.fws.gov/ventura/speciesinfo/protocols_guidelines> or more current formal guidance provided by CDFG and USFWS. The Project owner will also implement all terms and conditions described in the Biological Opinion prepared by USFWS.

Desert Tortoise Fencing

Per the Applicant's Desert Tortoise Translocation Plan, in order to avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing will be installed along the permanent perimeter security fence; along the utility corridors, temporary desert tortoise exclusion fencing or monitoring will be used to protect desert tortoises during construction. The proposed alignments for the permanent perimeter fence and utility rights-of-way fencing will be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility rights-of-way alignments will be conducted by the DB(s) using techniques outlined in the USFWS 2009 *Desert Tortoise Field Manual* and may be conducted in any season with USFWS and CDFG approval. BMs may assist the DB under his or her supervision. These fence clearance surveys will provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect will cover an area approximately 90 feet wide centered on the fence alignment. Transects will be no greater than 15 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, will be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS 2009 *Desert Tortoise Field Manual*. Any desert tortoise located during fence clearance surveys will be handled by the DB or BMs authorized by the USFWS to handle tortoises in accordance with the Desert Tortoise Translocation Plan (Appendix C). The Project owner will adhere to the following:

1. Timing, Supervision of Fence Installation. The exclusion fencing will be installed prior to the onset of site clearing and grubbing. The fence installation will be supervised by the DB and monitored by the BMs to ensure the safety of any tortoise present.
2. Fence Material and Installation. The permanent tortoise exclusionary fencing will be constructed in accordance with the USFWS 2009 *Desert Tortoise Field Manual* (Chapter 8 – Desert Tortoise Exclusion Fence).
3. Security Gates. Security gates will be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time.
4. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing will be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing will be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing will be inspected monthly and during and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing will be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing will occur for the life of the Project. Temporary fencing will be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing will be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the DB will inspect the area for tortoise.

5.3.2 Couch's Spadefoot Toad

The Project will avoid the known Couch's spadefoot toad breeding habitat south of I-10 in the borrow pit that spans Wiley's Well Road (Figure 3 in Appendix C). Specific avoidance and minimization measures for Couch's spadefoot toad and their breeding habitat are located within the Couch's Spadefoot Toad Protection and Mitigation Plan (Appendix C).

5.3.3 Burrowing Owl

If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area, burrowing owls will be passively relocated per the Burrowing Owl Relocation and Mitigation Plan (Appendix C).

5.3.4 Nesting Birds

If active nests are detected during the pre-construction survey, and noisy (>65dBA) construction activities will take place near the nest, birds will be monitored as per the Nesting Bird Monitoring and Management Plan (Appendix C). The size of the buffer zone will be developed in consultation with CDFG. The DB or a BM will monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the DB, disturb nesting activities, will be prohibited within the buffer zone until such a determination is made.

5.3.5 Golden Eagle

If an occupied nest is detected within one mile of the Project boundaries during construction, the Project owner will prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles. The likelihood that golden eagle nests will be detected within one mile of the Project boundaries is extremely low; therefore, a Golden Eagle Monitoring and Management Plan will be produced only if necessary. Appendix C is included as a placeholder for this plan, should it be necessary.

5.3.6 Common Raven

Common raven monitoring and management will be conducted according to the Common Raven Monitoring, Management, and Control Plan (Appendix C).

5.4 Jurisdictional Drainages

The following best management practices will be implemented to protect drainages near the Project Disturbance Area:

a. Minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.
b. Water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities will not be allowed to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.
c. Comply with all litter and pollution laws. All contractors, subcontractors, and employees will also obey these laws, and it will be the responsibility of the Project owner to ensure compliance.

d. Spoil sites will be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.

e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, will be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage, will be removed immediately.

f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature will be allowed to enter into, or placed where it may be washed by rainfall or runoff into waters of the state.

g. When operations are completed, any excess materials or debris will be removed from the work area.

h. No equipment maintenance within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

6.0 CONSTRUCTION MONITORING AND REPORTING

6.1 Biological Monitoring during Construction

The details of DB, Designated Botanist, and BM will be responsible for enforcing the avoidance and minimization measures in this BRMIMP; specific duties are found in Section 2.0. The DB and BMs will keep a daily record of observations and daily monitoring activities using the data sheet in Appendix D. All encounters with federally or state-listed species will be reported to the DB, who will compile the following information for the MCR:

- Species, date, time of encounter, and weather conditions;
- Location (global positioning system coordinates, narrative, and maps);
- Behavior;
- General condition and health, including injuries and state of healing;
- Gender, size, diagnostic markings, including identification numbers or markers; and
- Description of translocation activities, such as location (global positioning system coordinates, narrative, and maps), burrow or site description to, date, time, weather, tortoise behavior, translocation methods.
- For tortoises, each individual will be thoroughly photographed. If permitted by USFWS and CDFG, a small, temporary identification number will be drawn on the tortoise in liquid paper or other water-soluble light paint for further documentation of individual tortoise encounters and activities.
- Observations of all listed species or species of special concern will be reported to the CDFG Natural Diversity Data Base within 10 days of sighting.

6.2 Wildlife Reporting Requirements

Observations of special-status species made during pre-construction surveys and daily construction monitoring activities will be recorded on data forms (Appendix E).

6.2.1 Special-status Species Observation

The DB will submit any sightings of any special-status species that are observed on or in proximity to the Project site, or during Project surveys, to the CNDDB per CDFG requirements.

6.2.2 Dead or Injured Listed Species

If an injured or dead listed species, including road-kills, is detected within or near the Project Disturbance Area the CPM, the Ontario Office CDFG, and the Carlsbad Office USFWS will be notified immediately by phone. Notification will occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication will be submitted to these agencies.

6.3 Monthly Compliance Reports

During construction, implementation of the avoidance and minimization measures in the BRMIMP will be reported in the MCR to the CPM by the DB. The MCRs will include copies of all written reports and summaries that document biological resources compliance activities (Table 8). In addition to the BM reports (Section 6.1), the MCR will include the following:

Table 8. Required Information Pertaining to Biological Resources for the Monthly Compliance Report

Condition		Information to be included
BIO-2	Designated Biologist Duties	Summaries of written records of the tasks specified in BIO-2 (Designated Biologist Duties) and those included in the BRMIMP.
		Copies of all written reports and summaries that document biological resource compliance activities.
BIO-4	Biological Monitor Duties	Copies of all written reports and summaries that document biological resource compliance activities conducted by Biological Monitors.
BIO-6	WEAP	Number of persons who have completed the WEAP training in the prior month and a running total of all persons who have completed the training to date.
BIO-7 BIO-8	BRMIMP	Implementation of BRMIMP measures (for example, construction activities that were monitored, species observed).
BIO-9	Desert Tortoise Clearance Surveys and Fencing	Implementation of desert tortoise measures pertaining to clearance surveys and fencing.
BIO-11	Desert Tortoise Compliance Verification	Beginning with the first month after clearing, grubbing, and grading are completed and continuing every month until construction is complete, submit the results of the monthly compliance inspections. This portion of the MCR will be submitted BLM, USFWS, and CDFG as well as the CPM.
BIO-18	Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures	Implementation of burrowing owl avoidance and minimization measures.
BIO-19, Section A	Special-Status Plants	Implementation of the special-status plant impact avoidance and minimization measures (as executed by the Designated Botanist).

6.4 Non-compliance Resolution

The DB or BM will notify the CPM and BLM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, or operation activities related to biological resources. If the non-compliance or halt to construction or operation relates to desert tortoise or any other federally or state-listed species, the Project owner will also notify the Carlsbad Office of USFWS and the Ontario Office of the CDFG at the same time. The Project owner will notify the CPM and BLM of the circumstances and actions being taken to resolve the problem.

Resolution of non-compliance issues will require the cooperation of the DB and/or Designated Botanist, CPM, ECM, and Crew Foreman. Through this cooperative effort, all involved parties would become aware of the issues, remediation measures, and reasons for future avoidance of similar and related noncompliance issues.

7.0 COMPENSATORY MITIGATION

Several of the conditions of approval include compensatory mitigation measures associated with the conservation of the following key resources: desert tortoise habitat, common raven, burrowing owl, sand dunes/Mojave fringe-toed lizard, and jurisdictional waters. Table 9 illustrates the recommended mitigation acreage calculations and Table 10 lists the total estimated acreage for compensation, cost, and verification information for each resource.

Table 9. Mitigation Acreage Calculations

Resource	Acres Impacted	Mitigation Ratio	Recommended Mitigation Acreage
1) Desert Tortoise Habitat – Direct Impacts			
Within Desert Wildlife Management Area/Critical Habitat	24	5:1	120
Outside Critical Habitat	1,750	1:1	1,750
Total Desert Tortoise Mitigation			**1,870**
2) Stabilized/Partially Stabilized Sand Dunes – Direct Impacts			
Direct Impacts	7.5	3:1	22
3) Playa and Sand Drifts Over Playa			
Direct Impacts	38	3:1	114
Total Mojave Fringe-toed Lizard Mitigation			**136**
4a) State Waters – Direct Impacts			
Microphyllous Riparian Vegetation	16	3:1	48
Unvegetated Ephemeral Dry Wash	53	1:1	53
4b) State Waters – Indirect Impacts			
Unvegetated Ephemeral Dry Wash	21	0.5:1	10
Total State Waters Mitigation			**111**

In accordance with the applicable COC (in particular BIO 12, 13, 18, 20, 22 and 29 and the USFWS Biological Opinion), the Project Owner will ensure that compensatory mitigation requirements are met by directly acquiring/managing mitigation land, contracting with an approved third party to acquire/manage mitigation land, depositing specified funds into the mitigation account established by the Renewable Energy Action Team (REAT), and/or depositing specified funds into an approved in-lieu fee account.

Table 10. Compensatory Mitigation Requirements, Schedule, and Verification

Biological Resource (COC)	Estimated Acreage for Compensation	Cost	Schedule/Verification	Notes
Desert Tortoise (BIO-12)	**1,870** 24 acres at 5:1 1750 acres at 1:1	$4,263,600	• The Project owner will provide the CPM with written notice at least 30 days prior to the start of ground-disturbing activities on the Project site. • If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner will provide the CPM with approved Security at least 30 days prior to the start of Project ground-disturbing activities. • No later than 12 months after the start of ground-disturbing Project activities, the Project owner will submit a formal acquisition proposal to the CPM and will obtain approval from the CPM prior to the acquisition. • The Project owner or an approved third party will complete the acquisition and all required transfers of the compensation lands, and provide written verification no later than 18 months after the start of Project ground-disturbing activities. • The Project owner will complete and submit to the CPM a Property Analysis Record (PAR) or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition. • The Project owner will fully fund the required amount for long-term maintenance and management of the compensation lands no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. • No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands, the Project owner will make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. • Initial protection and habitat improvement activities on the compensation lands will be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands. • The Project owner will provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands within 180 days of the land or easement purchase, as determined by the date on the title. • Within 90 days after completion of all Project related ground disturbance, the Project owner will provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction.	Cost is based on 1,870 acres of desert tortoise habitat (will be adjusted to reflect the final Project footprint). See BIO-29 for another option for satisfying some or all of BIO-12 requirements.

Biological Resource (COC)	Estimated Acreage for Compensation	Cost	Schedule/Verification	Notes
Common Raven (BIO-13)	1,754	$184,170	• No less than 30 days prior to any construction-related ground disturbance activities, the Project owner will provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. • Within 30 days after completion of Project construction, the Project owner will provide to the CPM for review and approval, a written report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding. • No less than 10 days prior to the start of any Project-related ground disturbance activities, the Project owner will provide documentation to the CPM.	One-time payment of $105 per acre of permanent disturbance to REAT Account.
Burrowing Owl (BIO-18)	39	$143,045	• If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the DB will provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. • The Project owner will report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. • Within 30 days after completion of construction the Project owner will provide to the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed. • The Project owner will do all of the following if relocation of one or more burrowing owls is required: – No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, will submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner will submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS. – Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner will provide the CPM with a management plan for review and approval, in consultation with CDFG, BLM and USFWS, for the compensation lands and associated funds. – No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner will provide written verification of Security in accordance with this COC. – No later than 18 months after the start of construction-related ground disturbance activities, the Project owner will provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded.	Final amount due will be determined by PAR analysis pursuant to BIO-12. Anticipated displacement of two owls for a total of 39 acres of mitigation land (to be revised as appropriate). Amount may change based on land costs or the estimated costs of enhancement and endowment. 39 acres will be used as a placeholder for security.

Biological Resource (COC)	Estimated Acreage for Compensation	Cost	Schedule/Verification	Notes
Sand Dunes/Mojave Fringe-Toed Lizard (BIO-20)	136	$422,668	• No later than 30 days prior to beginning construction-related ground-disturbing activities, the Project owner will provide written verification of Security. The Project owner will complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities. • The Project owner will provide the CPM, CDFG and USFWS with a management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. • No less than 90 days prior to acquisition of the property, the Project owner will submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcels intended for purchase. At the same time the Project owner will submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM. • Within 90 days after completion of Project construction, the Project owner will provide to the CPM and CDFG an analysis with the final accounting of the amount of Mojave fringe-toed lizard habitat disturbed during Project construction. • The Project owner will provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the initiation of construction related ground-disturbance activities.	Amount may change based on land costs or the estimated costs of enhancement and endowment.
Off-Site State Waters (BIO-22)	111 (of which at least 48 acres are microphyll woodland)	$342,768	• No less than 30 days prior to beginning construction-related ground-disturbing activities the Project owner will provide written verification of Security. • The Project owner will complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities. • The Project owner will provide the CPM, CDFG and USFWS with a draft management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. • Within 90 days after completion of Project construction, the Project owner will provide to the CPM and CDFG an analysis with the final accounting of the amount of jurisdictional state waters disturbed during Project construction. The Project owner will provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the start of construction-related ground-disturbing activities. • On January 31st of each year following construction the DB will provide a report to the CPM, BLM, USFWS and CDFG that describes the results of monitoring and management of the acquisition lands.	Parcel(s) of land that include at least 111 acres of state jurisdictional waters or area of state waters directly or indirectly impacted by the final Project footprint and will include at least 48 acres of microphyll woodland. May be integrated with desert tortoise mitigation acquisition if the criteria described in this condition are met. The final amount due will be determined by an updated appraisals and the PAR analysis conducted as described in BIO-12.

8.0 POST-CONSTRUCTION ACTIVITIES

The following sections provide details of post-construction requirements.

8.1 Construction Termination Report

Within 30 days after completion of Project construction, the Project owner will provide to the CPM, for review and approval, a written construction termination report identifying how mitigation measures have been completed.

8.2 Final Listed Species Mitigation Report

No later than 45 days after initiation of Project operation the DB will provide the CPM a Final Listed Species Mitigation Report that includes, at a minimum:

1. A copy of the mitigation implementation matrix in the BRMIMP with notes showing when each of the mitigation measures was implemented
2. All available information about Project-related incidental take of listed species
3. Information about other Project impacts on the listed species
4. Construction dates
5. An assessment of the effectiveness of COC in minimizing and compensating for Project impacts
6. Recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future Projects on the listed species
7. Any other pertinent information, including the level of take of the listed species associated with the Project.

8.3 Post-Construction Disturbance Calculation

The Project owner will submit pre-and post-construction aerial photographs of the Project Disturbance area to ensure that the extent of construction disturbance does not exceed 1,819.5 acres (Table 11). After construction is complete, the total acreage disturbed during construction will be calculated by comparing the pre-construction aerial photographs to the post-construction aerial photographs. Within 90 days of construction completion, Genesis Solar will submit a final report of actual disturbance to the CEC, BLM, CDFG, and USFWS for review and approval. The report will include a final accounting of the acreages of vegetation communities/cover types present before and after construction compared to the calculations estimated in the CEC License and BLM Record of Decision (Table 12).

If post-construction disturbance calculations show that the actual acreage of disturbance is less than the estimated amount, the Project Owner would be eligible for a refund. If the actual acreage of disturbance is over the estimated amount, the Project Owner would be responsible for mitigating for the additional acreage. The amount of the refund or additional mitigation would be based on the difference in acreage of disturbance.

Table 11. Acreage of Direct and Indirect Impacts to Biological Resources

Resource	Acres Impacted
1) Desert Tortoise Habitat – Direct Impacts	
Within Desert Wildlife Management Area/Critical Habitat	24
Outside Critical Habitat	1,750
Total Desert Tortoise Mitigation	
2) Stabilized/Partially Stabilized Sand Dunes – Direct Impacts	
Direct Impacts	7.5
3) Playa and Sand Drifts Over Playa	
Direct Impacts	38
Total Mojave Fringe-toed Lizard Mitigation	
4a) State Waters – Direct Impacts	
Microphyllous Riparian Vegetation	16
Unvegetated Ephemeral Dry Wash	53
4b) State Waters – Indirect Impacts	
Unvegetated Ephemeral Dry Wash	21
Total State Waters Mitigation[1]	
Total Direct Impacts (1, 2, 3)	**1,819.5**

[1] The direct disturbance acres for 4a are within the direct disturbance acres for 1, 2, and 3. The indirect disturbance acres for 4b are outside of the Project Disturbance Area

8.4 Evaporation Pond Netting and Monitoring

The Project owner will cover the evaporation ponds prior to any discharge with 1.5-inch mesh netting designed to exclude birds and other wildlife from drinking or landing on the water of the ponds. Netting with mesh sizes other than 1.5-inches may be installed if approved by the CPM in consultation with CDFG and USFWS. The netted ponds will be monitored regularly 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 ponds will include a visual deterrent in addition to the netting, and the pond will be designed such that the netting will never contact the water. Detailed monitoring and reporting of the evaporation ponds is included in the Avian Protection Plan (Appendix C).

9.0 MITIGATION IMPLEMENTATION MATRIX

The following table contains the verification criteria, implementation phase, and effectiveness/success criteria for each COC and BLM mitigation measure.

Table 12. Mitigation Implementation Matrix

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
BIO-1	Designated Biologist Selection and Qualifications	No less than 30 days prior to the start of construction-related ground disturbance, the Project owner will submit the names of the designated biologists along with the completed USFWS Desert Tortoise Authorized Biologist Request Form to the USFWS and CPM.	Pre-construction	USFWS and CPM approval
BIO-2	Designated Biologist Duties	The Designated Biologist will provide written records that document compliance activities in MCRs.	Pre-construction	CPM review of MCRs
BIO-3	Biological Monitor Selection and Qualifications	No less than 30 days prior to site mobilization or construction-related ground disturbance, the Project owner will submit qualifications and training information about Biological Monitor(s) to the CPM. If additional Biological Monitors are needed during construction, their qualifications will be submitted to the CPM for approval no later than 10 days before the monitors duties will commence. The DB will submit a written statement to the CPM confirming that individual BMs have been trained including the date when training was completed.	Pre-construction	CPM approval
BIO-4	Biological Monitor Duties	Activities of the monitors will be included in the Designated Biologist's MCRs	Pre-construction	CPM review of MCRs
BIO-5	Designated Biologist and Biological Monitor Authority	Following an incident, the Designated Biologist will notify the CPM and BLM no later than the morning of the following business day. If an incident involves a federal or state-listed species, USFWS and CDFG will be notified on the same schedule. The BLM and CPM will be made aware of the circumstances of the incidents and how the problems will be resolved.	Pre-construction	CPM assessment of corrective actions, in consultation with CDFG, BLM, and USFWS.
BIO-6	WEAP	No less than 30 days prior to the start of construction-related ground disturbance, the Project owner will provide the CPM, USFWS, and CDFG a copy of the final WEAP, supporting documents, and qualifications of person(s) administering program. The number of persons who have completed the WEAP will be included in the MCR submitted by the Project owner. All permanent employees will repeat the WEAP annually; new employees will complete the training within 7 days of beginning work at the site. Evidence of WEAP training completion by will be in the form of a certificate or visible sticker on the employee's hardhat.	Pre-construction, construction, and operations	CPM approval
BIO-7	BRMIMP	No less than 30 days prior to the start of any site mobilization or construction-related ground disturbance, the Project owner will provide the CPM a copy of the full draft BRMIMP; the BLM, CDFG, and USFWS will be provided with the sections of the BRMIMP relating to federal or state-listed species on the same schedule. The final BRMIMP will be provided to the CPM seven (7) days prior to the start of any construction-related ground disturbance; final BRMIMP. The BRMIMP will be revised or supplemented if any permits are received after the final BRMIMP is submitted; the Project owner will submit the updated BRMIMP to the CPM within 10 days following the receipt of additional permits.	Pre-construction, construction, and operations	CPM approval; BLM, USFWS, CDFG review

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
BLM BIO-7a	Climate Change	The Applicant will ensure that monitoring accomplished under BIO-7 and other mitigating measures use available climatalogical data when analyzing Project effects or resource trends.	Construction	CPM review of MCRs
BIO-8	Impact Avoidance and Minimization Measures	The BRMIMP will include all mitigation measures; the Designated Biologist's MCR will report on implementation of the measures. Within 30 days after completion of Project construction, the Project owner will submit to CPM a written construction termination report identifying how measures have been completed.	Construction, Operations	CPM review of MCR. Applicable plan approval by CPM.
BIO-9	Desert Tortoise Clearance Surveys and Fencing	The BRMIMP will include all mitigation measures and their implementation methods; the Designated Biologist's MCR will document the implementation of the mitigation measures. Within 30 days after the completion of desert tortoise clearance surveys the Designated Biologist will submit a report to the CPM, USFWS, and CDFG describing implementation of mitigation measures.	Construction	Information contained in BRMIMP, the CPM, USFWS, and CDFG review of MCR.
BIO-10	Desert Tortoise Translocation Plan	Within 30 days prior to site mobilization or construction related ground disturbance, the Project owner will provide the CPM with the final approved Desert Tortoise Translocation Plan.	Pre-construction	CPM approves plan and any modifications to plan, with BLM, CDFG, and USFWS consultation
BIO-11	Desert Tortoise Compliance Verification	No later than 2 days following the notification of a sighting, injury, kill, or relocation of a listed species, the Project owner submit to the CPM, CDFG, and USFWS via electronic communication the Designated Biologist's written report describing all reported incidents (described above) of listed species, describing who was notified and when the incident occurred. A map will be submitted to the CPM, CDFG, USFWS. For each month of construction, the Project owner will submit in the MCR with details about land Monthly compliance inspections of land disturbing construction activities to the CPM, BLM, USFWS, and CDFG. No later than 45 days after Project initiation the Designated Biologist will provide the CPM with a Final Listed Species Mitigation Report.	Pre-construction, Construction	The CPM, CDFG, USFWS review of incident reports. CPM review of mitigation report. CPM, CDFG, USFWS, and BLM review of MCR.

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
BIO-12	Desert Tortoise Compensatory Mitigation	CPM will receive notice at least 30 days prior to ground-disturbing activities. If mitigation actions are not completed at least 30 days prior to ground-disturbing activities, the CPM will be provided with the approved Security at least 30 days prior to start of Project ground-disturbing activities. No later than 12 months after the start of ground-disturbing Project activities, the Project owner will submit a formal proposal to acquire lands to CPM; no later than 18 months after construction commence, verification of land purchase will be sent to the CPM, CDFG, BLM, and USFWS. The Project owner will conduct a property analysis (PAR) or similar analysis no later than 60 days after the CPM approved compensation lands for acquisition; money for maintenance of compensation lands will be provided no later than 30 days after the PAR is approved; no later than 60 days after the CPM determines the required compensation land activities, the CPM will receive verification that funds are available; no later than 6 months after the CPM's approval of activities on compensation, habitat improvement on the compensation lands will be completed.	Pre-construction	CPM, CDFG, BLM, USFWS approval of land purchase and management.
BIO-13	Raven Management Plan	No less than 30 days prior to any construction-related ground disturbance activity, the Project owner will provide the CPM, USFWS, and CDFG with a final version of a Raven Plan. Within 30 days after completion of Project construction, the Project owner will provide the CPM with a written report pertaining to the Raven Plan. On January 31st of each year following construction, the Designated Biologist will provide a report to the CPM outlining Raven management and control activities. No less than 10 days prior to the start of Project-related ground disturbance, the Project owner will provide documentation to the CPM, BLM, CDFG, and USFWS that funds have been deposited to the REAT-NFWS sub-account for the Project.	Construction, Operations	CPM, USFWS, CDFG review of Raven Plan. CPM review of yearly report post-construction.
BIO-14	Weed Management Plan	No less than 10 days prior to the start of Project-related ground disturbance activities, the Project owner will provide the CPM with the final Weed Management Plan. Within 30 days after completion of Project construction, the Project owner will provide the CPM an update on weed management activities. On January 31st of each year following construction the Designated Biologist will submit a report to the CPM that provides documentation and update of weed management activities	Construction, Operations	CEC, USFWS, and CDFG approval of plan and any modifications to plan. CPM review of annual report post-construction.
BIO-15	Pre-Construction Nest Surveys and Avoidance Measures	Prior to the start of any Project-related ground disturbance activities, the Project owner will submit a report to the CPM describing findings of pre-construction nest surveys. No later than January 31st of every year following construction a follow-up report will be submitted to CPM, CDFG, and USFWS describing the success of buffer zones in preventing disturbance to nesting activity and results of nesting effort.	Construction	The CPM, CDFG, and USFWS review of reports.

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
BIO-16	Avian Protection Plan	No less than 30 days prior to the start of construction-related ground disturbance activities, the Project owner will submit to the CPM, USFWS, and CDFG a final Avian Protection Plan. For one year following the beginning of power plant operation, the Designated Biologist will submit quarterly avian monitoring reports to the CPM, CDFG, and USFWS; an annual report will be prepared by the Designated Biologist to detail findings for the monitoring year and suggest future monitoring and management actions.	Construction, Operations	The CPM, USFWS, CDFG approval of avian plan. CPM, CDFG, and USFWS review of monitoring reports.
BIO-17	American Badger and Kit Fox Avoidance and Minimization Measures.	The Project owner will submit surveys to the CPM and CDFG within 30 days of Project completion. Reports will include mitigation measures.	Post-construction	CPM and CDFG review of reports.
BIO-18	Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures	If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist will provide the CPM, BLM, CDFG, and USFWS documentation indicating that non-disturbance fencing has been installed at least 10 days prior to construction-related ground disturbance. The Project owner will report monthly to the CPM, CDFG, BLM, and USFWS on implementation of mitigation measures. Within 30 days of Project completion, the Project owner will provide the aforementioned agencies a report detailing how mitigation measures in the plan have been completed. If a relocation is necessary, the aforementioned agencies will be notified by the Project owner no less than 10 days after pre-construction survey completion. The necessity of owl relocation will trigger additional reporting requirements including reports to CPM on compensation lands, funds available for compensation lands, and an annual monitoring and management report of the owl relocation area.	Pre-construction, Construction	The CPM, BLM, CDFG, USFWS approval of mitigation measures. Applicable land acquisition and management plan approval by CPM.
BIO-19	Special-Status Plant Impact Avoidance, Minimization, and Compensation	Special-Status plant avoidance and minimization measures will be incorporated in the BRMIMP.	Construction, Operations	Information contained in BRMIMP. The BLM and CPM review of surveys. Notification to CPM, USFWS, CDFG, and BLM of species discovery. CPM review of MCR. CPM, in consultation with BLM state botanist, approval of construction termination report.
	Section A: Special-Status Plant Impact Avoidance and Minimization Measures	Pre-construction survey data and mapping will be submitted to CPM and BLM state botanist no less than 30 days prior to ground-disturbing activities. Notification to CPM, USFWS, CDFG, and BLM if state or federally listed species or BLM Sensitive species are discovered on site throughout the life of the Project. The Designated Botanist will submit monthly summaries to be included in the MCR. Within 30 days of completion of construction, the Project owner will provide a written construction termination report identifying how measures have been completed.		
	Section B: Conduct Late Season Botanical Surveys	Preliminary summary of results of survey will be submitted to the CPM and BLM state botanist within two weeks following completion of surveys. The final survey report will be submitted to the BLM state botanist no less than 30 days prior to the start of ground-disturbing activities.	Completed Fall 2010	CPM and BLM review of report.

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
	Section C: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys	No special-status plants detected in Summer/Fall 2010 Surveys; therefore, no avoidance requirements required for late-season annual plants.	N/A	N/A
	Section D: Off-Site Compensatory Mitigation for Special-Status Plants	No mitigation required	N/A	N/A
BIO-20	Sand Dune Community/Mojave Fringe-Toed Lizard Mitigation	No later than 30 days prior to beginning construction-related ground-disturbing activities, the Project owner will provide written evidence of financial Security. Acquisition of compensatory lands will occur within 18 months of the start of ground-disturbing activities; written verification sent to CPM, CDFG, and USFWS. The Project owner will provide the CPM, CDFG, and USFWS with a management plan for compensation lands within 180 days of land purchase. No less than 90 days prior to compensation land acquisition, the Project owner will submit a formal acquisition proposal to the aforementioned agencies describing the parcels for purchase and also submit a PAR or similar analysis. A final account of habitat disturbed during Project construction will be provided to CPM and CDFG within 90 days after completion of Project construction.	Pre-Construction, Construction, Operations	CPM, CDFG, and USFWS approval of purchased lands and their management. Management plan will be approved by CPM in consultation with CDFG and USFWS.
BIO-21	Evaporation Pond Monitoring	No less than 30 days prior to operation of evaporation ponds the CPM will be provided with as-built drawings and photographs of the ponds indicating that bird exclusion netting has been installed. For the first year of operation, the Designated Biologist will submit quarterly reports to the CPM, CDFG, USFWS of listing details of site visits to evaporation ponds. Thereafter, the Designated Biologist will submit annual monitoring reports with this information to CPM, CDFG, and USFWS no later than January 31st of every year for the life of the Project.	Operations	CPM review of as-built drawings. CPM, CDFG, and USFWS review of monitoring reports.
BIO-22	Mitigation for Impacts to State Waters	No less than 30 days prior to the start of construction-related ground disturbance activities potentially affecting waters of the state, the Project owner will provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that BMPs will be implemented. The Project owner will notify the CPM and CDFG of any change of conditions to the Project, impacts to state waters, or the mitigation efforts. The notifying report will be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. A copy of the notifying Change of Conditions report will be included in the annual reports or until it is deemed unnecessary by the CPM, in consultation with CDFG. The Project owner will provide CPM, CDFG, and USFWS with a draft management plan for compensation lands within 180 days of the purchase date.	Pre-construction, Construction, Post-construction	Contained in BRMIMP. CPM, CDFG, and USFWS approval of management plan for compensation lands (if applicable).

Condition of Certification		Verification	Implementation Phase	Effectiveness Criteria
BIO-23	Decommissioning Plan	No less than 30 days prior to initiating construction-related ground disturbance activities, the Project owner will provide the BLM and CPM a draft Decommissioning and Closure Plan. The plan should be finalized prior to the start of commercial operation and reviewed every five years thereafter and submitted to the CPM for approval, with BLM consultation. No less than 10 days prior to construction-related ground disturbance, the Project owner will provide financial assurances to the CPM to guarantee funding to implement the plan.	Operations	CPM and BLM approval of plan. CPM verification of financial assurance.
BIO-24	Revegetation of Temporarily Disturbed Areas	No less than 30 days prior to construction-related ground disturbance activities, the Project owner will submit to the CPM a final Revegetation Plan. Within 30 days after completion of Project construction, the Project owner will provide the CPM with a Revegetation Plan report, including which items are still outstanding. The Designated Biologist will submit reports per the plan by January 31st following each relevant reporting year.	Pre-construction and Operations	The CPM approval of plan and all modifications to plan.
BIO-27	Couch's Spadefoot Toad Mitigation	No less than 30 days prior to construction related ground disturbance, the Project owner will submit to the CPM and CDFG a final Protection and Mitigation Plan. Modifications to the plan require CPM approval, with CDFG consultation. If applicable, and no less than 90 days prior to operation, the CPM will be provided with as-built drawings and photographs of the created mitigation ponds. Also, if applicable, on January 31st of every year following the initiation of operation, the Project owner will submit reports to the CPM documenting capacity of the created ponds to hold water during breeding season, and reporting terminates when ponds are found to be successful by the CPM.	Construction and Operations	CPM and CDFG approval of plan. CPM review of as-built drawings. CPM review of monitoring reports.
BIO-28	Golden Eagle Inventory & Monitoring	No fewer than 30 days from the completion of golden eagle inventory, the Project owner will submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory. If an occupied nest is detected within one mile of the Project boundary during the inventory, the USFWS and CDFG will be contacted within one working day. A Golden Eagle Monitoring and Management Plan will be submitted to CPM, CDFG, and USFWS within 30 days if a nest is detected.	Pre-construction, Construction, Operations.	The CPM, CDFG, and USFWS review of inventory and applicable plan.
BIO-29	In-Lieu Fee Mitigation Option	The Project owner will notify CEC and all other interested parties that it would like a determination that the Project's in-lieu fee proposal meets California Environmental Quality Act and CESA requirements. Proof of the in-lieu fee payment will be made to the CPM prior to construction.	Pre-construction	The CEC and CPM receipt of fee payment verification.

10.0 FACILITY CLOSURE

10.1 Temporary Closure

Temporary closures may be necessary in the event of disastrous events or unfavorable economic conditions. In the case of temporary closure, measures to protect biological resources would be needed only if there were surface disturbances or releases of harmful materials. If such an event occurs, Genesis Solar will consult with the responsible agencies to plan cleanup and mitigation of impacts to biological resources.

All Project features with openings at ground level must be covered or capped securely for the duration of the temporary closure. They may be opened for periodic inspection, but must be covered and secured immediately after being inspected.

10.2 Permanent Closure

Permanent closure will occur at the end of the facility's operational phase. Genesis Solar has prepared a Conceptual Decommissioning and Closure Plan (Appendix C); upon Project closure the Project owner will implement a final Decommissioning and Closure Plan. This plan will include a cost estimate for implementing the proposed decommissioning and reclamation activities, and will be consistent with the guidelines in BLM's 43 Code of Federal Regulations 3809.550 et seq., subject to review and revisions from the CPM in consultation with BLM, USFWS, and CDFG. The plan will include take avoidance and mitigation requirements applicable to the sensitive biological resources in the area at that time. The plan will also include reclamation of areas where facilities would be removed, including transmission conductors and all other power plant facilities, in order to restore wildlife habitat and promote the re-establishment of wildlife species. Techniques to restore the habitat will be presented in a detailed plan and approved by the resource agencies.

11.0 BRMIMP MODIFICATION PROCEDURES

11.1 Revisions to the BRMIMP

Any changes to the BRMIMP must be approved by the CPM and in consultation with CDFG, BLM, and USFWS. If any permits have not yet been received when the final BRMIMP is submitted, these permits will be submitted to the CPM within five days of their receipt, and the BRMIMP will be revised or supplemented to reflect the permit condition(s). The Project owner will submit to the CPM the revised or supplemented BRMIMP within 10 days following the Project owner's receipt of any additional permits. Under no circumstances will ground disturbance proceed without implementation of all permit conditions.

11.2 Maintaining and Distributing the BRMIMP

It is Genesis Solar's responsibility to maintain and distribute the BRMIMP and any changes to the BRMIMP. During the construction phase of the Project, this task has been delegated to the Environmental Construction Manager and the DB. During Project operation, the on-site environmental manager or other compliance staff will be responsible for keeping the plan up to date. The BRMIMP will initially be distributed in three-ring binders so that changes can be

distributed without supplying a new copy of the entire document. The plan will be distributed to the following individuals or their successors as shown in Table 13 below:

Table 13. Recipients and Distribution of the BRMIMP

Title/ Entity	No. Copies
CPM	2
AO	2
ECM	2
DB	1 plus copies for each BM
Designated Botanist	1
USFWS (applicable sections only)	2
CDFG applicable sections only)	2

12.0 REFERENCES

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FIGURES

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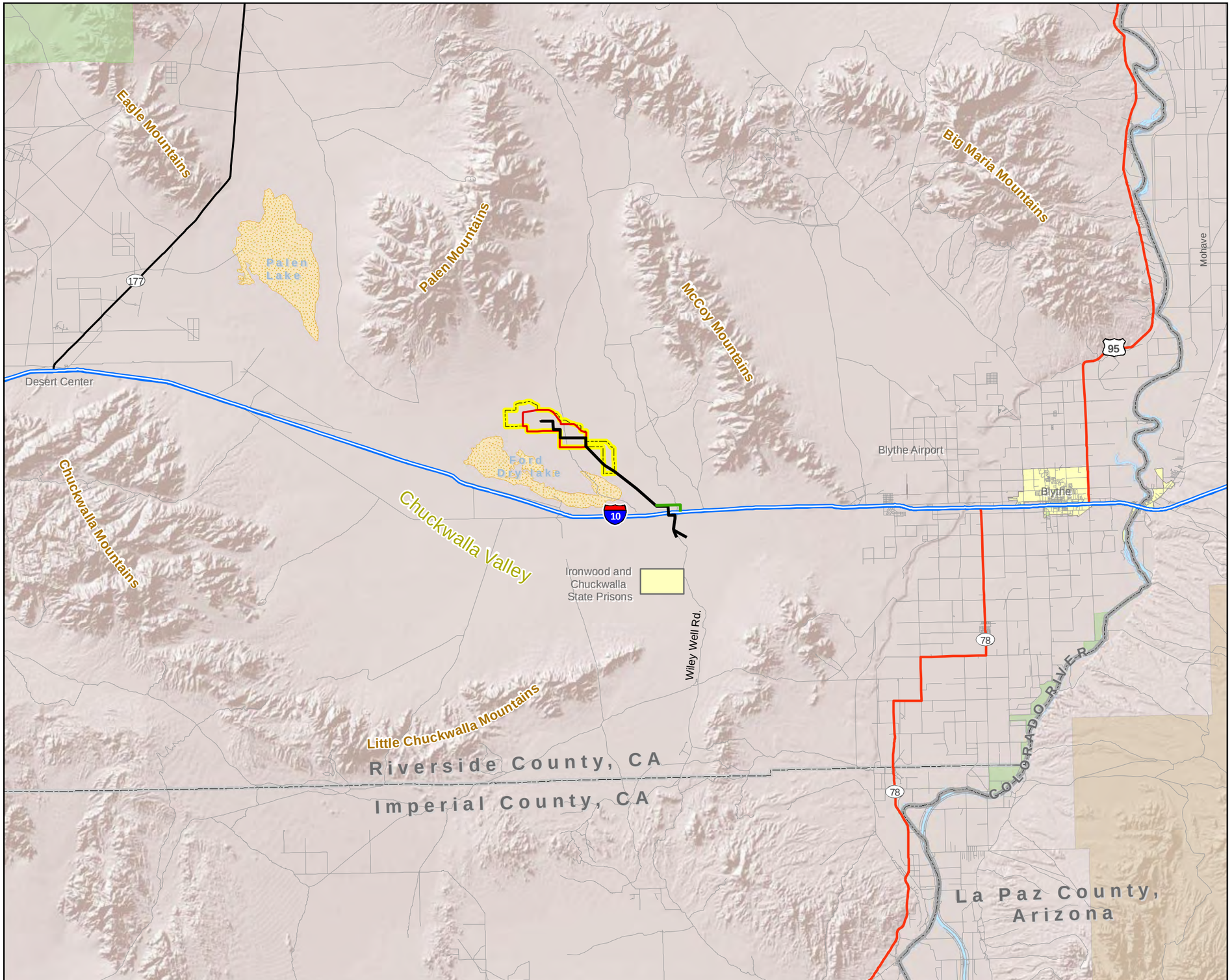
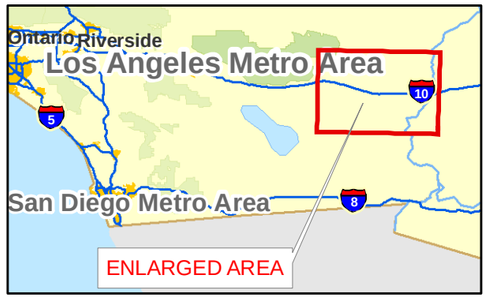


GENESIS SOLAR, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA



Legend

- Project Requested ROW
- Interstate
- Highway
- Major Road
- Local Road
- State Boundary
- County Boundary
- Plant Site
- Runways (500 to 250k)
- Lake/River
- Intermittant Lake
- Local Park
- Miliitary Installation
- Urban Area
- Proposed Transmission Interconnect
- Proposed Access Road

N

0 2.5 5 7.5 10
Miles

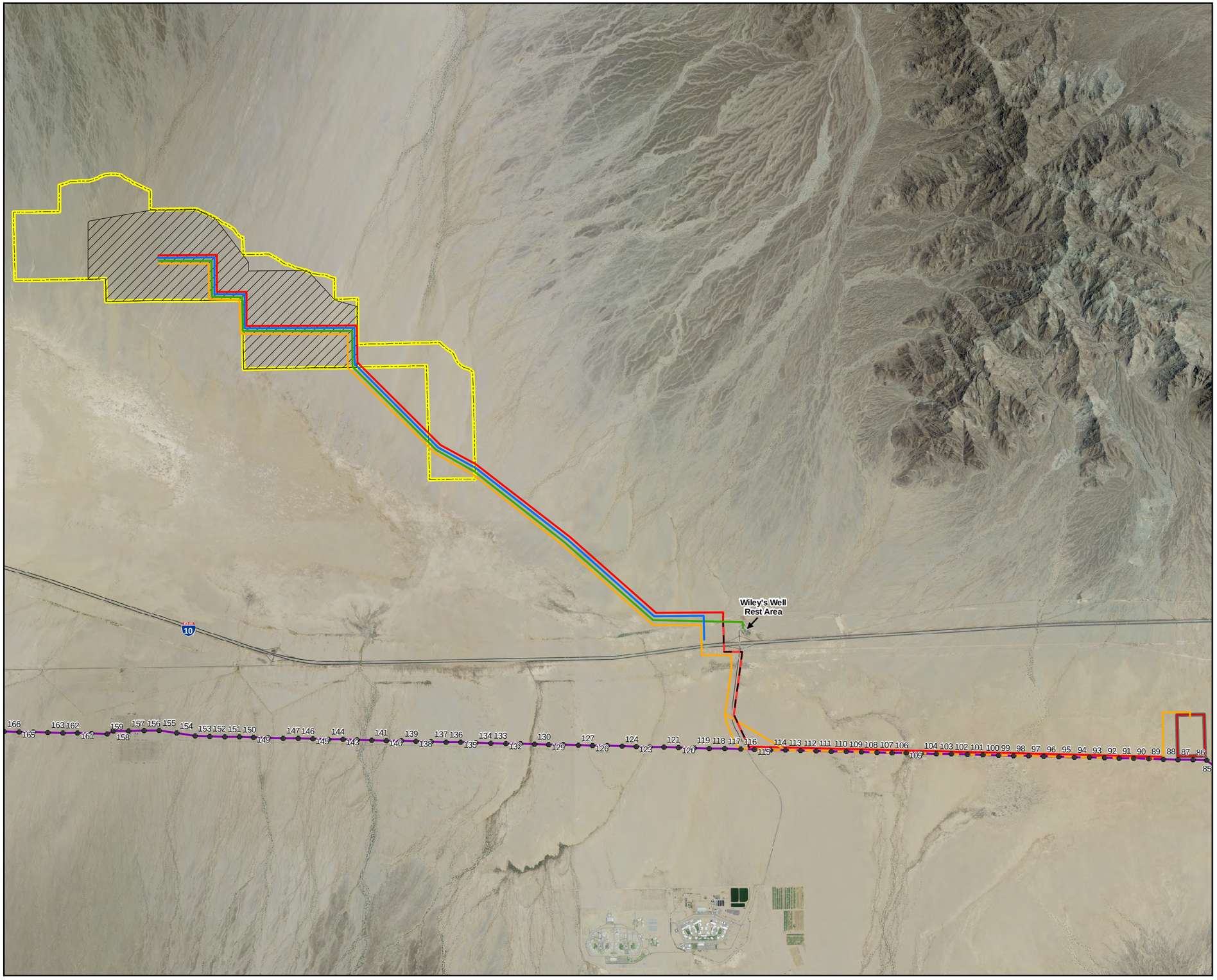
Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, BLM, TTEC

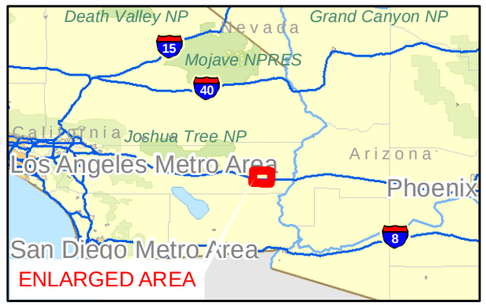
FIGURE 1
REGIONAL LOCATION MAP

TETRA TECH EC, INC.

Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA





- Blythe Energy Project Transmission Line
- Blythe Energy Project Transmission Line Structure
- Transmission Interconnect
- Transmission Interconnect on Existing Poles
- Gas Line
- Access Road
- Distribution Line/Redundant Communication Line
- Redundant Communication Line in Existing ROW
- Project Requested ROW
- Plant Site
- Proposed 230kv Expansion Area

N

0 0.5 1 1.5 2
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, TTEC, USDA, Riverside County, A. Karl & Assoc.

FIGURE 2
FACILITY LAYOUT

TETRA TECH EC, INC

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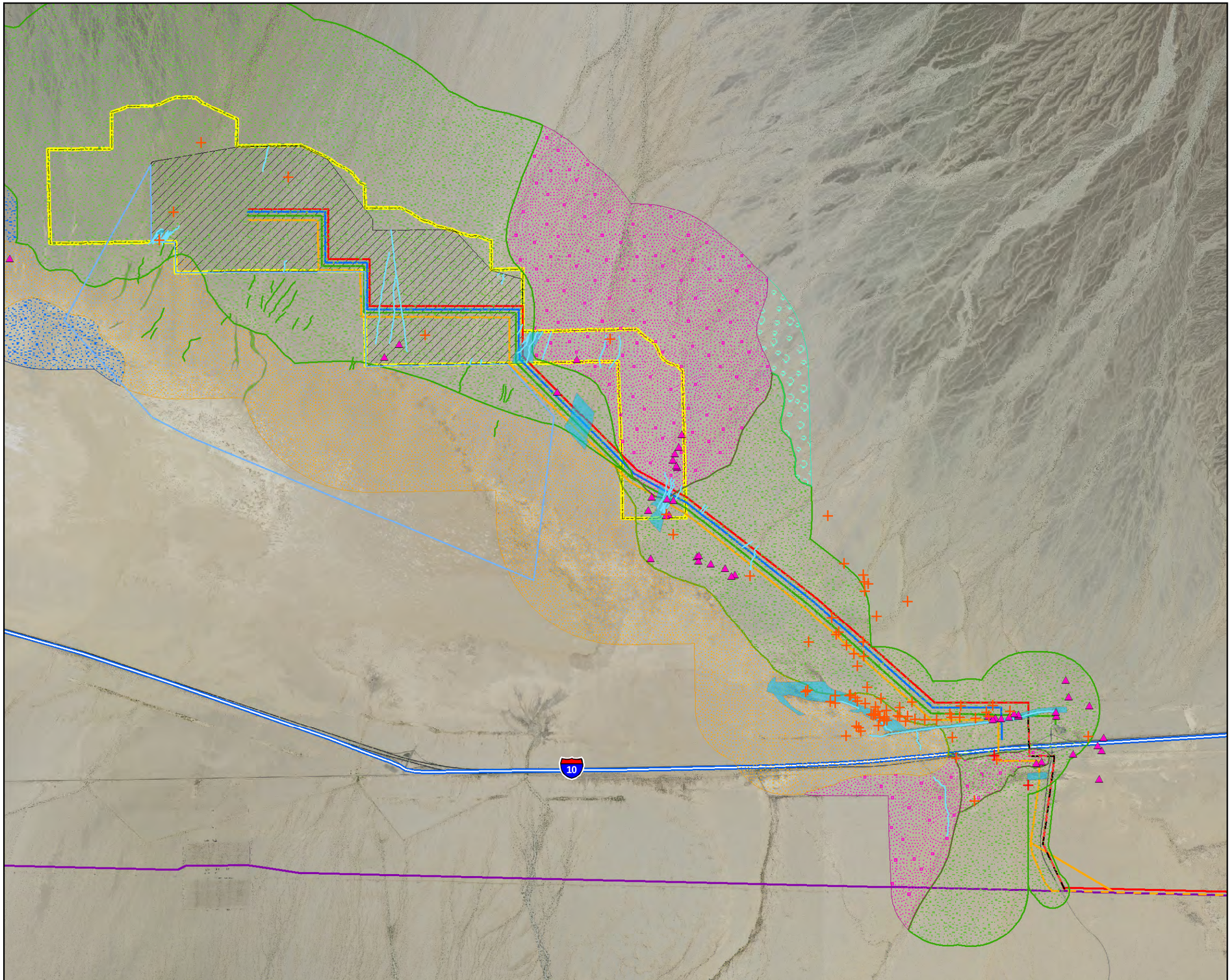

Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA

Special Status Plant Observations
- Harwood's Milkvetch
- Desert Unicorn Plant

Deliniated Waters
- Jurisdictional Waters of the State
- Jurisdictional Waters of the State (indirectly impacted)
- Downstream Wash Evaluation Area
- Jurisdictional Waters of the State
- Jurisdictional Waters of the State (indirectly impacted))
- Chenopod Scrub
- Sonoran Creosote Bush Scrub
- Dry Desert Wash Woodland
- Playa and Sand Drifts over Playa
- Stabilized and Partly-Stabilized Sand Dune
- Transmission Interconnect
- Genesis Transmission Interconnect on Existing BETL Poles
- Gas Line
- Access Road
- Distribution Line/Redundant Communication Line
- Redundant Communication Line in Existing ROW
- Blythe Energy Project Transmission Line
- Project Requested ROW
- Genesis Plant Site
- Colorado River Substation

N

0 0.5 1
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, USDA, TTEC, Alice Karl

Figure 3a
Special-Status Plants, Jurisdictional Waters, and Vegetation Communities Observed during 2009 and 2010 Field Surveys

TETRA TECH EC, INC.

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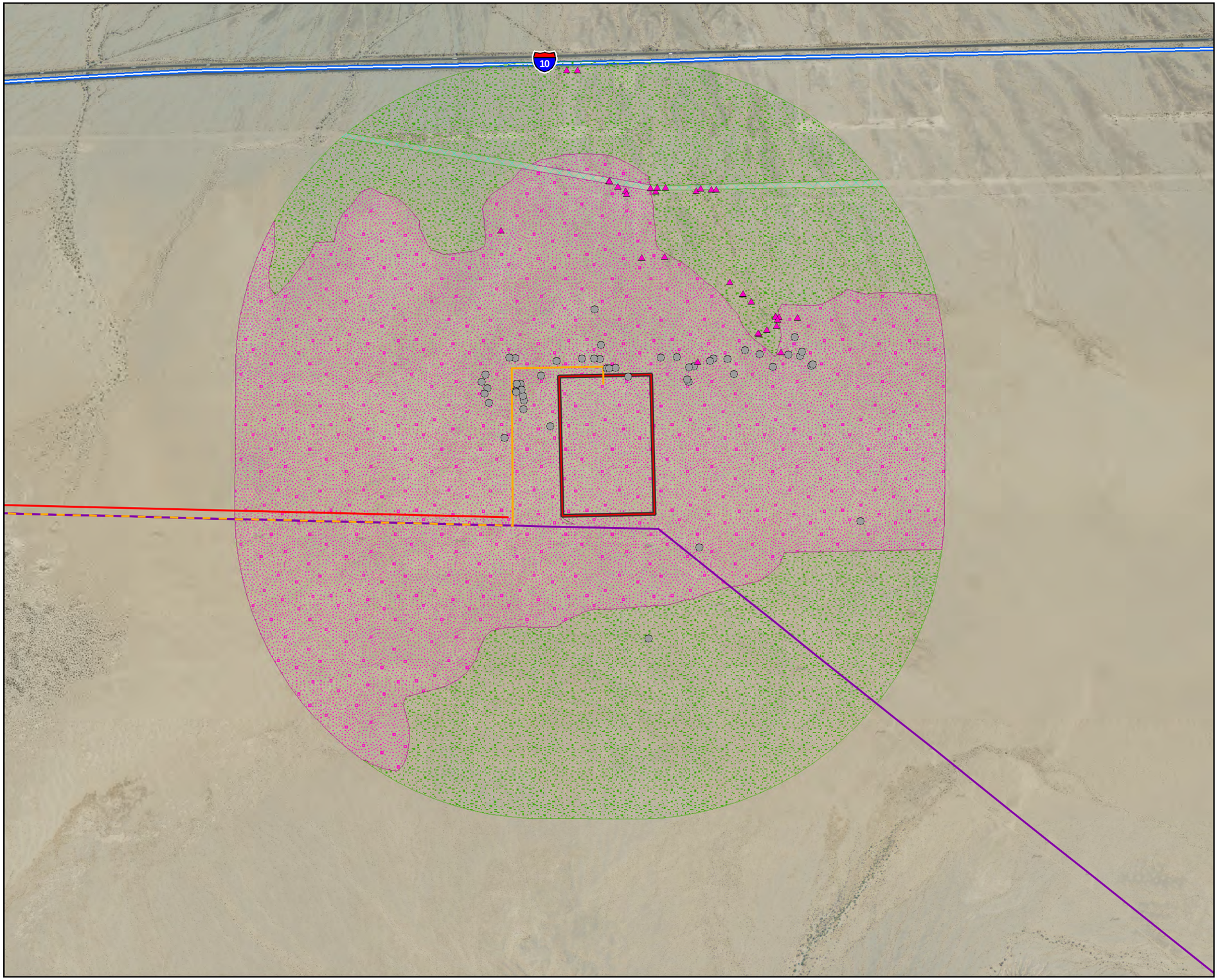


Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA

Special Status Plant Observations
- Harwood's Milkvetch
- Harwood's Eriastrum
- Disturbed Habitat
- Sonoran Creosote Bush Scrub
- Stabilized and Partially Stabilized Sand Dunes
- Transmission Interconnect
- Genesis Transmission Interconnect on Existing BETL Poles
- Gas Line
- Access Road
- Distribution Line/Redundant Communication Line
- Redundant Communication Line in Existing ROW
- Blythe Energy Project Transmission Line
- Project Requested ROW
- Genesis Plant Site
- Colorado River Substation

N

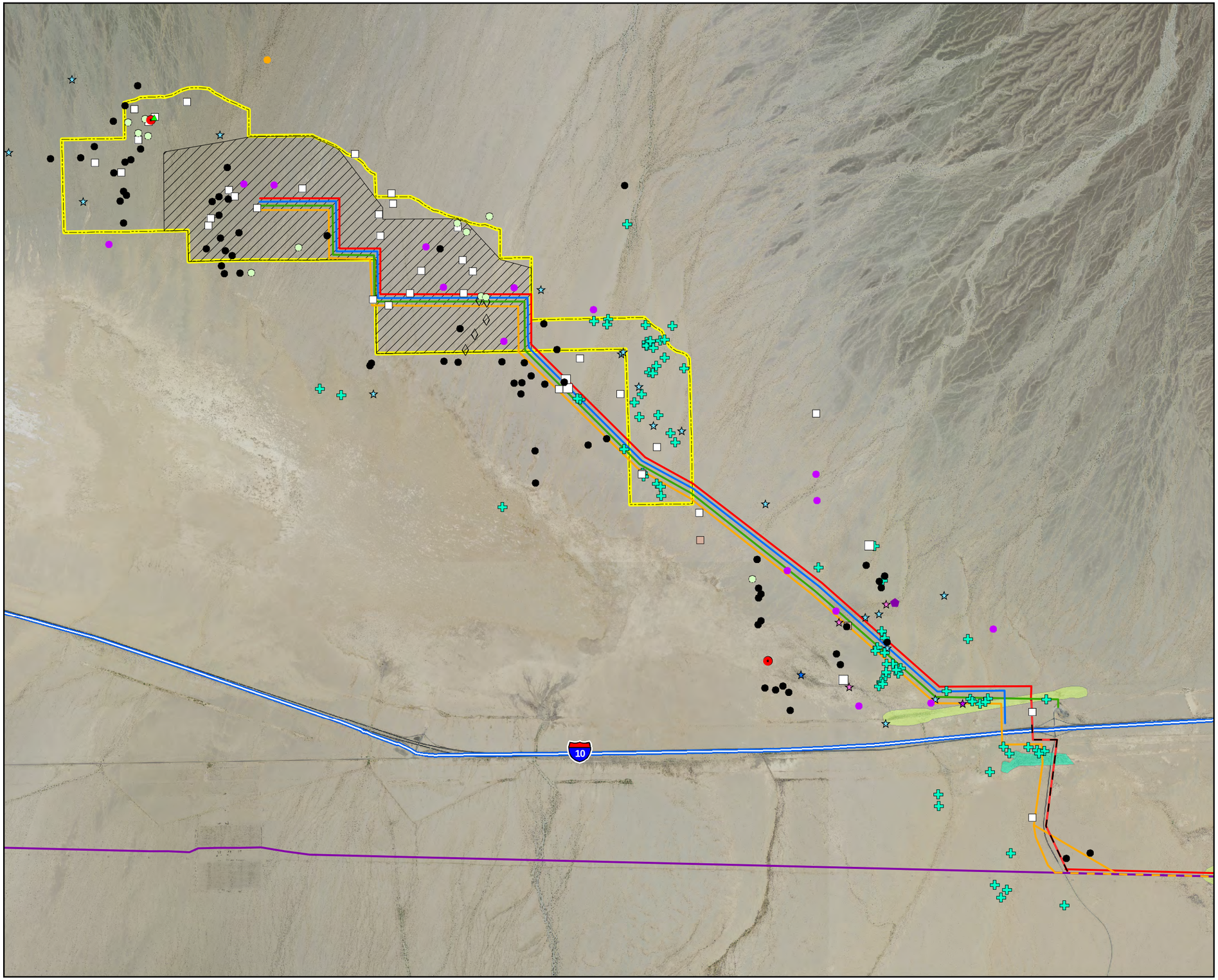
0 0.25 0.5
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, USDA, TTEC, Alice Karl

Figure 3b
Special-Status Plants, Jurisdictional Waters, and Vegetation Communities Observed during 2009 and 2010 Field Surveys

TETRA TECH EC, INC.

P:\projects_2005\fpl\maps\Genesis_Bio\2009_and_2010_compilation\Bio_Observations_2010_wildlife.mxd



Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA

Desert Tortoise Observations
- Carcass
- Bone Fragments 4-15 years old
- Bone Fragments 3,000 - 5,000 years old
- Tracks

Borrowing Owl sign/Observation
- Burrowing Owl
- Inactive Burrow
- Active Burrow
- Pellet
- Possible Burrow with Whitewash

Wildlife Sign
- American Badger Burrow
- Kit Fox Burrow Complex
- Loggerhead Shrike
- Northern Harrier
- Mojave Fringe-toed Lizard
- Ferruginous Hawk
- Swainson's Hawk
- Burro Deer (Tracks)
- Known Couch's Spadefoot Toad Habitat
- Potential Couch's Spadefoot Toad Habitat
- Transmission Interconnect
- Genesis Transmission Interconnect on Existing BETL Poles
- Gas Line
- Access Road
- Distribution Line/Redundant Communication Line
- Redundant Communication Line in Existing ROW
- Blythe Energy Project Transmission Line
- Project Requested ROW
- Genesis Plant Site
- Colorado River Substation

N

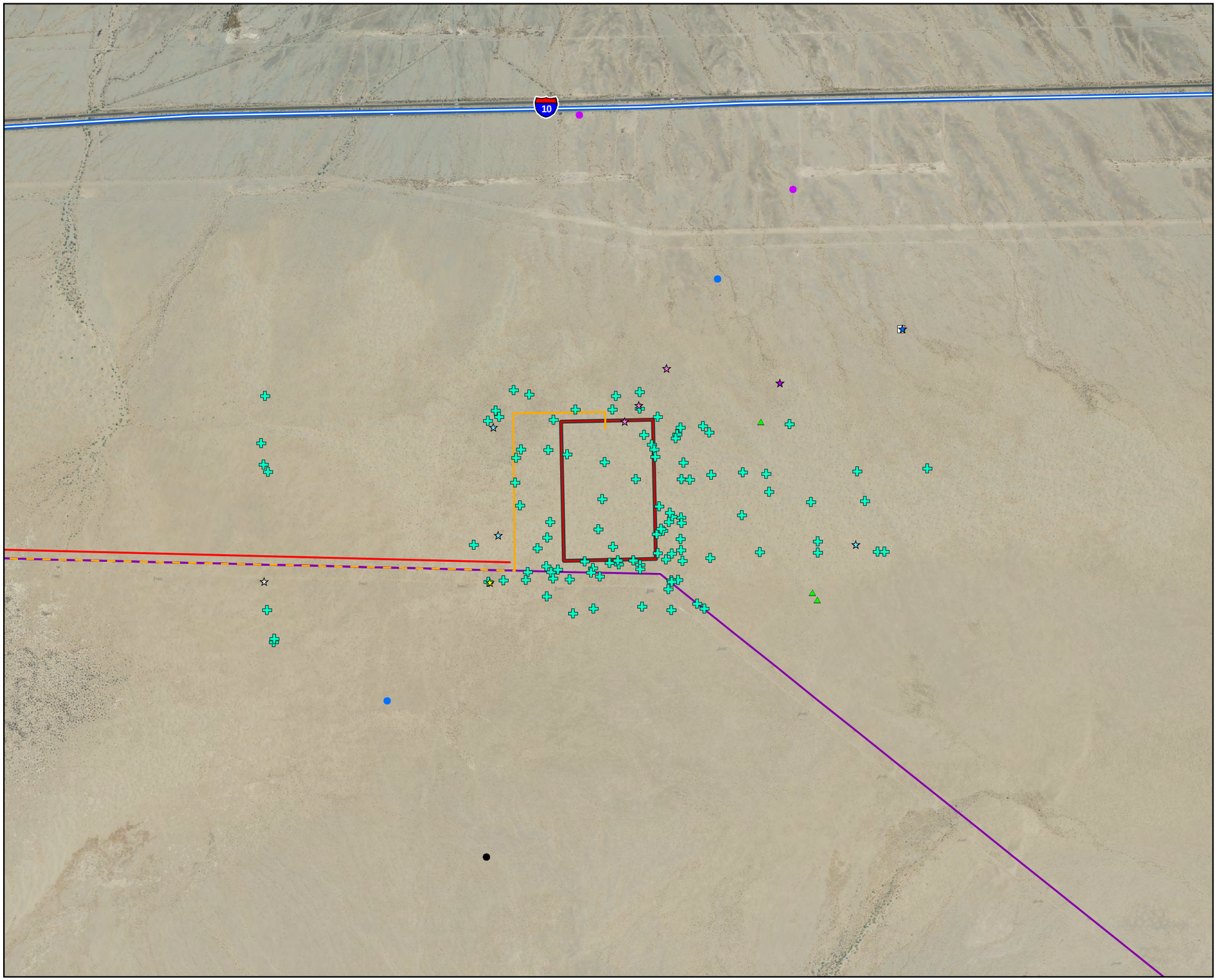
0 0.5 1
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, USDA, TTEC, Alice Karl

Figure 4a
Special-status Wildlife Species Observed During 2009 and 2010 Field Surveys

TETRA TECH EC, INC.

P:\projects_2005\fpl\maps\Genesis_Bio\2009_and_2010_compilation\Bio_Observations_2010_wildlife_CRS.mxd



Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA

Desert Tortoise Observations
- Burrow
- Bone Fragments 4-15 years old
- Bone Fragments 3,000 - 5,000 years old

Borrowing Owl Sign/Observation
- Burrowing Owl

Wildlife Sign
- American Badger Burrow
- Kit Fox Burrow Complex
- Loggerhead Shrike
- Northern Harrier
- Mojave Fringe-toed Lizard
- Cooper's Hawk
- Ferruginous Hawk
- Swainson's Hawk
- Unknown Raptor Nest
- Transmission Interconnect
- Genesis Transmission Interconnect on Existing BETL Poles
- Gas Line
- Access Road
- Distribution Line/Redundant Communication Line
- Redundant Communication Line in Existing ROW
- Blythe Energy Project Transmission Line
- Project Requested ROW
- Genesis Plant Site
- Colorado River Substation

N

0 0.25 0.5
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, USDA, TTEC, Alice Karl

Figure 4b
Special-status Wildlife Species Observed During 2009 and 2010 Field Surveys

TETRA TECH EC, INC.

APPENDIX A

CEC ENVIRONMENTAL ASSESSMENT, BIOLOGICAL RESOURCES COCS, AND BLM MITIGATION MEASURES

VI. ENVIRONMENTAL ASSESSMENT

A. BIOLOGICAL RESOURCES

The Commission must consider the potential impacts of project-related activities on biological resources, including state and federally listed species, species of special concern, wetlands, and other resources of critical biological interest such as unique habitats. The evidence is contained in exhibits and testimony which describes the biological resources in the vicinity of the project site and linear alignments, assesses the potential for adverse impacts, and determines whether mitigation measures are necessary to ensure compliance with applicable laws, ordinances, regulations, and standards (LORS). (Ex. 1; 3; 11; 16; 17; 19; 20; 23; 24; 26; 30; 31; 34; 35; 36; 39; 40; 42; 44; 45; 46; 47; 50; 56; 57; 58; 59; 60; 62; 63; 65; 68; 400; 402; 403; 406; 407 – 415, 423 – 428; 435; 438; 439; 445, 500 – 511; 800-820; 830; 7/12/10 RT 28:11-14, 29:18-20, 33: 23-25, 37:2-4, 39:10-14, 42:12-17, 46:18-20; 7/21/10 RT 11:10-12, 126:18-19, 130:16-18, 131:24-25).

SUMMARY AND DISCUSSION OF THE EVIDENCE

1. Project Description

Genesis Solar, LLC (Genesis Solar) is proposing development of a 250-megawatt (MW) solar generating facility within a 4,640-acre right-of-way (ROW) grant application from the Bureau of Land Management (BLM). Interstate 10 (I-10) is located approximately 2 miles south of the southernmost boundary of the ROW. The Genesis Solar Energy Project (GSEP) site occurs at elevations ranging from approximately 350 to 450 feet above mean sea level, approximately 25 miles west of the community of Blythe and 27 miles east of Desert Center, California in eastern Riverside County. The GSEP will be located on the alluvial fan on the southern flank of the Palen Mountains in the eastern portion of the Chuckwalla Valley. The GSEP will be located within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. (Ex. 400, pp. C.2-13 to C.2-14.)

Approximately 1,727 acres within the proposed ROW will be used for the solar power plant facility and 84 acres will be used for the linear facilities, collectively referred to as the Project Disturbance Area throughout the remainder of this Biological Resources section. The Project Disturbance Area encompasses all areas to be temporarily and permanently disturbed including the following:

- "plant site" described by the applicant as the solar arrays, power blocks, power equipment, support facilities and evaporation ponds;
- "linear facilities" including the access road, transmission line, natural gas pipeline; and
- All areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas or by any other activities resulting in disturbance to soil or vegetation. (Ex. 400, pp. C.2-12 to C.2-13.)

The evidence shows that the Applicant recently proposed some minor modifications to the GSEP that were not discussed in their Application for Certification (AFC).. These modifications include a six-pole transmission line extension at the Colorado River Substation and an electrical distribution/telecommunications line. Construction of six additional poles will result in disturbance to 6.5 acres from construction and laydown areas, conductor pulling areas, and the transmission access. Within this temporary 6.5 -acre impact area 1.2 acres will be permanently affected due to the 6-foot by 6-foot pole construction pad and the 3,700- foot long, 14-foot wide transmission maintenance road. (Ex. 403, pp. C.2-5 through C.2-8.)

2. Environmental Baseline for the GSEP

The Revised Staff Assessment (RSA or Exhibit 400) and Revised Staff Assessment Supplement (SSA or Exhibit 403) describe the vegetation and wildlife that occur within the plant site and along linear facilities. (Ex. 400, pp. C.2-14 to C.2-62.) **Biological Resources Table 1**, below, lists all special-status species evaluated during the analysis that are known to occur or could potentially occur in the GSEP area and vicinity. Special-status species (or their sign) observed during the 2009 field surveys are indicated by **bold-face type**. Special-status species listed in **Biological Resources Table 1** that were detected or considered likely to occur based on known occurrences in the vicinity and suitable habitat present within the GSEP area are discussed in more detail below. The rest of these species have no or low-to-moderate potential to occur in the Project area. (Ex. 400, pp. C.2-49 to C.2-62.)

Biological Resources Table 1
Special-Status Species Known or Potentially Occurring in the GSEP Study Area

PLANTS		
Common Name	**Scientific Name**	**Status State/Fed/CNPS/BLM/ Global Rank/State Rank**
Chaparral sand verbena	*Abronia villosa* var. *aurita*	__/__/1B.1/__/G5T3T4/S2.1
Angel trumpets	*Acleisanthes longiflora*	__/__/2.3/__/G5/S1.3
Desert sand parsley	*Ammoselinum giganteum*	__/__/2.3/__/G2G3/SH
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2/__/G5/S2
Harwood's milk-vetch	***Astragalus insularis* var. *harwoodii***	**__/__/2.2/__/G5T3/S2.2?**
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	__/FE/1B.2./S/G5T2/S2.1
California ayenia	*Ayenia compacta*	E/__/2.3/__/G4/S3.3
Pink fairy duster	*Calliandra eriophylla*	__/__/2.3/__/G5/S2.3
Sand evening-primrose	*Camissonia arenaria*	__/__/2.2/__/G4?/S2
Crucifixion thorn	*Castela emoryi*	__/__/2.3/__/G3/S2.2
Abram's spurge	*Chamaesyce abramsiana*	__/__/2.2/__/G4/S1.2
Arizona spurge	*Chamaesyce arizonica*	SR/__/2.3/__/G5/S1.3
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/S/G3/S1.2?
Las Animas colubrina	***Colubrina californica***	**__/__/2.3/__/G4/S2S3.3**
Spiny abrojo/Bitter snakeweed	*Condalia globosa* var. *pubescens*	__/__/4.2/__/G5T3T4/S3.2
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3.2
Ribbed cryptantha	***Cryptantha costata***	**__/__/4.3/__/G4G5/S3.3**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3/__/G3G4/S3?
Wiggins' cholla	*Cylindropuntia wigginsii (syn=Opuntia wigginsii)*	__/__/3.3/__/G3?Q/S1.2?
Utah vining milkvine	*Cynanchum utahense*	__/__/4.2/__/G4/S3.2
Glandular ditaxis	*Ditaxis claryana*	__/__/2.2/__/G4G5/S1S2
California ditaxis	*Ditaxis serrata* var. *californica*	__/__/3.2/__/G5T2T3/S2.2
Harwood's eriastrum	***Eriastrum harwoodii***	**__/__/1B.2/__/G2/S2**
California satintail	*Imperata brevifolia*	__/__/2.1__/G2/S2.1
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G4/S3.3
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2/__/G5/S2
Spearleaf	*Matelea parvifolia*	__/__/2.3/__/G5?/S2.2
Argus blazing star	*Mentzelia puberula*	__/__/__/__/__/__
Slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	__/__/2.2/__/G3G4T3?/S2S3
White-margined penstemon	*Penstemon albomarginatus*	__/_ /1B.1/S/G2/S1

PLANTS		
Common Name	**Scientific Name**	**Status State/Fed/CNPS/BLM/ Global Rank/State Rank**
Lobed cherry	*Physalis lobata*	__/__/2.3/__/G5/S1.3
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3
Desert unicorn plant	***Proboscidea althaeifolia***	**__/__/4.3/__/G5/S3.3**
Orocopia sage	*Salvia greatae*	__/__/1B.3./S/G2/S2.2
Desert spikemoss	*Selaginella eremophila*	__/__/2.2./__/G4/S2.2?
Cove's cassia	*Senna covesii*	__/__/2.2/__/G5?/S2.2
Mesquite nest straw	*Stylocline sonorensis*	__/__/1A/__/G3G5/SX
Dwarf germander	*Teucrium cubense* ssp. *depressum*	__/__/2.2/__/G4G5T3T4/ S2
Jackass clover	*Wislizenia refracta* ssp. *refracta*	__/__/2.2/__/G5T5?/S1.2 ?
Palmer's jackass clover	*Wislizenia refracta* ssp. *palmeri*	__/__/?/__/__/__
WILDLIFE		
Common Name	**Scientific Name**	**Status State/Federal**
Reptiles/Amphibians		
Desert tortoise	***Gopherus agassizii***	**ST/FT**
Couch's spadefoot toad	*Scaphiopus couchii*	CSC/__/BLM Sensitive
Mojave fringe-toed lizard	***Uma scoparia***	**CSC/BLM Sensitive**
Desert rosy boa	*Charina (Lichanura) trivirgata*	__/__
Birds		
Western burrowing owl	***Athene cunicularia hypugaea***	**CSC/BCC/BLM Sensitive**
Golden eagle	*Aquila chrysaetos*	CFP/__/BLM Sensitive
Short-eared owl	***Asio flammeus***	**CSC**
Ferruginous hawk	***Buteo regalis***	**WL/BLM Sensitive**
Swainson's hawk	***Buteo swainsoni***	**ST**
Prairie falcon	***Falco mexicanus***	**WL**
American peregrine falcon	*Falco peregrinus anatum*	SFP
Vaux's swift	*Chaetura vauxi*	CSC
Mountain plover	*Charadrius montanus*	CSC/__/BLM Sensitive
Northern harrier	***Circus cyaneus***	**CSC**
Gilded flicker	*Colaptes chrysoides*	SE
Yellow warbler	*Dendroica petechia sonorana*	CSC
California horned lark	***Eremophila alpestris actia***	**WL**
Yellow-breasted chat	*Icteria virens*	CSC
Loggerhead shrike	***Lanius ludovicianus***	**CSC/BCC**
Gila woodpecker	*Melanerpes uropygialis*	SE
Black-tailed gnatcatcher	*Polioptila melanura*	__/__
Purple martin	*Progne subis*	CSC
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC

PLANTS		
Common Name	**Scientific Name**	**Status State/Fed/CNPS/BLM/ Global Rank/State Rank**
Brewer's sparrow	***Spizella breweri***	**BCC**
Bendire's thrasher	*Toxostoma bendirei*	CSC/__/BLM Sensitive
Crissal thrasher	*Toxostoma crissale*	CSC
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BCC/Sensitive**
Mammals		
Pallid bat	*Antrozous pallidus*	CSC/__ /BLM Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/BLM Sensitive
Spotted bat	*Euderma maculatum*	CSC/__/ BLM Sensitive
Western mastiff bat	*Eumops perotis californicus*	CSC/__/ BLM Sensitive
Hoary bat	*Lasiurus cinereus*	__/__
California leaf-nosed bat	*Macrotus californicus*	CSC/__/ BLM Sensitive
Arizona myotis	*Myotis occultus*	CSC
Cave myotis	*Myotis velifer*	CSC/__/ BLM Sensitive
Yuma myotis	*Myotis yumanensis*	__/__/BLM Sensitive
Colorado Valley woodrat	*Neotoma albigula venusta*	__/__
Pocket free-tailed bat	*Nyctinomops femorosaccus*	CSC
Big free-tailed bat	*Nyctinomops macrotis*	CSC
Burro deer	***Odocoileus hemionus eremicus***	**__/__/__**
Nelson's bighorn sheep	*Ovis canadensis nelson*	__/BLM Sensitive
Yuma mountain lion	*Puma concolor browni*	CSC
American badger	***Taxidea taxus***	**CSC**
Desert kit fox	***Vulpes macrotis arsipus***	**__/__**

Source: (Ex. 400, pp. C.2-23 to C.2-25.)

Status Codes:

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE = State listed as endangered
ST = State listed as threatened
CFP = California Fully Protected
WL = State watch list
SR = State-listed rare; Plant species listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety
is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901)

California Native Plant Society
List 1B = Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere

List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all Federal Candidate species and Federal Delisted species which were so designated within the last 5 years and CNPS List 1B plant species that occur on BLM lands. http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.

Global Rank/State Rank

Global rank (G-rank) and State rank (S-rank) is a reflection of the overall condition of an element throughout its global or State) range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values. State rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical

G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals
G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals
G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals
G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 or S5= Demonstrably widespread, abundant, and secure.

Threat Rank

.1 = very threatened
.2 = threatened
.3 = no current threats known

Intervenors, California Unions for Reliable Energy (CURE) and Center for Biological Diversity (CBD) challenged the adequacy of the baseline surveys from the Applicant and Staff's assessments. First, we will consider the surveys and Intervenors' claims, and then we address construction impacts, operational impacts, and cumulative impacts.

Desert Tortoise Surveys

Protocol-level surveys of most of the Study area for the desert tortoise were conducted between March 17 – 25 and April 6 – 13, 2009 (Study area except south of I-10) and October 30, 2009 (transmission line south of I-10). The transmission line route changed after spring surveys; surveys for the northern alignment were conducted in Spring 2010. (Ex. 58). Survey results of the Project Disturbance Area include 19 mineralized and 9 non-mineralized carcass fragments. Preliminary spring 2010 surveys identified approximately 30 tortoise bone fragments (>> 4 years age) along the transmission line and buffer area. (Ex. 400, pp. C.2-36 to C.2-37.)

The evidence shows that the Project Disturbance Area is currently unoccupied by desert tortoise and the northwestern portion of the GSEP site is suitable or marginally suitable habitat, while the remainder of the site is not habitat for desert tortoise. The Sonoran creosote bush scrub and wash habitat north and west of the GSEP site is higher quality habitat. Energy Commission, BLM, CDFG and USFWS staff agree that the habitat within the Project Disturbance Area is of lower quality closer to the Ford playa and is higher quality toward the upper bajadas, but consider the entire GSEP site to contain suitable habitat for desert tortoise (e.g., Sonoran creosote bush scrub with friable soils for burrowing and appropriate forage plants) and could potentially be occupied by this species in the future. (Ex. 400, p. C.2-37.)

Mojave Fringe-Toed Lizard Surveys

Thirty-nine Mojave fringe-toed lizards were observed during spring 2009 Project surveys. Approximately 60+ Mojave fringe-toed lizards including juvenile, sub-adult, and adults were found during spring 2010 field surveys within the transmission line and buffer area. Several Mojave fringe-toed lizards were observed within the proposed six-pole extension area for the gen-tie transmission line at the SCE Colorado River Substation site. The evidence indicates that the Project Disturbance Area contains suitable Mojave fringe-toed lizard habitat wherever stabilized and partially stabilized sand dune habitat (7.5 acres) and playa/sand drift over playa habitat (38 acres) occur. Mojave fringe-toed lizard habitat preferences are more closely tied to the landform than to the vegetation community, and Sonoran creosote bush scrub habitat with an active sand layer can also support this species. This species was detected south of I-10 in Sonoran creosote bush scrub because this area supports a layer of wind-blown sand from the adjacent dunes. (Ex. 400, p. C.2-38.)

Couch's Spadefoot Toad Surveys

No Couch's spadefoot toads were observed during spring 2009 surveys; however, because of the short time this species is above ground, and because the surveys were not conducted during the proper season (i.e., after summer rains), the lack of observations does not suggest the species is absent from the GSEP site. Based on the evidence, the closest known record for this species is from a breeding pond near the intersection of I-10 and Wiley Well Road. A large ponded area (an old borrow pit) is visible in aerial photos in the same general area. Aerial photos and a site visit by BLM staff indicate the borrow pit can sustain ponded water. This area is within the GSEP transmission line route. (Ex. 400, p. C.2-39.)

Intervenor, CURE argues that the RSA's baseline method for Couch's spadefoot toads violates the requirements of CEQA because the RSA could not establish an accurate environmental setting for determining impacts to Couch's spadefoot toad. CURE notes that, as a Condition of Certification, the RSA requires surveys to identify potential spadefoot toad breeding habitat (Ex. 400, p. C.2-276.) The surveys related to Couch's spadefoot toad have been scheduled for summer or early fall 2010. (Ex. 58, p. 17.) Cure claims that by deferring establishment of the baseline environmental setting for Couch's spadefoot toad until after Project approval, the RSA failed to satisfy CEQA's requirement that the baseline be determined as the first step in the environmental review process. (CURE, 1st Op. Brief, p. 5.)

Staff counters that an adequate baseline survey was provided for Couch's spadefoot toad breeding habitat at the Genesis project site, with on-the-ground field surveys conducted by the Applicant and by Staff, and with verification by review of aerial photography. As Staff described (RSA, C.2- 38-C.2-39) and as the Applicant's expert testified at the Evidentiary Hearing (7/12/10 RT 78:13-81:14), presence/absence surveys for spadefoot toads are not a prerequisite for an adequate impact analysis or for development of mitigation measures. Staff made the conservative assumption that this species could occur at the GSEP site without surveys confirming their presence because they are such a difficult species to detect. (Staff's Reply Brief 8/2/10, p. 5-6.) Applicant stipulated to the assumed presence based upon Staff's conservative estimate. We find that the assumed presence of Couch's spadefoot toad provides an adequate basis upon which to fashion conditions to mitigate potential impacts, especially where, as here, the applicant will provide further refinement of the data to the CPM after subsequent surveys are complete.

A Lead Agency is not required to obtain every last bit of information to conduct its analysis. An EIR must include details sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project. (*Laurel Heights Improvement Association v Regents of University of California* (1988) 47 Cal.3d 376, 404-405)) but CEQA does not require agencies to "conduct every test and perform all research, study, and experimentation recommended to it by interested parties." (*Society for California Archaeology v. County of Butte* (1977) 65 Cal.App.3d 832, 838.) "Indeed, a project opponent or reviewing court can always imagine some additional study or analysis that might provide helpful information," but "[i]t is not for them to design the EIR." (*Laurel Heights Improvement Ass. v. Regents of the Univ. of Calif.* (1988) 47 Cal.3d 376, 415).

Western Burrowing Owl Surveys

Protocol-level surveys for the western burrowing owl of part of the Project Disturbance Area (except for part of the Study area associated with the newest transmission line route south of I-10) were conducted in winter of 2007 (Phase I) and spring of 2009. One burrowing owl was observed during 2007 surveys and two owls and burrowing owl sign (burrows, whitewash, feathers and pellets) were observed throughout the study area during 2009 field surveys although outside of the Project Disturbance Area. One burrowing owl was observed during spring 2010 field surveys within the transmission line study area. The entire Project Disturbance Area (1,811acres) is considered burrowing owl habitat. (Ex. 400, p. C.2-41.)

Other Mammals Surveyed

American badger sign was found during spring 2009 field surveys; burrow predation evidence by badgers was found in the buffer area west of the GSEP Project Disturbance Area. Therefore, the entire Study area is considered suitable habitat for American badger. (Ex. 400, p. C.2-41.)

Desert kit fox burrows, complexes and scat were observed throughout the Study area within desert wash and upland scrub habitats during 2009 field surveys; desert kit fox complexes, kit fox scat and burrows were observed south of I-10 during spring 2010 surveys. Over 65 kit fox burrow complexes, both active burrows with fresh scat present and inactive burrow complexes were observed throughout the Project Disturbance Area and linear Disturbance. The entire Study area is suitable habitat for desert kit fox. (Ex. 400, p. C.2-46.)

No sign or evidence of **Nelson's bighorn sheep** were found during field surveys and bighorn sheep are not expected to occur in the Project area. The Project Area is not within a known bighorn sheep corridor as identified in the NECO Plan. (Ex. 400, p. C.2-47.)

During spring 2009 field surveys, tracks of **burro deer** were found in one location south of I-10 along the southern transmission line route. Burro deer sign (tracks) were found along the transmission line and buffer area during spring 2010 surveys. This species is expected to occur north of I-10 and within the Study area especially along desert washes and areas of dry desert wash woodland and other microphyllous riparian vegetated washes. Therefore, these habitat areas are considered suitable for burro deer within the Study area. (Ex. 400, p. C.2-47.)

Golden Eagle and Bird Surveys

CBD claims that the RSA fails to provide "adequate information regarding the biological baseline" for golden eagles. (CBD Op. Brief, p. 4).

Wildlife Research Institute (WRI) conducted golden eagle surveys by helicopter in accordance with USFWS protocols and prepared the *Golden Eagle Risk Assessment for the Genesis Solar Energy Project*, dated June 2010. The initial surveys were performed on March 25-26, 2010, and April 2-3, 2010 and three golden eagle nests were found within the 10-mile survey buffer of the GSEP area. One of these nests was an inactive nest in the McCoy Mountains approximately 8.26 miles east of the GSEP site boundary, and 5.2 miles form the closest point of the transmission line. The other two nests were within the Palen Mountains, both approximately 9.8 miles northwest of the GSEP site boundary. One of these was inactive, but the other showed evidence that new material may have been recently added; no eagles were observed using this nest. The two nests found in the Palen Mountains likely represent alternate nest sites for one eagle pair given the close proximity of the nests. The three observed nests likely represent two eagle territories, one in the Palen Mountains and one in the McCoy Mountains. (Ex. 403, p. C.2-1.)

Per the USFWS protocol, a follow-up survey was performed on May 14, 2010 to revisit active or possibly active territories and no new eagle nesting activity was observed. No eagles were observed during any March, April, or May 2010 helicopter surveys in either mountain range. (Ex. 403, p. C.2-1.)

The evidence concluded, and we find, that disturbance to nesting golden eagles was unlikely due to the distance of the solar facility from nests, the lack of view of the Project from the nests and the lack of known prey concentration in the area. (Ex. 403, pp. C.2-1 to C.2-2.) CBD provided no evidence to contradict these surveys.
In addition, the following migratory/special-status bird species were observed during project surveys: Loggerhead shrikes, Le Conte's thrasher, California horned lark, Brewer's sparrow, prairie falcon, short-eared owl, Swainson's hawk, ferruginous hawk, and northern harrier. (Ex. 400, pp. C.2-42 to C.2-45.)

Plant Surveys

As shown in **Biological Resources Table 1**, several special-status plant species have the potential to occur within the study area. Thirteen of these species were

either observed during botanical and wildlife field surveys performed during spring 2009 and 2010 and/or are considered to have moderate to high potential for occurrence, based on suitable habitat and/or known occurrences in the region including: Harwood's eriastrum, Harwood's milk-vetch, Ribbed cryptantha, Desert unicorn plant, Abram's spurge, Las Animas colubrine, Flat-seeded spurge, Glandular diaxis, California diaxis, Lobed ground cherry, Dwarf germander, Palmer's jackass clover, Jackass clover, Winged cryptantha, Utah vining milkweed, and a new undescribed taxon of saltbush (*Atriplex sd*. Nov.). (Ex. 400, pp. C.2-25 to C.2-26.)

There are 50 pages in the RSA establishing a comprehensive baseline description of the environmental setting, plant communities, and stream resources found on the GSEP site and in the GSEP vicinity (Ex. 400, pp. C.2-12 through C.2-62). An additional 23 page impact analysis dedicated specifically to the subject of special-status plants (Ex. 400, pp. C.2-17 through C.2-34), includes an analysis and detailed description of all early and late-season plants known to occur within 50 or more miles of the GSEP site. A comprehensive list of potentially occurring plant species is found in the RSA at page (Ex. 400, p. C.2-22). We find that the surveys contained in the record provide an adequate environmental baseline.

3. Construction Impacts and Mitigation

Biological Resources Table 2 summarizes the direct, indirect and cumulative impacts to biological resources resulting from GSEP construction and operation and includes the condition of certification that will mitigate these impacts. **Biological Resources Table 3** provides a summary of acreage impacts and recommended mitigation.

Biological Resources Table 2
Summary of Impacts and Mitigation

Biological Resource	Impact/Mitigation
Sonoran Creosote Bush Scrub & Associated Wildlife	**Direct Impacts**: Permanent loss of 1,774 acres; fragmentation of adjacent wildlife habitat and native plant communities **Indirect Impacts**: Disturbance (noise, lights, dust) to surrounding plant and animal communities; spread of non-native invasive weeds; changes in drainage patterns downslope of Project; erosion and sedimentation of disturbed soils. **Cumulative Impacts**: Contributes 0.8% to cumulative loss from probable future projects within the NECO planning area **Mitigation**: Off-site habitat acquisition and enhancement (**BIO-12**); implement impact avoidance and minimization measures (**BIO-8)** and Weed Control Plan (**BIO-14**)
Waters of the State & Associated Sensitive Plant Communities	**Direct Impacts**: Permanent loss of 69 acres of state waters, including 16 acres of microphyll woodland. Temporary direct impacts to 18 acres. Loss of important wildlife habitat function and values, and impaired or lost hydrologic and geomorphic functions necessary to sustain the habitat **Indirect Impacts**: Permanent loss of hydrological connectivity downstream of the Project, including 21[c] acres unvegetated ephemeral wash; head-cutting on drainages upslope and erosion/sedimentation downslope; * **Cumulative Impacts**: Contributes 2.9% to cumulative loss from future projects within the NECO planning area; contributes 4.6% to cumulative loss from future projects within the Chuckwalla- Ford Dry Lake watershed. **Mitigation**: Acquisition and enhancement of 111 acres ephemeral desert washes, implementation of avoidance and minimization measures to protect state waters (**BIO-22**); implement Weed Management Plan (**BIO-14**)
Desert Tortoise	**Direct Impacts**: Potential take of individuals during operation and construction; permanent loss of 1,774 acres (including 24 acres of critical habitat) of desert tortoise habitat and fragmentation of surrounding habitat. **Indirect Impacts**: Increased risk of predation from ravens, coyotes, feral dogs; disturbance from increased noise and lighting; introduction and spread of weeds; increased road kill hazard. **Cumulative Impacts**: Contributes to cumulative loss of low to moderate value desert tortoise habitat (2.0% to 0.1 habitat value, 2.9% to 0.2 habitat value, 0.1% to 0.3 habitat value) from future projects in the NECO planning area; **Mitigation**: Implement avoidance and minimization measures (**BIO-6** through **BIO-11**) and acquire 1,870 acres of desert tortoise habitat (**BIO-12**).

Biological Resource	Impact/Mitigation
Mojave Fringe-Toed Lizard	**Direct impacts**: Mortality to individuals during construction and permanent loss of **7.5** [a,f] acres of sand dune habitat and **38** acres of sand drift over playa; increased road kill hazard from construction traffic; potential accidental direct impacts to adjacent preserved habitat during construction and operation. **Indirect impacts**: introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat; increased road kill hazard from construction and operations traffic; harm from accidental spraying/drift of herbicides and dust suppression chemicals. **Cumulative Impacts**: Contributes 0.2% to cumulative loss from future projects within the NECO planning area; contributes 1.7% to cumulative loss from future projects within the range of the Chuckwalla Valley population. **Mitigation**: Implement **BIO-20**, Mojave fringe-toed lizard compensation, and **BIO-8**, impact avoidance and minimization measures
Couch's Spadefoot Toad	**Direct Impacts:** loss of breeding and upland habitat, mortality of individuals; disturbance to breeding ponds, **Indirect Impacts:** reduced flow to breeding areas, increased flow to upland habitat, construction noise could trigger emergence when conditions are not favorable. **Cumulative Impacts**: Contributes 1.6% to cumulative loss of habitat from future projects within the NECO planning area. **Mitigation**: Conduct surveys and implement impact avoidance and minimization measures, avoidance and protection of breeding habitat **BIO-27** (Couch's spadefoot toad impact avoidance and minimization measures).
Western Burrowing Owl	**Direct Impacts**: Permanent loss of foraging habitat; potential loss of eggs and young; degradation and fragmentation of remaining adjacent habitat from edge effects; disturbance of nesting and foraging activities for nesting pairs near the plant site and linear facilities; **Indirect Impacts**: increased road kill hazard from operations traffic; potential collision with mirrors; increased predation from ravens; disturbance of nesting activities from operations. **Cumulative Impacts**: Contributes 0.5% to cumulative loss from future projects within the NECO planning area. **Mitigation:** Implement burrowing owl impact avoidance and mitigation measures, including habitat acquisition if owls are displaced by the Project (**BIO 18**, Burrowing owl impact avoidance, minimization, and compensation measures)

Biological Resource	Impact/Mitigation
Golden Eagle	**Direct/Indirect Impact**: Loss of foraging habitat; potential disturbance to nesting golden eagles during construction if active nests occur within one_ miles of Project boundaries **Cumulative Impacts**: Contributes 7.4% to cumulative loss of Sonoran creosote bush scrub and 0.2% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within the NECO planning area within 10 miles of the Project. Contributes 0.8% to cumulative loss of Sonoran creosote bush scrub and 0.03% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within 10 miles of the nearest mountains. **Mitigation**: Implementation of Golden Eagle Nest Inventory and Monitoring (**BIO-28**) and off-site habitat acquisition and enhancement for desert tortoise will protect eagle foraging habitat (**BIO-12**); additional mitigation may be required pending USFWS guidance.
Special-Status Birds & Migratory Birds	**Direct Impacts**: Permanent loss of breeding and foraging habitat, including loss of 1,774 acres of Sonoran creosote bush scrub and 16[b] acres of microphyll woodland; potential loss of eggs and young; disturbance of nesting and foraging activities for populations on and near the plant site and linear facilities; degradation and fragmentation of remaining adjacent habitat from edge effects. **Indirect Impacts**: increased road kill hazard from operations traffic and collision with mirrors; increased predation from ravens; disturbance from operations. **Cumulative Impacts**: Contributes 0.6% to cumulative loss of habitat from future projects within NECO planning area. **Mitigation**: Implement impact avoidance and minimization measures (**BIO-8**); pre-construction nest surveys (**BIO-15**); avian protection plan (**BIO-16**) off-site habitat acquisition and enhancement (**BIO-12** and **BIO-22**)
Desert Kit Fox & American Badger	**Direct Impacts**: Permanent loss of 1,811 [a,f] acres of foraging and denning habitat; fragmentation and degradation of remaining habitat, loss of foraging grounds, crushing or entombing of animals during construction; increased risk of road kill hazard from construction traffic. **Indirect Impacts**: Disturbance from increased noise and lighting; introduction and spread of weeds; increased risk of road kill from operations traffic. **Cumulative Impacts**: Contributes 0.5% to cumulative loss of habitat from future projects within the NECO planning area. **Mitigation:** Implementation of impact avoidance and minimization measures (**BIO-8**), conduct pre-construction clearance surveys (**BIO-17**); off-site habitat acquisition and enhancement (**BIO-12** and **BIO-22**)
Nelson's bighorn sheep	**Direct Impacts:** None **Indirect Impacts:** harassment from elevated construction noise **Cumulative Impacts**: None **Mitigation:** Implementation of noise-related avoidance and minimization measures (**BIO-8**).
Bats	**Direct/Indirect/Cumulative Impacts**: Loss of foraging habitat. **Mitigation:** off-site habitat acquisition and enhancement (**BIO-12** and **BIO-22**)

Biological Resource	Impact/Mitigation
Special Wildlife Management Areas	**Chuckwalla DWMA/Desert Tortoise Critical Habitat:** Impacts to 24 acres **ACEC**: None **WHMA:** Impacts to1,811[a,f] acres **Mitigation**: Mitigate loss of critical habitat with acquisition and preservation of suitable desert tortoise at a 5:1 ratio (**BIO-12**).
Special-status Plants ▪ Harwo od's eriastrum ▪ Harwo od's milk-vetch ▪ Ribb ed cryptantha ▪ Desert unicorn plant ▪ L ate-season special-status plants •	**Direct Impacts:** Potential impacts to BLM Sensitive Harwood's eriastrum (CNPS 1B) from gen-tie construction near substation; Harwood's milk-vetch (CNPS 2) on linears and solar plant site; desert unicorn plant (CNPS 4) at solar plant site; ribbed cryptantha (CNPS 4) on linears and solar plant site. Potential direct impacts to CNPS 1B, 2, 4 and new taxa detected during late season surveys. **Indirect impacts:** Fragmentation/isolation and reduced gene flow between isolated fragments of area population; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; potential disruption of sand transport systems that maintain habitat below the Project; alteration of drainage patterns; herbicide drift; disruption of photosynthesis and other metabolic processes from dust. Construction of SCE substation could cause loss of over 1000 individuals of Harwood's eriastrum. **Cumulative Impacts:** Contributes to cumulative loss of plants and habitat, and indirect effects to Harwood's eriastrum, Harwood's milk-vetch, desert unicorn plant and ribbed cryptantha from other I-10 corridor projects and throughout range. Contributes 0.7% to cumulative loss of Harwood's milk-vetch habitat from future projects within the NECO Planning Area. Contributes cumulative loss of dune-, playa-, and wash habitat for other special-status species in Chuckwalla Valley: 4.6% desert washes in Chuckwalla Valley; 1.7% dunes and sand fields; 0.2% playa. **Mitigation:** Implement **BIO-19** - avoidance requirements for Harwood's eriastrum; off-site compensation or restoration mitigation for Harwood's milk-vetch; general avoidance and minimization measures for all special-status plants. Implement late-season surveys and mitigate according to triggers and performance standards in **BIO-19**. Indirect effects and impacts to habitat also addressed in Weed Management Plan (**BIO-14**); Best Management Practices (**BIO-8**); special-status plant impact avoidance and minimization measures and potential habitat compensation (**BIO-19**), acquisition of sand dune habitat (**BIO-20**).
Groundwater-Dependent Plant Communities	**Direct:** None **Indirect/Cumulative:** None; with dry cooling, impacts to groundwater plant communities would be less than significant **Mitigation:** None

Source: (Ex .400, Table 5, pp. C.2-64 to C.2-67.)

Biological Resources Table 3
Acreage of Direct and Indirect Impacts to Biological Resources and Recommended Mitigation

Resource	Acres Impacted	Mitigation Ratio	Recommended Mitigation Acreage
Desert Tortoise Habitat – Direct Impacts			
Within DWMA/Critical Habitat	24	5:1	120
Outside Critical Habitat	1,750	1:1	1,750
Total Desert Tortoise Mitigation			**1,870**
Stabilized/Partially Stabilized Sand Dunes – Direct Impacts			
Direct Impacts	7.5	3:1	22
Playa and Sand Drifts Over Playa			
Direct Impacts	38	3:1	114
Total Mojave Fringe-toed Lizard Mitigation			**136**
State Waters* - Direct Impacts			
Microphyllous Riparian Vegetation	16	3:1	48
Unvegetated Ephemeral Dry Wash	53	1:1	53
State Waters- Indirect Impacts			
Unvegetated Ephemeral Dry Wash	21	0.5:1	10
Total State Waters Mitigation			**111**

Source: Ex. 403, Table 6, p. C.2-8.

Impacts to Waters of the State

Grading within the Project Disturbance Area and its ephemeral drainages will directly impact 69 acres of state jurisdictional waters, and for 53 of these acres it will permanently eliminate their hydrological, biogeochemical, vegetation and wildlife functions. Eighteen acres of drainages will be temporarily impacted by construction of linear facilities and access roads associated with those facilities. (Ex. 400, p. C.2-71; 403, p. C.2-7.)

Desert washes downstream from the Project area, comprising approximately 21 acres of state waters, will also be indirectly impacted as a result of changes to upstream hydrology, with downstream vegetation in washes deprived of flows or receiving lower or higher volumes and velocities of water than current conditions at discharge points along the stormwater conveyance channel. Diversions could

significantly alter the hydrology and wa sh-dependent vegetation of any features that may occur downstream of the Project area, an effect that is quite app arent below I-10 near the Corn Springs Exit. O n the n orthern side of I-10 broad expanses of desert wash trees and s hrubs hav e died in response to the construction of I-10 and the diversion of s maller channel s into collector ditches on the southern side of I-10. (Ex. 400, pp. C.2-71 to C.2-72.)

The evide nce shows that direct impac ts of the GSEP to 69 acres of state jurisdictional waters and indirect impac ts to as many as 21 acres to be significant. The extensive ephemeral drainage network at the GSEP site currently provides many functions and values, including landscape hydrologic connections, stream energy dissipation during high-wa ter flows that reduces erosion and improves water quality, water supply and wa ter-quality filtering functions, surface and subsurface water storage, groundwat er recharge, sediment transport, storage, and depos ition aiding in fl oodplain maintenance and developm ent, nutrient cycling, wildlife habitat and mo vement/migration; and support for vegetation communities that he lp stab ilize stream banks an d provide wildlife habitat. The GSEP will eliminate all of t hese functions and value s on at least 5 3 acres of ephemeral washes, and will temporarily impact these functions on another 18 acres. (Ex. 400, p. C.2-72.)

Off-site acquisition and enhanc ement of off- site state waters will mitigate GSEP impacts to state waters. Staff and CDFG have propos ed mitigation at a 1:1 ratio for unvegetated ephemeral drai nages, and at a 3:1 mit igation ratio for microphyll woodlands, the higher ratio reflecting the hi gh wildlife v alues and scarcity of this habitat type. Indirect impacts to state wate rs will be mitigated at half the ratio of direct impacts, as detailed in **Biological Resources Table 3**. The lesser mitigation r atio for indirect impacts to drainages downgradient of t he GSEP site reflects the expectation that while the wash-dependent vegetation down slope of altered drainages will ev entually be lost, that loss will be slow and gradual. It is anticipated that the wa sh-dependent vegetation do wnstream of the GSEP deprived of flows will cont inue to provide habitat fo r years and possibly deca des after the Project is constructed, although eventually it will die (if deprived of flows) or be indir ectly affected by erosion and se dimentation along reaches below the stormwater channel discharge points. (Ex. 400, pp. C.2-72 to C.2-73; 403 p. C.2-8.)

Condition of Certification **BIO-22** includes the off site acquis ition of 111 acres of waters of the state within the Chuckwalla Valley watershed, with at least 48 acres of that consisting of microphyllous ripar ian vegetation. This condition also provides t he spec ifics of avoidance an d mitigation measures for impacts to

ephemeral drainages within and downslope of the Project Disturbance Area. Implementation of Condition of Certification **BIO-22** will reduce GSEP impacts to state waters to less than significant levels, and will satisfy CDFG codes relating to protection of state waters. (Ex. 400, p. C.2-73; 403 p. C.2-8.)

Impacts to Special-status Species

Mojave Fringe-toed Lizard. The GSEP will directly impact 45.5 acres of Mojave fringe-toed lizard habitat (comprised of 7.5 acres of dunes and 38 acres of playa with sand drifts) The Mojave fringe-toed lizards in the Chuckwalla Valley are at the southernmost portion of the species range, and the GSEP could increase the risks of local extirpation of an already fragmented and isolated population. Condition of Certification **BIO-20** requires acquisition and protection of habitat supporting core populations of Mojave fringe-toed lizard habitat in the Chuckwalla Valley, which will reduce GSEP impacts to less than significant levels. (Ex. 400, pp. C.2.1 to C.2-2 and pp. C.2-74 to C.2-76.)

A number of sensitive species were observed in the vicinity of the proposed substation during the 2010 surveys, including many Mojave fringe-toed lizards. The transmission line extension construction could therefore result in direct and indirect impacts to Mojave fringe-toed lizards and to their habitat. Condition of Certification **BIO-20** requires acquisition and protection of habitat supporting core populations of Mojave fringe-toed lizard habitat in the vicinity of the proposed substation. This impact will be mitigated to less than significant levels with Condition of Certification **BIO-20**. (Ex. 400, pp. C.2-74 to C.2-76.)

CBD argues that the RSA fails to identify habitat fragmentation as a significant impact of the facility site, the access road, and the transmission line. (CBD Op. Brief, p. 6). However, the record shows that habitat fragmentation is identified as a significant impact to the Mojave fringe-toed lizard in the RSA (Ex. 400) at pages C.2-74 through C. 2-75, as well as C. 2-147. Fragmentation of the habitat and the accompanying isolation and reduced population viability was deemed to be significant. (Ex. 400, pp. C.2-75; C.2-147). The access road and transmission lines were included in the biological analysis in the RSA as part of the total disturbance area of the project (Ex. 400, pp. C.2-12 through C.2-13). We find that the evidence identifies habitat fragmentation as a significant impact of the facility site, the access road, and the transmission line, and we further find that these impacts will be mitigated to less than significant levels with Condition of Certification **BIO-20**.

Desert Tortoise . During construction of the GSEP desert tortoises may be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and injury or mortality from encounters with worker's or visitor's pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel will occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may seek shade by taking shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved. (Ex. 400, pp. C.2-76 to C.2-77.)

The Applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoise out of construction areas, relocating/translocating the resident desert tortoise from the GSEP site, reducing construction traffic and speed limits to reduce the incidence of road kills and worker environmental awareness training programs. (Ex. 400, p. C.2-77.)

We have incorporated these recommendations into conditions of certification. These include Conditions of Certification **BIO-1** through **BIO-5,** which requires qualified biologists, with authority to implement mitigation measures necessary to prevent impacts to biological resources, be on site during all construction activities. Condition of Certification **BIO-6** requires the development and implementation of a Worker Environmental Awareness Program to train all workers to avoid impacts to sensitive species and their habitats. Condition of Certification **BIO-7** requires the project owner to prepare and implement a Biological Resources Mitigation Implementation and Monitoring Plan that incorporates the mitigation and compliance measures required by local, state, and federal LORS regarding biological resources. Condition of Certification **BIO-8** describes Best Management Practices requirements and other impact avoidance and minimization measures. (Ex. 400, p. C.2-77.)

Conditions of Certification **BIO-9** through **BIO-11** are specific to desert tortoise; Condition of Certification **BIO-9** will require installation of security and desert tortoise exclusionary fencing around the entire Project Disturbance Area

(including access roads), and **BIO-10** recommends the development and implementation of a desert tortoise translocation plan to move the tortoises currently living in the Project Disturbance Area to identified translocation sites. **BIO-11** requires verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. (Ex. 400, p. C.2-77.)

To offset the loss of 1,774 acres of desert tortoise habitat, Condition of Certification **BIO-12** recommends habitat compensation at a 1:1 ratio for desert tortoise (i.e., acquisition and preservation of one acre of compensation lands for every acre lost). For Project impacts to 24 acres of Chuckwalla Desert Critical Habitat Unit, the mitigation ratio will be 5:1. The acquisition of compensatory mitigation lands offsets Project impacts to desert tortoise and other sensitive species by protection of those lands, and by enhancement actions such as fencing, road closure, weed control, and habitat restoration. The protection and enhancement actions increase the carrying capacity of the acquired lands for desert tortoise, which increases their population numbers by enhancing survivorship and reproduction. (Ex. 400, p.C.2-81). This compensatory mitigation is consistent with recommendations from the California This compensatory mitigation is consistent with recommendations from the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and BLM guidance in the NECO. Condition of Certification **BIO-12** also requires that the land acquisitions be within the Colorado Desert Recovery Unit, and have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise populations and designated critical habitat. These conditions satisfy the CDFG's requirements under Section 2081 of the California Fish and Game Code. (Ex. SA, pp. C.2-79 to C.2-82.)

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys, but given the proximity of good habitat in the immediate vicinity of the proposed substation desert tortoise could occur in or near transmission line construction areas and could be directly or indirectly impacted. Implementation of conditions of certification **BIO-9** through **BIO-12** will reduce potential impacts to desert tortoise to less than significant levels. Construction activities and addition of new perching structures such as poles could result in increased ravens, and hence an increase in desert tortoise predation. This impact will be mitigated with implementation of Condition of Certification **BIO-13**, the Raven Management Plan. (Ex. 400, p. C.2-70.)

<u>Couch's Spadefoot Toad</u>. The GSEP is located at the western border of the Couch's spadefoot toad range. The evidence shows that the impacts to one of

the few known breeding ponds for this species at the western boundary of its range to be a significant impact. Condition of Certification **BIO-27** requires development and implementation of a Couch's Spadefoot Toad Protection and Mitigation Plan, which requires avoiding impacts to all spadefoot toad breeding habitat along the Project linear corridors, or requires construction of replacement habitat if impacts are unavoidable. In order to complete this plan, habitat surveys in 2010 will be required to identify potential spadefoot toad breeding habitat along the linear alignment. (Ex. 400, p. C.2-86.)

The evidence suggests that construction activities can avoid the known breeding pond south of I-10 near Wiley Well Road (7/12/10 RT 78:12 – 81:14). The Protection and Mitigation Plan will provide detailed guidance to implement the protection of the I-10 pond during Project construction and operation, and will extend that protection to any other ponds detected during habitat surveys conducted north of I-10 along the linear corridor. Condition of Certification **BIO-27** also requires that the new breeding pond habitat be created if ponds are impacted during construction. The avoidance, minimization and compensatory mitigation described in **BIO-27** will reduce impacts to Couch's spadefoot toad to less than significant levels. (Ex. 400, p. C.2-87.)

<u>Western Burrowing Owl</u>. The evidence indicates that while no burrowing owls were detected in the Project Disturbance Area during the 2009 surveys, they could be found there when construction occurs because they have been recorded nearby. Condition of Certification **BIO-18** (Burrowing Owl Impact Avoidance and Minimization Measures) requires a pre-construction survey to determine the current number of owls occupying the Project Disturbance Area and surrounding buffer area. **BIO-18** recommends avoidance and minimization measures to protect owls nesting near but not within the Project Disturbance Area. In addition, Staff has conservatively assumed that one burrowing owl pair might occur within the Project, and acquisition of up to 19.5 acres per owl of compensatory mitigation will be required to offset the loss of habitat if pre-construction surveys indicate that owls are using the GSEP site for breeding. If no burrowing owls are detected nesting within the Project Disturbance Area during pre-construction surveys, then the acquisition of 19.5 acres per owl of burrowing owl habitat will not be required. With implementation of **BIO-18,** direct and indirect impacts to burrowing owls resulting from construction of the Project will be mitigated to less than significant levels through pre-construction surveys and acquisition of compensatory habitat if it is determined that owls will be displaced as a result of construction following surveys. (Ex. 400, p. C.2-89.)

Golden Eagle. While golden eagles are known to occur in the region, there are no known nests within 14 miles of the GSEP site and this species was not incidentally observed during avian point count surveys or field surveys conducted for other plant and wildlife species. Golden eagle inventories were conducted using methods recommended by USFWS and covered all potential nesting habitat within 10 miles of the GSEP boundaries. (Ex. 400, p. C.2-89; Ex. 59 ; Ex. 65.) Staff made a general evaluation of the potential for the GSEP to injure or disturb breeding or wintering golden eagles with the assumption that an active golden eagle territory might occur within 10 miles of the GSEP boundaries. Based on guidance provided by the USFWS staff defined disturbance as an activity that will result in injury to an eagle or which would substantially interfere with normal breeding, feeding, or sheltering behavior. (Ex. 400, p. C.2-89.)

The evidence indicates that GSEP construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to the GSEP boundaries to be affected by the sights and sounds of construction. Because these potential impacts are unlikely disturbance to nesting activities will be avoided with implementation of Condition of Certification **BIO-28** (Golden Eagle Inventory and Monitoring)for those nests found within one (1) mile of construction activities. This condition requires that during construction, golden eagle nest surveys be conducted in accordance with USFWS guidelines to verify the status of golden eagle nesting territories within one (1) mile of the project boundaries. If active nests are detected, **BIO-28** requires monitoring guidelines, performance standards, and adaptive management measures to avoid adverse impacts to golden eagles from GSEP construction. Implementation of **BIO-28** will reduce potential impacts of GSEP construction on nesting golden eagles to less than significant levels. (Ex. 400, p. C.2-89.)

Staff also assessed the impacts of the GSEP to golden eagle foraging habitat, and concluded that the GSEP would contribute to the cumulative loss of golden eagle foraging habitat within the NECO planning area. The GSEP will reduce the availability of foraging habitat in the Project area and could degrade foraging habitat by the introduction and spread of noxious weeds and an increase in human activity in the area. The potential for impacts to golden eagle foraging habitat can be minimized by the implementation of Conditions of Certification **BIO-12** (acquisition of desert tortoise compensatory mitigation lands), **BIO-22** (acquisition of state waters compensatory mitigation lands) **BIO-14** (implementation of Weed Management Plan). As described in **BIO-12**, the acquisition of desert tortoise mitigation lands would be targeted for areas within and near the Chuckwalla Bench and the Chuckwalla DWMA. Because these

targeted areas are also within 10 miles of potential nesting sites for golden eagles, acquisition of these desert tortoise mitigation lands will also provide protected golden eagle foraging grounds. (Ex. 400, p. C.2-90.)

Migratory/Special-status Bird Species. Several special-status species, such as black-tailed gnatcatchers, yellow warblers, and crissal thrashers, breed in the region, but will not breed on the site due to lack of suitable habitat. This region does not provide breeding habitat for Swainson's hawks, northern harriers, short-eared owls, ferruginous hawks, or Brewer's sparrows but may provide overwintering habitat or the species may be present during migration. The GSEP impacts to Sonoran creosote bush scrub and microphyll woodland will contribute to loss of foraging habitat, cover, and roost sites for these species on their migratory or wintering grounds, but will not contribute to loss of breeding habitat. The GSEP will have more substantial adverse effects to the resident breeding birds at the site, which include loggerhead shrike, California horned lark, and Le Conte's thrasher among others. These species will be adversely affected by the loss of 16 acres of microphyll woodland and 1,774 acres of Sonoran creosote bush scrub. Le Conte's thrasher, loggerhead shrikes and other wash-dependent species will in particular be affected by the loss of the cover, foraging and nesting opportunities provided by the structurally diverse and relatively lush dry washes and microphyll woodland. Dry washes contain less than five percent of the Sonoran Desert's area, but are estimated to support ninety percent of Sonoran Desert birdlife. As discussed in the cumulative impact subsection, the evidence shows that the GSEP will be a substantial contributor to the cumulative loss of the NECO Planning Area's biological resources, including habitat for these special-status birds. Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan and **BIO-22**, mitigation for impacts to state waters, will offset the cumulative loss of habitat for these species. (Ex. 400, pp. C.2-90 to C.2-91.)

The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503, which protects active nests or eggs of California birds. Mitigation measures to avoid and minimize impacts to nesting birds have been incorporated into Conditions of Certification including: **BIO-8** (Impact Avoidance and Minimization Measures); **BIO-15** (Pre-construction Nest Surveys); which describes guidelines for performing pre-construction surveys and **BIO-16** (Avian Protection Plan) which provides a mechanism to monitor for bird collisions and implement adaptive management measures to minimize impacts. Implementation of conditions of certification will avoid direct impacts to nests, eggs, or young of migratory birds, and will minimize the impacts

to less significant levels for construction disturbance to resident and migratory birds. (Ex. 400, p. C.2-91.)

Other Mammals. The GSEP site supports foraging and roosting habitat for several special-status bat species. Roosting opportunities for bats are available in tree cavities, soil crevices and rock outcroppings primarily within dry desert wash woodland habitats. Bats likely utilize habitats throughout the study area for foraging but forage more commonly when water is present within the desert washes when insects are more abundant. Implementation of the Project will result in loss of these foraging and roosting habitat opportunities for special-status bats that might occur in the Project area. Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan and **BIO-22**, mitigation for impacts to state waters, will offset the cumulative loss of habitat for these species. (Ex. 400, p. C.2-91.)

Construction of the Project could kill or injure American badgers by crushing with heavy equipment or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Like badgers, desert kit fox are burrow dwellers and are similarly at risk of death or injury from construction activities. The desert kit fox is not a special-status species, but it is protected under Title 14, California Code of Regulations (section 460), and potential impacts to individuals of this species must be avoided. Badger burrows and kit fox burrow complexes were detected within the Project Disturbance Area, and the site includes suitable foraging and denning habitat for these species. Construction activities could also result in disturbance or harassment of individuals. Condition of Certification **BIO-17** requires that concurrent with the desert tortoise clearance survey, a qualified biologist perform a preconstruction survey for kit fox dens and American badgers in the Project area, including areas within 250 feet of all Project facilities, utility corridors, and access roads. (Ex. 400, p. C.2-91.)

The GSEP will permanently remove approximately 1,811 acres of foraging and denning habitat for American badgers and kit foxes and will fragment and reduce the value of foraging and denning habitat adjacent to the Project site. This habitat loss and degradation could adversely affect American badger and kit fox populations within the NECO Planning Area. As discussed in the cumulative impact subsection, the GSEP will be a substantial contributor to the cumulative loss of the NECO Planning Area biological resources, including American badgers and kit fox. Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan, and **BIO-22**, compensatory mitigation for state

waters, will offset the loss of habitat for this species and reduce the impact to less-than-significant. (Ex. 400, p. C.2-92.) We find the combination of these conditions along with Condition of Certification **BIO-17** mitigates impacts to American badgers and kit fox below significance.

The GSEP site is south of a bighorn sheep connectivity corridor between the Palen and McCoy Mountains, identified in the NECO. The evidence indicates that the GSEP site is not an important movement corridor for this species given the distance from the mountain ranges and the width of the valley at the GSEP site. The Society for Conservation of Bighorn Sheep has recommended a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat. The GSEP site is over one mile from the base of either the McCoy Mountains or Palen Mountains, and is not expected to provide spring foraging habitat for the bighorn sheep. Therefore the GSEP will have no significant impact on bighorn sheep. (Ex. 400, p. C.2-92.)

Special-status Plant Species

No federal or state-listed plant species occur within the Project Disturbance Area but four species of special-status plants were detected within the Study area during spring 2009 and 2010 surveys, including Harwood's milk-vetch, desert unicorn, and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive species, was detected at the Colorado River Substation site and Project linears east of the site during the 2010 spring surveys. Harwood's eriastrum has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations, several of which are historic records that have not been verified. The evidence concludes that the Project's direct, indirect, and cumulative impacts to Harwood's eriastrum and Harwood's milk-vetch are significant, but impacts to ribbed cryptantha are not. While the direct effects of the Project on desert unicorn are minor, the impacts of all future projects in the NECO planning area are cumulatively considerable. The avoidance, minimization and compensation measures described in Condition of Certification **BIO-19** (Special-Status Plant Mitigation) will minimize the impacts to Harwood's eriastrum and Harwood's milk-vetch to a level less than significant, and will reduce the Project's contribution to cumulative effects to special-status plants to a level less than considerable. (Ex. 400, p. C.2-2.)

The special-status plant surveys at the project site were extensive, highly professional, covered multiple years, and are legally sufficient for a CEQA analysis. With this survey data, as well as expert opinion, multiple site visits by staff, an exhaustive review of databases and literature, and a review of GIS data on ownership and threats to occurrences from other projects, staff conducted a

thorough analysis of impacts to late season plants potentially occurring in the Project area. The information was adequate for staff to conclude that the Genesis Project's impacts to late season special-status plants, if present, *are* significant, and that avoidance, minimization, and compensation measures—with detailed and measurable performance standards—are required. Staff commits the Project to conducting the late season surveys prior to construction, and provides thresholds for significance and triggers for mitigation for any such plants detected, based on status, rarity, extinction risk, and the portion of the local population affected. (Staff Assessment C.2-2, C.2-3, C.2-7.)

Abram's spurge, flat-seeded spurge, lobed ground cherry have moderate to high potential to occur within the GSEP site. They were not detected during spring 2009 and 2010 botanical surveys but may have been missed because they are late season plants that cannot be detected during routine spring surveys. Project construction and operation could result in direct and indirect impacts to late season special-status plants, if present, and impacts to these and other species may be significant. **BIO-19** includes a requirement to conduct late-season surveys in summer-fall 2010. Specific triggers and detailed performance standards for mitigation of impacts are included in **BIO-19** to ensure that impacts to any special-status plants found during the late season surveys are mitigated to a level less than significant. (Ex. 400, pp. C.2-2 to C.2-3.)

CBD contends that the RSA provides inadequate information on late summer and fall blooming plants at the project site (CBD Op. Brief, p. 9). CBD points out that Staff concluded that potentially significant impacts to special-status plants could be missed unless additional late season surveys are conducted." (Ex. 400 at C.2-207). CBD argues that "this statement simply assumes that any such significant impacts that may be found can be mitigated. (CBD Op. Brief, p. 9). The RSA analyzes GSEP impacts to the special-status plant species found during two years of spring surveys, and analyzed the impacts of the project to late-season plants with potential to occur (if present) based on known occurrences within a 50-mile region and the presence of suitable habitat. (Ex. 400, pp C.2-99 to 116.)

We again point out that the presence of a species on a project site may be assumed. Assuming the presence of a species obviates the need for surveys and allows the creation of performance conditions that provide maximal protection to the species presumed to be present at the site. We see nothing wrong with Staff's conservative approach of assuming the worst case scenario for impacts analysis and mitigation, then verifying the results in subsequent surveys. Condition of Certification **BIO-19** contains performance standards that will ensure

that any species found, including new, undescribed species or plants with local or regional significance, will be mitigated to a level less than significant.

A number of additional conditions of certification are required that will minimize direct and indirect impacts to special-status plants. **BIO-14** requires finalizing and implementing the detailed Weed Management Plan, the guidance for which was based on a hybrid of BLM, The Nature Conservancy, USFS, and NatureServe guidelines for management of invasive plants. The avoidance and minimization measures contained in **BIO-1** through **BIO-8** will also benefit special-status plants by protecting the avoided occurrences of Harwood's milk-vetch, Harwood's eriastrum, ribbed cryptantha, desert unicorn plant, and other avoided special-status plants from accidental effects during construction. **BIO-20** requires compensation for impacts to Mojave fringe-toed lizard habitat; the dunes and sand fields that support this species also support several special-status plants. **BIO-22** (Mitigation for Impacts to State Waters) requires acquisition of desert washes and desert wash woodland and permanent protection of the acquired habitat from future development. Desert washes provide essential habitat for a number of late-season special-status plants. **BIO-7** (preparation of BRMIMP) will ensure implementation of all mitigation measures under a mitigation monitoring plan and enforced under the authority of the CPM. (Ex. 400, p. C.2-115.)

Condition of Certification **BIO-24** requires the Applicant prepare a Revegetation Plan to restore all areas subject to temporary disturbance to pre-Project grade and conditions. To the extent practical and as part of this Revegetation Plan, the Applicant will salvage native desert plants during construction of the Project and will use the salvaged plants for revegetation of temporarily disturbed areas. The Revegetation Plan will address the salvaging of cacti, native trees, and topsoil during initial vegetation grubbing of the Project site, as well as proper storage of salvaged plant material and seed collection, replanting of salvaged materials, and monitoring parameters including revegetation success criteria and performance standards for salvaged materials. (Ex. 400, p. C.2-115.)

The 2009 and 2010 surveys also included an inventory of native cacti, succulents and native trees that are not considered rare (e.g., they are not tracked by CNDDB or included on the CNPS special-status plant lists) but the harvesting of these native plants is regulated under the California Native Plant Protection Act (Fish and Game Codes 1900-1913) and the California Desert Native Plant Act of 1981 (i.e. Food and Agricultural Code 80001, et. seq. and Fish and Game Codes 1925-1926), and prevent unlawful harvesting of non-listed native desert plants of the state. (Ex. 400, p. C.2-116.)

The Applicant conducted stratified sampling plots for cacti, yucca, and native trees in the Study area and found that two cacti species (beavertail cholla and Wiggins cholla, although the latter is no longer believed to be a valid taxon) and three tree species (palo verde, cat-claw acacia, and ironwood) occur within the Project area. Other cacti and native trees identified during field surveys include buckhorn cholla (*Cylindropuntia acanthocarpa*), silver cholla (*C.=Opuntia echinocarpa*), pencil cholla (*C.=Opuntia ramosissima*), ocotillo (*Fouquieria splendens*), fish-hook cactus (*Mammillaria tetrancistra*), honey mesquite (*Prosopis glandulosa*), and smoke tree (*Psorothamnus spinosus*). To the extent practical, the Applicant will salvage native desert plants during construction of the Project and will use the salvaged plants for revegetation of temporarily disturbed areas. The Applicant has prepared a draft Revegetation Plan that addresses the salvaging of cacti and native trees during initial vegetation grubbing of the Project site, as well as proper storage of salvaged plant material and seed collection, replanting of salvaged materials, and monitoring parameters including revegetation success criteria and performance standards for salvaged materials. Condition of Certification **BIO-24,** entitled "Revegetation of Temporarily Disturbed Areas," requires the applicant to prepare and implement a Revegetation Plan which will address the salvaging of topsoil and native desert plants to aid in the revegetation of temporarily disturbed areas following Project construction. (Ex. 400, p. C.2-116.)

CBD argues that "in order to assure that the ambitious goals of this revegetation effort is met post project closure, it will be necessary to bond the project, so that all revegetation obligations will met [sic] and assured." (CBD Op. Brief, p. 10 citing Ex. 830 p. 7). CBD further contends that the Revegetation Plan appears to only address the 59.8 acres of temporary construction impacts due to project and transmission line construction. Clearly a more comprehensive revegetation strategy needs to be developed for the entire site of approximately 1800 acres." (*Id*). Clearly, CBD misread the condition, because the Revegetation Plan contemplated in Condition of Certification **BIO-24** only applies to revegetation of *temporarily disturbed* impact areas following project construction. It does not address permanently disturbed impact areas. The mitigation for the permanently disturbed plant site is contained in other conditions, such as Condition of Certification **BIO-19.**

Construction Noise Impacts

Construction activities will result in a temporary, although relatively long-term (37 months) increase in the ambient noise level. Animals rely on hearing to avoid predators, obtain food, and communicate. Excessive construction noise could

interfere with normal communication, potentially interfering with maintenance of contact between mated birds, obscuring warning and distress calls that signify predators and other threats, and affecting feeding behavior and protection of the young. High noise levels may also render an otherwise suitable nesting area unsuitable. Behavioral and physiological responses to noise and vibration have the potential to cause injury, energy loss (from movement away from noise source), a decrease in food intake, habitat avoidance and abandonment, and reproductive losses. (Ex. 400, p. C.2-92.)

Assuming an average construction noise of 93 dBA at 50 feet from the noise center (the upper range of noise levels for construction equipment), project construction noise will attenuate to 30 dBA at a distance of five miles from the noise center. Using sound extrapolation, project construction noise should attenuate to 60 dBA at approximately 2,300 feet (0.43 mile) from the noise center of construction activities. The loudest proposed construction activity will be the steam blows required to prepare a steam turbine for startup during the final phase before operation. This process cleans the piping and tubing which carry steam to the turbines; starting the turbines without cleaning these systems will destroy the turbine. A continuous low-pressure technique will be used for steam blows, which will release steam over a continuous period of about 36 hours and will result in noise levels of about 80 dBA at 100 feet. Another relatively loud and short-term construction activity is pile driving. If required, noise from this activity could be expected to reach 101 dBA at a distance of 50 feet and attenuate to 47 dBA at distance of five miles from the project site. (Ex. 400, p. C.2-92.)

The majority of the construction activities will occur within the power blocks located approximately 3,200 feet (0.6 mile) from the GSEP boundary. Therefore, it is anticipated that construction noise levels will typically be less than 65 dBA in the Palen/ McCoy Wilderness Area and surrounding the GSEP site. The infrequent occasions when construction activities will occur near the project boundary and resultant noise levels will be temporarily elevated beyond 65 dBA surrounding the GSEP will not significantly impact sensitive wildlife. For a complete analysis of construction noise impacts, refer to the **Noise** section of this Decision. (Ex. 400, p. C.2-92.)

Noxious Weeds Impacts

Construction activities and soil disturbance could introduce new noxious weeds to lands adjacent to the GSEP plant site and its linear facilities, and could further spread weeds already present in the Project vicinity. The spread of invasive

plants is a major threat to biological resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species. To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The Applicant has submitted a draft Weed Management Plan to avoid and minimize the spread of noxious weeds. We have incorporated recommendations from the Applicant into Condition of Certification **BIO-14** (Weed Management Plan). The Weed Management Plan includes a discussion of weeds targeted for eradication or control and a variety of weed prevention measures such as establishing weed wash stations for construction vehicles and revegetation of disturbed areas with native seed mix. Implementation of this condition/weed management plan will reduce potential impacts from introduction and spread of noxious weeds to less than significant levels. (Ex. 400, p. C.2-94.)

Dust Impacts

Disturbance of the soil's surface caused by construction traffic and other activities will result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area. Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erosion of the soil and accelerates the loss of nutrients. Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on both foraging and burrowing potential for Mojave fringe-toed lizards. The impacts of increased dust and other construction impacts will be minimized below significance with implementation of Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures). This condition includes measures to limit areas subject to disturbance, erosion control measures, and vehicular speed limits, all of which help minimize dust associated with construction and operation of the GSEP. (Ex. 400, pp. C.2-95 to C.2-96.)

4. Operational Impacts and Mitigation

Potential operational impacts to biological resources include increased risk of predation on desert tortoise and wildlife, lighting, potential collisions with structures, increased noise levels, and impacts to birds due to hazardous conditions at the evaporation ponds.

Operational Impacts to Biological Resources

Construction and operation of the GSEP project area could provide new sources of food, water, and nesting sites that might draw unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote to the Project area. Project structures will also provide new nesting and perching sites for ravens such as new transmission line towers and perimeter fencing. Development of new elevated perching sites as a result of GSEP construction could increase raven numbers locally, including the probability that young ravens remain in the area after maturing, which, in turn, could result in increased predation on desert tortoise in the vicinity of the Project Disturbance Area. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert. Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence. (Ex. 400, pp. C.2-82.)

The draft Common Raven Monitoring, Management and Control Plan includes methods and best management practices to avoid and minimize raven attractants and subsidies on the GSEP site, and these methods and practices have been incorporated into Condition of Certification **BIO-13**. The Applicant's Common Raven Monitoring, Management and Control Plan will involve identifying and preventing conditions that might attract or support ravens (for example, eliminating food sources such as garbage or roadkill, minimizing creation of structures that could provide ravens perches, nests or roosts), monitoring the effectiveness of raven management and control measures, and then implementing additional adaptive management measures to make sure that the GSEP does not result in an increase in raven numbers. Implementation of measures in **BIO-13** will avoid or minimize the contributions of the Project to increased desert tortoise predation from ravens to less than significant levels. (Ex. 400, p. C.2-83.)

In addition to ravens, feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises. Dogs brought to the GSEP site with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat. The worker environmental awareness training (**BIO-6**) and restrictions on pets being brought to the site (**BIO-8**) will reduce or eliminate the potential for these impacts. (Ex. 400, pp. C.2-82 to C.2-83.)

Lighting During Operations

GSEP operations will require on-site nighttime lighting for safety and security, which could disturb the resting, foraging, or mating activities of wildlife and make wildlife more visible to predators. To reduce off-site lighting impacts, lighting at the GSEP facility will be restricted to areas required for safety, security, and operation. Exterior lights will be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity (GESP 2009a). Switched lighting will be provided for areas where continuous lighting is not required for normal operation, safety, or security. These features have been incorporated into Condition of Certification **VIS-2** (Temporary and Permanent Exterior Lighting) and **BIO-8**. With implementation of these measures, lighting at the GSEP will have no adverse effects on wildlife. (Ex. SA, p. C.2-92.)

Avian Collision Hazards

Collision hazards at the GSEP site will include several ancillary buildings (e.g., air cooled condenser structure, administration building, control room, steam turbine generator building) that range in height from 30 to 50 feet. The structures will be located within the power block, approximately in the center of each solar field and surrounded by solar arrays. The solar collection assemblies will vary in height depending on their position while tracking the sun; the tallest configuration will be approximately 25 feet tall. The tallest structures are the transmission line monopoles, which are approximately 75 feet tall. As described above, operation of the GSEP will require onsite nighttime lighting for safety and security at the site. The transmission line support structures will not be lit and no red incandescent lighting is proposed. With implementation of Conditions of Certification **VIS-2** and **BIO-8** pertaining to minimization of night lighting, lighted GSEP facilities will not pose a significant collision hazard at night. (Ex. 400, p. C.2-96.)

However, relative to nighttime collisions with lighted facilities, the risk of bird collisions and other injuries from solar facilities during daytime is unstudied. In particular, bird response to glare from the proposed solar trough technology is not well understood. Although the proposed Project facilities are significantly shorter than 350 feet (the height above which is considered a collision danger for migrating birds), there is concern that the mirrors may appear to a bird as a no-hazard flight area. The mirrors reflect light and take on the color of the image being reflected. When viewed from an angle near the current direction of the sun, at a distance or an elevated position, the solar field at its most reflective point

may appear like a waterbody or lake. Diurnal birds could also be at risk of injury and fatality from burns if they flew into the reflected sunlight between parabolic troughs or landed on the collector tubes of heat transfer fluid. Given the lack of research-based data on the impacts of glare and collision threats to birds, Condition of Certification **BIO-16** will require implementation of an Avian Protection Plan. The Avian Protection Plan will provide the information needed to determine if operation of the Project poses a collision risk for birds, and will provide adaptive management measures to mitigate those impacts to less than significant levels. (Ex. 400, p. C.2-97.)

CBD contends that one of the potentially significant impacts of the proposed project that was not adequately addressed is the potential to kill large numbers of birds by singeing or burning or collisions with mirrors. (CBD Op. Brief, p. 8) CBD concedes that "it is unknown whether birds could be singed or burned given the design of this plant—to our knowledge no bird studies have been undertaken or made public regarding the existing solar trough plants." (*Id*). CBD argues that the Conditions of Certification should include monitoring and reporting of impacts to all bird species, including frequent monitoring for migratory birds during migration seasons. If impacts to birds are greater than were expected in the RSA, a condition should be included to provide additional mitigation measures at a later time." (*Id*). We find that the Avian Protection Plan does exactly what CBD is suggesting and therefore, Condition of Certification **BIO-16** will mitigate impacts to avian resources below the level of significance.

Impacts from Electrocution by Transmission Lines

Large raptors such as golden eagle, red-tailed hawk, and great horned owl, can be electrocuted by transmission lines if the bird's wings simultaneously contact two conductors of different phases, or a conductor and grounded hardware. Potential impacts to wildlife resulting from electrocution by transmission lines will be minimized by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006*. Specifically, the phase conductors shall be separated by a minimum of 60 inches and bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible. This is further described in Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures); with implementation of Condition of Certification **BIO-8** the proposed transmission lines will not pose a substantial electrocution threat to birds. (Ex. 400, p. C.2-98.)

Operational Noise

The majority of operational noise will originate from the power blocks, which will be roughly centered at each site and surrounded by solar fields; this creates a buffer for noise to attenuate before reaching the GSEP property boundary and the Palen/McCoy Wilderness Area. Other minor operational noise sources include mirror rotation and maintenance activities (e.g., mirror washing). Excessive noise could disrupt the nesting, roosting, or foraging activities of sensitive wildlife. Operational noise is expected to typically range from 90dBA and for certain equipment to approximately 50 to 60 dBA at greater linear distances from the power generation equipment. Based on these estimates, the evidence shows that there will be no significant impacts to surrounding wildlife from increased operational noise. (Ex. 400, pp. C.2-98 to C.2-99.)

Impacts from Evaporation Ponds And Groundwater Pumping

The GSEP will include two 5-acre evaporation ponds that will collect wastewater. A variety of waterfowl and shore birds seasonally inhabit or utilize evaporation ponds as resting, foraging, and nesting areas. Evaporation ponds in the Sonoran Desert pose several threats to wildlife. First, creation of a new water source to an area where water is scarce will attract ravens to the GSEP, potentially increasing predation rates on juvenile desert tortoise in adjacent habitat. Second, waterfowl, shorebirds, and other resident or migratory birds that drink or forage at the ponds could be harmed by selenium or hyper-saline conditions resulting from high total-dissolved-solids concentrations Condition of Certification **BIO-21** requires installation of netting over the evaporation ponds to exclude birds and other wildlife as well as a monitoring program to ensure the effectiveness of exclusion. CBD argues that "birds will be attracted even if the ponds are netted (citations omitted)" (CBD Op. Brief, p. 8). Condition of Certification **BIO-21** requires visual deterrence in addition to the installation of netting over the evaporation ponds. We find that these measures will reduce evaporation pond impacts to birds to less-than-significant levels. (Ex. 400, p. C.2-99.)

The GSEP's groundwater pumping will have an impact on groundwater levels within the zone of potential effect centered on the GSEP's pumping well. The uncertainty as to the potential extent of the GSEP's impacts to groundwater and the potential adverse effects to groundwater dependent sensitive plant communities and to wildlife was reduced to less than significant by the project change to dry cooling. To ensure that the Project's proposed use of groundwater does not lower groundwater levels in the basin so that biological resources are

significantly and adversely affected. the applicant has reducedthe proposed water use significantly when switching from wet cooling to dry cooling.

Impacts to Biological Resources from Fire Response All-Terrain Vehicles

Condition of Certification **Worker Safety-6** requires the Applicant to provide two all-terrain fire engines for emergency personnel to enter the site in the event that normal access to the plant is unavailable. (Ex. 433). According to the record, these fire engines will be in the possession of the Riverside County Fire Department and will not be housed on the GSEP site. (7/12/10 RT 404:10-23.) Thus, in the event of an emergency where the main access to the GSEP is blocked, the all-terrain fire engines would still have the ability to access the site. At the time of the evidentiary hearing, no routes were planned for alternative access for the all-terrain fire engines. (7/12/10 RT 405: 2-7; 409:13-21; 410:21-411:8).

CURE argues "the record contains no analysis of potentially significant impacts to biological resources from fire engines driving through habitat for numerous species. Staff's failure to analyze potentially significant impacts from the all-terrain fire engines blatantly violates CEQA's requirement to analyze all potentially significant impacts. Therefore, if the Commission approves the Project as proposed, the Commission will violate CEQA as a matter of law." (CURE 1st Op. Brief, p. 11).

Likewise, CBD argues, "the impacts of such cross-country or off-road travel in this area by such vehicles were not identified or analyzed in the RSA and therefore the Commission has not complied with CEQA in this regard. The Center [CBD] is aware that the Riverside County Fire Department will likely eventually develop a plan for such emergency access under a variety of scenarios, however, that evaluation has not yet been undertaken." (CBD Op. Brief, p. 10).

Indeed, the record shows that the Riverside County Fire Department will "pre-plan for certain scenarios" (7/12/10 RT 411:3-8) but has yet to do so. (7/12/10 RT 405:2-7). The RCFD is "cognizant of environmental issues [and] safety issues." (7/12/10 RT 409:13-24). The reason the RCFD asked for the all-terrain fire trucks was to obtain access to the GSEP if ever the Wiley Well Road or GSEP main access were blocked. (7/12/10 RT 409:13-24; 413:8-13.)

Applicant's expert testified that "there's never been a case at either of the SEGS facilities where the main access to the plant was blocked. And actually the Harper facility has a similar long road to it. And in almost 20 years of operation that road nor has the main access ever been blocked." (7/12/10 RT 406:15-20.)

We can infer from the record that two emergency situations must *both* exist before the RCFD would take the all-terrain fire trucks off-road. First, a fire or similar emergency must be occurring at the GSEP that RCFD is responding to. Additionally, the Wiley Well Road or GSEP main access must be blocked. The record supports the conclusion that the odds of these two events occurring simultaneously are infinitesimally small. Further, the biological impacts that would be attributable to the all-terrain fire trucks driving to this event, should it ever happen, are speculative at best. We also note that the action of purchasing emergency vehicles does not, in itself, create any significant impact on biological resources. Therefore, the Intervenors have not met their burden to show the need for or the feasibility of an environmental analysis of the hypothetical impacts of the all-terrain fire trucks going off-road to bypass some obstruction to obtain emergency access to the GSEP.

CBD's opening brief quotes their witness' testimony that "fire in desert ecosystems is well documented to cause catastrophic landscape scale changes and impacts to the local species." (CBD Op. Brief, p. 10, citing Ex. 830 at 7.) CBD claims "the RSA fails to adequately identify or analyze the risk of fire or the potential impacts to the surrounding lands if a fire escaped from the site and accordingly also fails to address the mitigation of this impact." (*Id.*)

The record contains ample testimony (Ex. 400, pp. C.14-4, C.14-8, C.14-9, C.14-18 through C.14-24, C.14-31; Ex. 402 pp. 35 through 39) describing and analyzing the risk of fire, the potential impacts, and mitigation. The RSA focused on prevention using engineering and administrative controls, response from on-site automatic fire suppression systems, response from on-site personnel when a fire is in the incipient stage, and response from the off-site RCFD. The record contains background information on existing solar power plants using Therminol as the heat transfer fluid (Ex. 400, pp. C.14-20 through C.14-22) and developed an Emergency Response Matrix to assess the relative risk of a fire and the need for other emergency response at the proposed Genesis site (Ex. 402, p. 39). The **Worker Safety and Fire Protection** section of this Decision contains a finding that with mitigation, the risk of fire spreading beyond the boundary of the site is less than significant.

Other Challenges to the RSA from Intervenors CBD and CURE

First, CBD argues that the RSA failed to address the impacts of bringing a new paved road 6.5 miles into a previously roadless, remote area that will terminate at the edge of a designated wilderness. Secondly, CBD also contends that the RSA failed to address how such increased human presence, off-road vehicle activity, and noise would affect the remaining wildlife and habitat. Thirdly, CBD argues that the RSA failed to discuss edge effects, specifically, changes to sand movement and sand sources as well as spread of weeds and other invasive species, and subsidies to predators such as ravens and coyotes. (CBD Op. Brief, p. 6.)

As to CBD's first challenge, the evidence shows that the access road and transmission lines were included in the biological analysis in the RSA as part of the total disturbance area of the project. The impacts of the new paved road and transmission lines are discussed in several sections of the RSA and particularly at page C.2-84 (Ex. 400, pp. C.2-13; C.2-69; C.2-71; C.2-74; C.2-84). A variety of minimization measures that minimize the risks of increased traffic fatality and other hazards associated with the access road at the GSEP site are incorporated into Condition of Certification **BIO-8**. These measures include confining vehicular traffic to and from the Project site to existing routes of travel, prohibiting cross country vehicle and equipment use outside designated work areas, and imposing a speed limit on paved and dirt roads and posting signs to remind drivers to be aware of the potential for desert tortoise and other wildlife occurring on the roadways. We find Condition of Certification **BIO-8** mitigates the impacts from the new paved road below significance.

Condition of Certification **BIO-8** also responds to CBD's second claim that the RSA failed to disclose the potential impacts from the access road being used by recreationists and off-road vehicles to access areas of the valley that now have no designated routes or motorized vehicle access. CBD argues that the RSA failed to address how increased human presence, off-road vehicle activity, and noise might affect the remaining wildlife and habitat (CBD Op. Brief, p. 6). However, the record shows that the RSA dealt extensively with human presence in off-road vehicles and noise. Impacts from off-road vehicle activity are specifically addressed at page C.2-84 (see also, Ex. 400, pp. C.2-35; C.2-37; C.2-39; C.2-55; C.2-63; C.2-75-C.2-77; C.2-84; C.2-93; C.2-95; C.2-114; C.2-136; C.2-147; C.2-157; and 7/12/10 RT 243:14 – 245:9). Noise impacts (which was discussed in both the Construction Impacts and Operational Impacts sections of this Decision, *supra*) is addressed in the RSA at pages C.2-92

through C.2-93 (see also, Ex. 400, pp. C.2-39; C.2-64 through C.2-66; C.2-74; C.2-86; C.2-89; C.2-98; C.2-130; C.2-136; and C.2-153).

CBD argues that it is "highly likely that [the access road] will attract many off-road vehicle users and others seeking to access public lands." (CBD Op. Brief, p. 6.) CBD's expert testified that the creation of a road may invite an increase in off-road vehicle use and suggested that the BLM has "significant problems" policing off-road vehicles (7/12/10 RT 313:21 – 315:4). The record indicates that off-road vehicles are not authorized in the vicinity of the GSEP (7/12/10 RT 248:7 – 249:17). Staff and CBD differ as to whether the BLM has sole authority to restrict access to roads on their land, but Staff did not proffer conditions of certification that contained restrictions on who may travel on the GSEP access road. (CBD Op. Brief, p. 6; 7/12/10 RT 106:3 – 109:25).

In light of the record, we acknowledge that the risk of increased unauthorized off-road vehicle use from the new GSEP access road may be possible, but is highly speculative. Illegal off-road vehicle use will most likely occur where the "off-roaders" can engage in the activity without detection. Today, the proposed GSEP site is a remote expanse of desert more than 25 miles from the nearest town and nine miles away from the state prison that is the closest human settlement in the area. The sheer size and remoteness of the area may account for the reason the BLM has had "significant problems keeping off-road vehicles on designated routes." (7/12/10 RT 313:21 – 315:4). However, the record establishes that there will be an average of 650 workers on-site during the construction phase and 40 to 50 workers on-site during operation, 24 hours per day, seven days per week. (Ex. 400, pp. B.1-1 to B.1-2; B. 1-23.) These workers will have completed the Workers Environmental Awareness Program as required by Condition of Certification **BIO-6** and will be sensitized to the fragile vulnerability of the desert environment. The project owner is highly motivated to protect biological resources in the vicinity of the project. In addition, CUL-16 requires a guard or construction of a security gate at the south end of the access road to prevent unauthorized access, a measure that would further protect sensitive biological resources from illegal off-road use. Thus, the evidence supports a more reasonable inference that unauthorized off-road vehicle use in the vicinity of the GSEP will decrease because the increased presence of people will deter illegal off-road use due to the higher probability of detection. We find Conditions of Certification **BIO-6, BIO-8,** and **CUL-16** mitigates the impacts from the new paved road below significance.

Finally, CBD claims that the RSA failed to discuss edge effects. CBD specifies that edge effects around the facility include changes to sand movement and sand sources as well as spread of weeds and other invasive species, and subsidies to predators such as ravens and coyotes. (CBD Op. Brief, p. 6.) Again, this claim is contradicted by the evidence. Edge effects are discussed in the RSA (Ex. 400, pp. C.2-65 through C.2-66; C.2-160 through; C.2-162; C.2-198 through C.2-200). The RSA's analysis of habitat loss includes a discussion of impacts to sand transport systems and the effects on dunes when renewable energy projects' structures that are surrounded by wind fencing obstruct sand-carrying winds and water-deposited sands (Ex. 400, pp. C.2-75; C.2-147). Additional evidence on sand migration is contained in the RSA section on Soil and Water Resources and was introduced at the evidentiary hearing (Ex. 400, pp. C.9-17 to C.9-18; 7/12/10 RT 83:2 – 87:23).

The spread of noxious weeds (which was discussed in both the Construction Impacts and Operational Impacts sections of this Decision, *supra*) is discussed in detail in the RSA (Ex. 400, pp. C.2-10; C.2-84; C.2-90, C.2-93; see also **BIO-14**). Subsidies to predators such as ravens and coyotes are discussed in the RSA (Ex. 400, pp. C.2-64; C.2-82 - C. 2-84; C.2-143, C.2-195; see also **BIO-13** and **BIO-21**; 7/12/10 RT 140:12-141:6; 142:-142:20). Therefore, we find that the record includes an adequate analysis of edge effects, including changes to sand movement and sand sources as well as spread of weeds and other invasive species, and subsidies to predators such as ravens and coyotes.

5. Closure

Condition of Certification **BIO-23** requires the Applicant to develop a Decommissioning and Closure Plan and cost estimate that meets the requirements of BLM's 43 CFR 3809. 550 et seq. We acknowledge the uncertainty in planning for conditions 30 to 50 years in the future, but the Decommissioning and Closure Plan cannot defer establishing reasonable performance standards and goals until that time. The plan must explicitly state that the goals of reclamation include restoration of the site's topography and hydrology to a relatively natural condition and restoration of native plant communities. The plan must also provide guidelines for developing milestones and specific, quantitative success criteria for parameters such as native plant density and diversity and percent cover for weeds, thresholds that would trigger remedial actions, and information about what those remedial actions would be. The plan should also provide an approximate outline and schedule for monitoring the success of the reclamation effort. The reclamation plan will establish at least

a 10-year monitoring period to achieve re vegetation success criteria because of the slow pace of restoration in a desert environment. (Ex. SA, pp. C.2-123 to C.2-124.)

6. Cumulative Impacts

Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing relat ed im pacts" (14 Cal. Code Regs., § 15130(a)(1).) Cumulative impacts must be a ddressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (14 Cal. Code Regs., § 15130(a).) Such incremental effects are to be "viewed in connec tion with the effects of past projects, the effects of other current projects, and the effects of probable fu ture projects" (14 Cal. Code Regs., § 15164(b)(1).) Together, these projects comprise the cu mulative scenario which forms the basis of the cumulative impact analysis. NEPA states that cumulativ e effects can result from indiv idually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7.) Unde r NEPA, b oth context and intensity are consider ed. When considering intensity of an effect, we consider "whether the action is related to other actions with individually minor but cumulatively significant impacts. Signif icance cannot be avoided by terming an action temporary or by breaking it dow n into small component parts." (40 CF R §1508.27(b)(7).)

Biological Resources Table 4 lists the existing and foreseeable future projects (proposed) that were included in the quantitative analysis of cumulative effects.

Biological Resources Table 4
Existing and Proposed Future Projects Considered in Cumulative Effects Analysis

Existing Projects (analyzed quantitatively)	ROW Area* (ac)	Foreseeable Future Projects * [Proposed] (analyzed quantitatively)	ROW Area* (ac)
Chuckwalla State Prison	1,044	Genesis Solar Power Project (GSEP)	3,001**
Ironwood State Prison	681	Blythe Solar Power Project	7,239**
Eagle Mountain Pumping Plant (MDWSC)	378	NextEra Energy – McCoy (Solar)	20,560
Kaiser Mine	5,772	Palen Solar Power Project	2,974*
I-10 Corridor (200ft Freeway buffer from CL)	6,494	Bull Frog Green Energy – Big Maria Vista (Solar)	22,663
State highways (50ft Highway buffer from CL)	2,640	Chuckwalla Solar 1	4,091
DPV1 Transmission Line and Existing Access Roads (100ft T-line Tower Buffer; 20ft road width)	2,861	Rice Solar Energy Project	3,859
Landfills(BLM NECO dataset)		Desert Quartzite (Solar)	7,530
Blythe Energy Project I***	148	Desert Sunlight (Solar)	5,119
BLM Campgrounds – Wiley's Well, Coon Hollow, Cottonwood Spring, and Midland Long-Term Visitor Area	8,042	EnXco 1 (Solar)	1,325
BLM Off-Road Vehicle- authorized/designated routes in Meccacopia SRMS. (BLM NECO Human Use LTVAs dataset)	3,031	Chuckwalla Valley Raceway	493
Blythe area urban and agricultural lands (GAP Analysis vegetation dataset)	88,317	Mule Mountain Solar Project	6,618
Desert Center area urban and agricultural lands (2005 NAIP imagery)	8,424	Eagle Mountain Pumped Storage Project	252
Pipeline (NECO pipelines dataset)	4,392	Red Bluff Substation – for Genesis Solar Power Project	90
Projects Considered Qualitatively	Area (ac)	Colorado Substation – for Blythe Solar Power Project	44
Existing		EnXco 2 Mule Mountain	~2,021
BLM Grazing – Cattle and sheep allotments (Lazy Daisy, Chemehuevi, Rice Valley, and Ford Dry Lake (recently closed)	n/a	Paradise Valley (Residential "New Town" development)	6,724
BLM Multiple Use – Intensive multiple-use classes	n/a	Blythe Airport Solar I Project	639
Gen. Patton military training areas	n/a	Eagle Mountain Landfill	1,633
Colorado Aqueduct – open portions	n/a	Blythe Energy Project II	153
Chocolate Mountains Aerial Gunnery Range	n/a	DPV2 Proposed Roads (2-foot width) and towers (100 sq ft/tower)	256
Four approved commercial and 12 residential developments near Blythe	n/a	Genesis Solar Project Access Road	29
Solar Projects at Arizona border	n/a	Blythe Energy Project Transmission Line Towers	148
BLM Renewable Energy Study Areas (future, proposed)	n/a		

BLM Transmission Corridors	n/a		
		Genesis Solar Project Gas Line (100 foot width)	85
		Total Future Projects* 02/05/2010	339,704 acres
		Total Existing Disturbances*	134,750 acres

Source: (Ex. 400, p. C.2-138)

* Includes only renewable energy projects that had submitted a Plan of Development (POD) as of the time of the analysis (02/05/2010) and projects for which area data was available. Acreage shown for existing disturbances reflects only those projects for which area data was available.
** Acreage impacts depicted reflect the project footprint only; not the entire ROW. The unused portions of the ROW will be returned to BLM and not included in the final ROW permit
*** UFWS issued a BO for this project in 2001 and it's currently being constructed.
**** Not all of the projects depicted here will complete the environmental review, not all projects will be funded and constructed, and many will not use the entire ROW area.

Construction and operation of the GSEP will have effects on a number of biological resources that are individually limited but cumulatively considerable. The cumulative effects analysis employed a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects (e.g., increases in predators, noxious weeds, etc.). In many cases, the anticipated indirect effects are more significant, or adverse, than the direct loss of habitat, but are more difficult to quantify. Geographic scope varied between biological resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries (BLM-CDD 2002). (Ex. 400, pp. C.2-136.)

Significant cumulative effects (including indirect effects) were identified in a number of biological resource areas where the Project contributes—at least incrementally—to the cumulative effect. These include: desert washes in the Chuckwalla-Ford Dry Lake watershed and the broader NECO planning area; desert tortoise habitat; golden eagle foraging habitat; Mojave fringe toed lizard and their habitat; habitat for American badger, desert kit fox, and burrowing owl; LeConte's thrasher habitat; Couch's spadefoot toad range; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland (microphyll woodland); playa and sand drifts over playa, and dunes (active and stabilized). (Ex. 400, pp. C.2-173 to C.2-176.)

Of particular concern are the cumulative effects of renewable energy projects within the geographic scope of the Chuckwalla Valley, which contains an isolated system of dunes and population of Mojave fringe-toed lizard. The direct loss of dune habitat and Mojave fringe-toed lizard is minor relative to the indirect

downwind effects from obstructions within the active aeolian sand transport corridor, and the disruption of the fluvial processes that contribute sand to the system from the diversion of washes--approximately 63 miles of washes within the Chuckwalla-Ford Dry Lake watershed alone. In addition to the disruption of geomorphic processes, significant indirect effects that can be reasonably expected to occur in the Chuckwalla system from future projects include: fragmentation and its effects on connectivity and gene flow; spread of invasive non-native plants; increase in avian predators; and an increase in vehicle-related wildlife mortality. (Ex. 400, pp. C.2-174 to C.2-175.)

The Project is expected to contribute to a cumulative reduction in greenhouse gases. However, the benefits gained by the Project's reduction in greenhouse gases must also be weighed against the potential loss of carbon sequestration benefits from the desert vegetation and biological soil crusts. Based on the evidence, the cumulative loss of sequestration benefits and release of stored carbon from all past, present, and probable future projects is likely to be significant. With implementation of the avoidance and minimization measures (**BIO-8**), revegetion plan for temporarily disturbed area (**BIO-24**), compensating for habitat loss by preventing the future development of desert lands through acquisition and permanent protection under conservation easements (**BIO-12, BIO-19, BIO-20** and **BIO-22**), restoring degraded portions of acquired lands (**BIO-12** and **BIO-19**), minimizing the size of the disturbance area along the linears (**BIO-8 and BIO-19**), and revegetating after closure and decommissioning (**BIO-23**), the Project's contribution to the cumulative effects described above will be less than cumulatively considerable.

Implementation Conditions of Certification outlined in **Biological Resources Table 2** and discussed below will reduce the Project's contribution to cumulative effects to a level that is not cumulatively considerable. There may be cumulative effects after mitigation is implemented by all projects, but due to the mitigation implemented by the Project, its contribution will be less than cumulatively considerable. These residual cumulative effects from all future projects could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors. (Ex. 400, p. C.2-176.)

Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS offer an appropriate forum for such planning. We support these programmatic efforts and believes they represent an excellent means of

integrating the State's and BLM's renewable resources goals and environmental protection goals. (Ex. 400, p. C.2-176.)

7. LORS Compliance

The GSEP must comply with state and federal laws, ordinances, regulations, and standards (LORS) that address state and federally listed species, as well as other sensitive species and habitats.

State LORS

Under the Warren-Alquist Act (Pub. Res. Code § 25500) the Energy Commission's certificate for thermal power plants 50 MW and more is "in lieu of" other state, local, and regional permits (*Ibid.*). We have incorporated all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. When Conditions of Certification are finalized they will satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the Project could result in the "take" of desert tortoise, listed as threatened under CESA. Condition of Certification **BIO-12** specifies compensatory mitigation for desert tortoise habitat loss at a 1:1 ratio. Avoidance and minimization measures described in conditions of certification **BIO-6** through **BIO-11** and **BIO-13** will also mitigate for potential impacts to desert tortoise. The evidence suggests that this funding and mitigation approach would ensure compliance with CESA.

Streambed Alteration Agreement: California Fish and Game Code §§ 1600 1607. Pursuant to these sections, CDFG typically regulates all changes to the natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the Project would result in direct impacts to 69 acres of waters of the state and 21 acres of indirect impacts. Condition of Certification **BIO-22** would minimize and offset direct and indirect impacts to state waters and would assure compliance with CDFG codes that provide protection to these waters. (Ex. 400, pp. C.2-176 to C.2-177.)

Federal LORS

The GSEP is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (BLM 1999). As an amendment to the CDCA Plan, BLM produced the Northern and Eastern Colorado Coordinated Management Plan (NECO) (BLM CDD 2002). The NECO Plan provides for conservation and management of special status species through a system of management areas including: Desert Wildlife Management Areas (DWMAs), multi-species Wildlife Habitat Management Areas (WHMAs), bighorn sheep WHMAs, Areas of Critical Environmental Concern (ACEC), and wilderness areas.

Desert Wildlife Management Areas (DWMA) are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the desert tortoise would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The linear facilities south of I-10 pass through the Chuckwalla DWMA.

Area of Critical Environmental Concern (ACEC) are specific, legally defined, BLM designations where special management is needed to protect and prevent irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. Besides the Chuckwalla DWMA/ ACEC, the GSEP is not included within a designated ACEC, but the Palen Dry Lake ACEC is located to the west.

Critical Habitat consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the desert tortoise was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The linear facilities overlap with 24 acres of the Chuckwalla Desert Tortoise Critical Habitat Unit.

Wildlife Habitat Management Areas address other special status species and habitat management in the NECO, and include two kinds: one for bighorn sheep, one for all other special status species and habitats. Bighorn sheep WHMAs overlay the entire range of their occurrence and movement corridors. Multi-species WHMAs are complementary to existing restricted areas and DWMAs, which also cover other special status species and habitats. The plant site and

portions of the linear facility routes are situated within the Palen-Ford Multi-Species WHMA.

Wilderness Area The GSEP is contiguous and south of the 259,000-acre Palen/McCoy Wilderness, which includes the Granite, McCoy, Palen, Little Maria and Arica Mountains, five distinct mountain ranges separated by broad sloping bajadas.

Endangered Species Act (ESA; 16 USC Section 1531 et seq.) Potential take of the desert tortoise, listed as threatened by the USFWS, requires compliance with the federal Endangered Species Act (ESA) (16 USC §§ 1531 et seq.). "Take" of a federally-listed species is prohibited without an Incidental Take Permit, which would be obtained through a Section 7 consultation between BLM and the USFWS. The Applicant has submitted a Draft Biological Assessment (BA) for the Project to BLM, and BLM has initiated formal Section 7 consultation with the USFWS.

Bald and Golden Eagle Protection Act (Title 16, United States Code, Sections 668-668c) A recently issued Final Rule (September 2009) provides for a regulatory mechanism under the Bald and Golden Eagle Protection Act (Eagle Act) to permit take of bald or golden eagles comparable to incidental take permits under the ESA. This rule adds a new section at 50 CFR 22.26 to authorize the issuance of permits to take bald eagles and golden eagles on a limited basis. The Project could potentially result in "take" of the golden eagle from disturbance to nesting pairs as well as loss of foraging habitat. Implementation of Condition of Certification **BIO-28** would avoid of golden eagles by monitoring eagle nests during construction and implementing adaptive management measures. Condition of Certification **BIO-12** requires the acquisition of desert tortoise habitat that would also provide suitable eagle foraging habitat. While acquisition does not address the net loss of foraging habitat in the immediate future, it would prevent future losses of habitat by placing a permanent conservation easement and deed restrictions on private lands. With implementation of Conditions of Certification **BIO-28** and **BIO-12** the project would be in compliance with the Eagle Act. (Ex. 400, pp. C.2-177 to C.2-179.)

8. Public Comment

Staff responded to comments on the Biological Resources section of the Staff Assessment from the following parties in the RSA:

- California Unions for Reliable Energy, May 13, 2010;

- Kenneth Waxlax, Peter Murray and Associates Real Estate, May 7, 2010;
- Defenders of Wildlife, December 23, 2009;
- Western Watersheds Project, December 23, 2009;
- Center for Biological Diversity, December 23, 2009;
- California/Nevada Desert Energy Committee of the Sierra Club, December 23, 2009;
- Californians for Renewable Energy, December 23, 2009; and
- U.S. Environmental Protection Agency , November 30, 2009

(Ex. 400, pp. C.2-179 to C.2-204.)

CURE and CBD submitted "comments" which were essentially identical to the arguments made in their briefs already considered in the record. The Decision addresses both CURE and CBD's arguments, above.

FINDINGS OF FACT

Based on the record, we find the following:

1. The power block and solar arrays of the GSEP will occupy approximately 1,727 acres within the 4,640-acre ROW grant application from the BLM.
2. No federal or state-listed plant species occur within the Project Disturbance Area but four species of special-status plants were detected within the Study area during spring 2009 and 2010 surveys, including Harwood's milk-vetch, desert unicorn, and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive species, was detected at the Colorado River Substation site and Project linears east of the site during the 2010 spring surveys.
3. Fifteen special status wildlife species were detected during the surveys.
4. No live desert tortoises were found within the plant site boundary during the 2009 and 2010.
5. The assumed presence of Couch's spadefoot toad provides an adequate basis upon which to fashion conditions to mitigate potential impacts.
6. The GSEP site contains some suitable habitat for desert tortoise (e.g., Sonoran creosote bush scrub with friable soils for burrowing and appropriate forage plants) and could potentially be occupied by this species in the future.

7. Thirty-nine Mojave fringe-toed lizards were observed during spring 2009 surveys and 60+ were observed during the spring 2010 surveys.
8. The study area contains suitable Mojave fringe-toed lizard habitat wherever stabilized and partially stabilized sand dune habitat (7.5 acres) and playa/sand drift over playa habitat (38 acres) occur.
9. The RSA identifies habitat fragmentation as a significant impact of the facility site, the access road, and the transmission line.
10. Habitat fragmentation impacts will be mitigated to less than significant levels with Condition of Certification **BIO-12 and BIO-20**.
11. No Couch's spadefoot toads were observed during surveys; however, because of the short time this species is above ground, and because the surveys were not conducted after summer rains, the lack of observations does not suggest the species is absent from the GSEP site.
12. GSEP will have no significant impact on bighorn sheep.
13. The entire Project Disturbance Area (1,811 acres) is considered burrowing owl habitat.
14. The entire Study area is considered suitable habitat for the American badger and the desert kit fox.
15. No sign or evidence of Nelson's bighorn sheep were found during the 2009 field surveys and bighorn sheep are not expected to occur in the Study area.
16. The closest known historic golden eagle nests are within 14 miles of the GSEP site.
17. Disturbance to nesting golden eagles is unlikely due to the distance of the solar facility from nests, the lack of view of the project from the nests and the lack of known prey concentration in the area.
18. Migratory/special-status bird species were observed during project surveys including the Loggerhead shrikes, Le Conte's thrasher, California horned lark, Brewer's sparrow, prairie falcon, short-eared owl, Swainson's hawk, ferruginous hawk, and northern harrier.
19. Condition of Certification **BIO-14** (Weed Management Plan) will minimize the impacts to adjacent native plant communities from the introduction and spread of noxious weeds.
20. Condition of Certification **BIO-19** will reduce potential impacts to special-status plants to less-than-significant levels.
21. Condition of Certification **BIO-12** requires the Applicant to acquire and enhance at least 1,870 acres of suitable habitat for desert tortoise to offset anticipated habitat loss associated with construction of the GSEP.

22. Implementation of conditions of certification **BIO-9** through **BIO-12** will reduce potential impacts to desert tortoise to less than significant levels.

23. Direct and indirect construction impacts to vegetation and wildlife will be reduced to less than significant levels with implementation of impact avoidance and minimization measures described in Conditions of Certification **BIO-1** through **BIO-8**.

24. Eliminating the washes on the GSEP will fundamentally and permanently alter the natural geomorphic and hydrological processes that currently characterize the project site, which in turn will fundamentally alter the biological processes that support recruitment of native vegetation and creation of wildlife habitat within the wash and on the associated floodplain.

25. With implementation of Condition of Certification **BIO-22**, impacts to 90 acres of state waters and loss of the hydrological and biological functions of the project site desert washes will be mitigated to less-than-significant levels.

26. Implementation of Conditions of Certification **BIO-8** (Impact Avoidance and Best Management Practices), **BIO-15** (Pre-Construction Nest Surveys) and **BIO-16** (Avian Protection Plan) will avoid direct impacts to nests, eggs, or young of migratory birds and will minimize the impacts of construction disturbance to nesting birds below the level of significance.

27. Conditions of Certification **BIO-1** through **BIO-11** impose impact avoidance and minimization measures to reduce construction impacts to desert tortoise including installation of exclusion fencing to keep desert tortoise out of construction areas, reducing construction traffic and speed limits to reduce the incidence of road kills, worker training programs, and other measures.

28. Implementation of Condition of Certification **BIO-9** through **BIO-12**, the compensatory mitigation plan, will offset cumulative regional habitat loss for the desert tortoise.

29. Conditions of Certification **BIO-4**, **BIO-5**, **BIO-6**, **BIO-7**, **BIO-8**, **BIO-12 and BIO-22** will reduce the impacts to native birds and bats to less than significant levels.

30. Conditions of Certification including **BIO-8** (Impact Avoidance and Minimization Measures); **BIO-15** (Pre-construction Nest Surveys); and **BIO-16** (Avian Protection Plan) will minimize the impacts to less significant levels for construction disturbance to resident and migratory birds.

31. The baseline of one pair of owls on the GSEP site is accurate.

32. Pre-construction surveys on the Project Disturbance Area and surrounding 500-foot buffer, as well as passive relocation, will avoid direct take of owls and offset potentially significant impacts to nesting or resident owls.

33. Condition of Certification **BIO-18** reduces potential impacts to burrowing owls to less-than-significant levels.

34. Condition of Certification **BIO-20** will reduce impacts to Mojave Fringe-toed lizard to less-than-significant levels.

35. Condition of Certification **BIO-27** will reduce impacts to Couch's spadefoot toad to less-than-significant levels.

36. Implementation of **BIO-28** will reduce potential impacts of GSEP construction on nesting golden eagles to less than significant levels.

37. Condition of Certification **BIO-17** mitigates potential impacts to the kit fox and badger below significance.

38. Noise impacts to nesting birds and other wildlife at GSEP will be less than significant.

39. Lighting at the GSEP will have no adverse effects on wildlife.

40. Condition of Certification **VIS-2** and **BIO-8** ensure that construction lighting at the GSEP will have no adverse effects on wildlife.

41. Condition of Certification **BIO-8** mitigates the impacts from the new paved road below significance.

42. The record includes an adequate analysis of edge effects, including changes to sand movement and sand sources as well as spread of weeds and other invasive species, and subsidies to predators such as ravens and coyotes.

43. Condition of Certification **BIO-13** (raven monitoring and management plan) contains project design features to reduce raven nesting and includes physical deterrents to nesting such as bird spikes and nest removal and monitoring to make sure these design features work as intended.

44. Condition of Certification **BIO-8**, requires using the minimal amount of water needed for dust abatement, food-related waste management and worker environmental awareness training, with restrictions on pets being brought to the site.

45. Condition of Certification **BIO-21** requires installation of netting over the evaporation ponds to exclude birds and other wildlife, which will reduce evaporation pond impacts to birds to less-than-significant levels.

46. With the mitigation addressed in Condition of Certification **BIO-8**, the transmission lines will not pose a significant threat to birds.

47. With implementation of dry cooling rather than wet cooling, the groundwater pumping for the GSEP will not result in significant impacts to groundwater-dependent ecosystems in the Chuckwalla Basin.

48. Construction and operation of the GSEP will have effects on a number of biological resources that are individually limited but cumulatively considerable.

49. The Conditions of Certification described below will minimize and offset the contributions of the GSEP to the cumulative loss of habitat for native plant communities and wildlife, including special-status species.

50. GSEP project will not result in significant cumulative impacts to biological resources.

51. Condition of Certification **BIO-9** requires the Applicant to implement all terms and conditions developed as part of the Biological Opinion in consultation with USFWS, which will ensure that the project is not likely to adversely affect the desert tortoise or its critical habitat.

CONCLUSIONS OF LAW

1. The project owner will implement appropriate avoidance and mitigation measures to prevent significant adverse impacts to all sensitive species.

2. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification below, as well as those in other portions of this Decision, the GSEP will not result in significant direct, indirect, or cumulative impacts to biological resources.

3. With implementation of the mitigation measures described in the evidentiary record and incorporated into the Conditions of Certification, the GSEP will conform to all applicable laws, ordinances, regulations, and standards related to biological resources as identified in the pertinent portion of **Appendix A** of this Decision.

CONDITIONS OF CERTIFICATION

Designated Biologist Selection and Qualifications[1]

BIO-1 The Project owner shall assign at least one Designated Biologist to the Project. The Project owner shall submit the resume of the proposed Designated Biologist(s), with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval in consultation with CDFG and USFWS.

The Designated Biologist must meet the following minimum qualifications:

[1] USFWS < www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to the USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are responsible for the implementation of all desert tortoise measures for which a project is approved and are permitted to the approve specific Biological 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 Biological Monitors approved by the Authorized Biologist. **Designated Biologists are the equivalent of Authorized Biologists.** Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;

3. Have at least one year of field experience with biological resources found in or near the Project area;

4. Meet the current USFWS Authorized Biologist qualifications criteria (www.fws.gov/ventura/speciesinfo/protocols_guidelines), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and

5. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: No fewer than 30 days prior to construction-related ground disturbance, the Project owner shall submit the names of the Designated Biologists(s) along with the completed USFWS Desert Tortoise Authorized Biologist Request Form (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, and the CPM for review and final approval. No construction-related ground disturbance, grading, boring, or trenching shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the Project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM and for consideration.

Designated Biologist Duties

BIO-2 The Project owner shall ensure that the Designated Biologist performs the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring or trenching activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the Project owner and the CPM. The Designated Biologist Duties shall include the following:

1. Advise the Project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the Project owner;

3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;

6. Notify the Project owner and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Database.

Verification: The Designated Biologist shall provide copies of all written reports and summaries that document biological resources compliance activities in the Monthly Compliance Reports submitted to the CPM. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During Project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his or her duties cease, as approved by the CPM.

Biological Monitor SELECTION AND Qualifications

BIO-3 The Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to the CPM. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>.

Verification: The Project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site mobilization or construction-related ground disturbance, grading, boring and trenching. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional biological monitors are needed during construction the specified information shall be submitted to the CPM and for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR Duties

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, fencing, grading, boring, trenching and reporting. The Designated Biologist shall remain the contact for the Project owner and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During Project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by the CPM.

Designated Biologist and Biological Monitor Authority

BIO-5 The Project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification. The Project owner shall provide Energy Commission staff with reasonable access to the Project site under the control of the Project owner and shall otherwise fully cooperate with the Energy Commission's efforts to verify the Project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s) the Project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, boring, trenching and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the Project owner and the construction/operation manager when to resume activities; and

3. Notify the CPM and BLM if there is a halt of any activities and advise them of any corrective actions that have been taken or would be instituted as a result of the work stoppage. If the work stoppage relates to desert tortoise or any other federal- or state-listed species, the Carlsbad Office of USFWS and the Ontario Office of CDFG shall also be notified.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The Project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM and BLM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, or operation activities. If the non-compliance or halt to construction or operation relates to desert tortoise or any other federal- or state-listed species, the Project owner shall also notify the Carlsbad Office of USFWS and the Ontario Office of the CDFG at the same time. The Project owner shall notify the CPM and BLM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the Project owner, a determination of success or failure will be made by the CPM, in consultation with USFWS, CDFG and BLM, within five working days after receipt of notice that corrective action is completed, or the Project owner would be notified by the CPM that coordination with other agencies would require additional time before a determination can be made.

Worker Environmental Awareness Program (WEAP)

BIO-6 The Project owner shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from the CPM. The Project owner shall also provide the BLM, USFWS and CDFG a copy of all portions of the WEAP relating to desert tortoise and any other federal or state-listed species for review and comment. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site preconstruction, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the Project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that no snakes, reptiles, or other wildlife shall be harmed;

3. Place special emphasis on desert tortoise, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

4. Include a discussion of fire prevention measures to be implemented by workers during Project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

5. Describe the temporary and permanent habitat protection measures to be implemented at the Project site;

6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 30 days prior to start of construction-related ground disturbance the Project owner shall provide to the CPM CPM for review and approval, and to the USFWS and CDFG for review, a copy of the final WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The Project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to construction-related ground disturbance activities the Project owner shall submit two copies of the CPM-approved final WEAP.

Training acknowledgement forms signed during construction shall be kept on file by the Project owner for at least six months after the start of commercial operation.

Throughout the life of the Project, the WEAP shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the Project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the Project owner and shall be made available to the CPM, BLM, USFWS and CDFG and upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During Project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan

BIO-7 The Project owner shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), and shall submit two copies of the proposed BRMIMP to the CPM for review and approval. The Project owner shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Desert

Tortoise Translocation Plan, the Raven Management Plan, the Closure, Conceptual Restoration Plan, the Burrowing Owl Mitigation and Monitoring Plan, and the Weed Management Plan, and all other individual biological mitigation and/or monitoring plans associated with the Project. The Project owner shall provide to BLM, CDFG, and USFWS a copy of all portions of the BRMIMP relating to desert tortoise and any other federal or state-listed species for review and comment.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction and operation. To address potential impacts of climate change in the implementation and monitoring of biological resource mitigation measures, the Project owner shall make use of available climatalogical data when analyzing project effects or resource trends. The BRMIMP shall include complete and detailed descriptions of the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the Project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. All sensitive biological resources to be impacted, avoided, or mitigated by Project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. All measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

7. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

8. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

9. All performance standards and remedial measures to be implemented if performance standards are not met;

10. Biological resources-related facility closure measures including a description of funding mechanism(s);

11. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and

12. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the Project site, or during Project surveys, to the California Natural Diversity Data Base (CNDDB) per CDFG requirements.

Verification: The Project owner shall submit the draft BRMIMP to the CPM at least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching. At the same time, the Project owner shall provide to BLM, USFWS, and CDFG a copy of all portions of the draft BRMIMP relating to desert tortoise and any other federal or state-listed species. The Project owner shall provide the final BRMIMP to the CPM, BLM, USFWS and CDFG at least 7 days prior to start of any construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No construction-related ground disturbance, grading, boring or trenching may occur prior to approval of the final BRMIMP by the CPM.

If any permits have not yet been received when the final BRMIMP is submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition(s). The Project owner shall submit to the CPM the revised or supplemented BRMIMP within 10 days following the Project owner's receipt of any additional permits. Under no circumstances shall ground disturbance proceed without implementation of all permit conditions.

To verify that the extent of construction disturbance does not exceed that described in this analysis, the Project owner shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM, BLM, USFWS and CDFG. The first set of aerial photographs shall reflect site conditions prior to any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and shall be submitted prior to initiation of such activities. The second set of aerial photographs shall be taken subsequent to completion of construction, and shall be submitted to the CPM, BLM, USFWS and CDFG no later than 90 days after completion of construction. The Project owner shall also provide a final accounting of the acreages of vegetation communities/cover types present before and after construction.

Any changes to the approved BRMIMP must be approved by the CPM and in consultation with CDFG, BLM and USFWS.

Implementation of BRMIMP measures (for example, construction activities that were monitored, species observed) shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval, a written construction termination report identifying which items of the

BRMIMP have been completed, a summary of all modifications to mitigation measures made during the Project's preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and which mitigation and monitoring items are still outstanding.

Impact Avoidance AND MINIMIZATION MEASURES

BIO-8 The Project owner shall undertake the following measures to manage the project site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Disturbance Areas. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, Project vehicles and equipment shall be confined to the flagged areas.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during Project construction and operation shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour on all dirt roads and 45 mph on all paved roads. Signs shall be established at appropriate locations (for example, at Arizona crossings of drainages) to remind drivers to be aware of the potential for desert tortoise and other wildlife occurring on the roadways.

4. Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, including during fence construction, the Designated Biologist shall be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and

wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities in unfenced habitat (i.e., outside of the cleared and fenced Plant Site).

5. Minimize Impacts of Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources.

6. Implement APLIC Guidelines. Transmission lines, fiber optic lines, and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 1994) and Mitigating Bird Collisions with Power Lines (APLIC 2006) to reduce the likelihood of large bird electrocutions and collisions.

7. Avoid Use of Toxic Substances. Soil binding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

8. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat. Lighting shall be kept to the minimum level for safety and security needs by using motion or infrared light sensors and switches to keep lights off when not required, and shielding operational lights downward to minimize skyward illumination. No high intensity, steady burning, bright lights such as sodium vapor or spotlights shall be used. FAA visibility lighting shall employ only strobed, strobe-like or blinking incandescent lights, preferably with all lights illuminating simultaneously. Minimum intensity, maximum "off-phased" dual strobes are preferred, and no steady burning lights (e.g., L-810s) shall be used.

9. Minimize Noise Impacts. A continuous low- pressure technique shall be used for steam blows, to the extent possible, in order to reduce noise levels in sensitive habitat proximate to the Genesis Project. Loud construction activities (e.g., unsilenced high pressure steam blowing and pile driving, or other) shall be avoided from February 15 to April 15 when it would result in

noise levels over 65 dBA in nesting habitat (excluding noise from passing vehicles). Loud construction activities may be permitted from February 15 to April 15 only if:

a. the Designated Biologist provides documentation (i.e., nesting bird data collected using methods described in BIO-15 and maps depicting location of the nest survey area in relation to noisy construction) to the CPM indicating that no active nests would be subject to 65 dBA noise, OR

b. the Designated Biologist or Biological Monitor monitors active nests within the range of construction-related noise exceeding 65dBA. The monitoring shall be conducted in accordance with Nesting Bird Monitoring and Management Plan approved by the CPM. The Plan shall include adaptive management measures to prevent disturbance to nesting birds from construction related noise. Triggers for adaptive management shall be evidence of Project-related disturbance to nesting birds such as: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Bird Monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of disturbance to the nesting bird.

10. <u>Avoid Vehicle Impacts to Desert Tortoise.</u> Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it shall be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may move it out of harm's way of the disturbed area as described in the *USFWS Desert Tortoise Field Manual* (USFWS 2009).

11. Avoid Wildlife Pitfalls : To avoid trapping des ert tortoise and other wildlife in trenches, pipes or culverts, the followin g measures shall be implemented:

a. Backfill Trenches. At the end of each work day, the Designated Biologist shall ensur e that all pot ential wild life pitfalls (trenches, bor es, and other exc avations) outsid e the area fenced with desert tortoi se exc lusion fencing have been back filled. If ba ckfilling is not feasib le, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wild life e scape ramps, or covered completely to prevent wild life ac cess, or fully enclos ed with desert tortoise-exclus ion fenc ing. All trenc hes, bores , and other excavations outside t he areas permanently fenced with deser t tortoise exc lusion fencing shall be inspected periodically throughout the day, at the end of each work day and at the beginning of eac h day by t he Designated Biologist or a Biologic al Monitor. Should a tortoise or other wildlife become trapped, the De signated Biologist or Biological Monitor shall remove and reloc ate the individual as described in the Desert Tort oise Translocation Plan. Any wildlife enc ountered during the c ourse of construction shall be allowed to leave the construction area unharmed.

b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure wit h a diameter greater than 3 inches, stored less than 8 in ches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such struct ures may be capped before being stored outside the fenced area, or placed on elev ated pipe racks. These materials would not need to be inspected or capped if they are stored within the pe rmanently fenced area after the clearance surveys have been completed.

12. Minimize Standing Water . Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the mini mal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles , which coul d attract desert tortoises and common ravens to construction sites. A Biological Monitor shall patrol t hese areas to ensure water does not puddle and shall take appropria te action to reduce water application where necessary.

13. Dispose of Road-killed Animals. During construction, road killed animals or other carcasses detected by personnel on roads associated with the Project area will be reported immediately to a Biological Monitor or Designated Biologists, who will remove the roadkill promptly for disposal (e.g., removal to a landfill or disposal at the project site). During operations, the Project Environmental Compliance Monitor will be notified of any roadkills and promptly remove and dispose of any roadkills. For special-status species road-kill, the Biological Monitor shall contact the Ontario Office of CDFG and the Carlsbad Office of USFWS within 1 working day of detection of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described in BIO-11 below.

14. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the Project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

15. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on dirt access routes within desert tortoise habitat shall not exceed 25 miles per hour.

16. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter “Waters of the State”. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. All disturbed soils and roads within the Project site shall be stabilized to

reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward drainages shall be stabilized to reduce erosion potential.

17. Monitor Ground Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

Verification: If loud construction activities are proposed between February 15 to April 15 which would result in noise levels over 65 dBA in nesting habitat, the Project owner shall submit nest survey results (as described in 9a) to the CPM no more than 7 days before initiating such construction. If an active nest is detected within this survey area the Project owner shall submit a Nesting Bird Monitoring and Management Plan to the CPM for review and approval no more than 7 days before initiating noisy construction.

All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

DESERT TORTOISE CLEARANCE SURVEYS AND FENCING

BIO-9 The Project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence specification and installation, tortoise handling, artificial burrow construction, egg handling and other procedures shall be consistent with those described in the USFWS' 2009 *Desert Tortoise Field Manual* <http://www.fws.gov/ventura/speciesinfo/protocols_guidelines> or more current guidance provided by CDFG and USFWS. The Project owner shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. These measures include, but are not limited to, the following:

1. Desert Tortoise Exclusion Fence Installation. Per the Applicant's Desert Tortoise Translocation Plan, in order to avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence; along the utility corridors, temporary desert tortoise exclusion fencing or monitoring will be used to protect desert tortoises

during construction.. The proposed alignments for the permanent perimeter fence and utility rights-of-way fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility rights-of-way alignments shall be conducted by the Designated Biologist(s) using techniques outlined in the USFWS' 2009 *Desert Tortoise Field Manual* and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision. These fence clearance surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 15 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*. Any desert tortoise located during fence clearance surveys shall be handled by the Designated Biologist(s) in accordance with the Applicant's Translocation Plan.

a. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed prior to the onset of site clearing and grubbing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

b. Fence Material and Installation. The permanent tortoise exclusionary fencing shall be constructed in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 8 – Desert Tortoise Exclusion Fence).

c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time.

d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a

day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing shall be inspected monthly and during and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

2. Desert Tortoise Clearance Surveys within the Plant Site. Following construction of the permanent perimeter security fence and the attached tortoise exclusion fence, the permanently fenced power plant site shall be cleared of tortoises by the Designated Biologist, who may be assisted by the Biological Monitors. Clearance surveys shall be conducted in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 6 – Clearance Survey Protocol for the Desert Tortoise – Mojave Population) and shall consist of two surveys covering 100 percent of the project area by walking transects no more than 15-feet apart. If a desert tortoise is located on the second survey, a third survey shall be conducted. On each subsequent pass surveyors shall attempt to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units shall be either perpendicular, parallel but offset from transect on the previous pass, and/or approached from the opposite direction on each subsequent pass. Clearance surveys of the power plant site may only be conducted when tortoises are most active (April through May or September through October). Surveys outside of these time periods require approval by USFWS and CDFG. Any tortoise located during clearance surveys of the power plant site shall be relocated and monitored in accordance with the Desert Tortoise Translocation Plan

   a. Burrow Searches. During clearance surveys all desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by

desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*. To prevent reentry by a tortoise or other wild life, all burrows shall be collapsed once absence has been determined, in accordance with the Desert Tortoise Translocation Plan. Tortoises taken from burrows and from elsewhere on the power plant site shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.

b. Burrow Excavation/Handling. All potential desert tortoise burrows located during clearance surveys shall be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises, in accordance with the Desert Tortoise Translocation Plan. All desert tortoise handling and removal, and burrow excavations, including nests, shall be conducted by the Designated Biologist, who may be assisted by a Biological Monitor in accordance with the USFWS' 2009 *Desert Tortoise Field Manual.*

3. Monitoring Following Clearing. Following the desert tortoise clearance and removal from the power plant site and utility corridors, workers and heavy equipment shall be allowed to enter the Project site to perform clearing, grubbing, leveling, and trenching activities. A Designated Biologist or Biological Monitor shall be on site during clearing and grading activities to move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.

4. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise. Desert tortoise moved from within Project areas shall be marked and monitored in accordance with the Desert Tortoise Translocation Plan.

5. Desert Tortoise Exclusion Fence Installation. Per the Applicant's Desert Tortoise Translocation Plan, in order to avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence; along the utility corridors, temporary desert tortoise exclusion fencing or monitoring will be used to protect desert tortoises during construction.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above. The report shall include the desert tortoise survey results, capture and release locations of any translocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

DESERT TORTOISE TRANSLOCATION PLAN

BIO-10 The Project owner shall develop and implement a final Desert Tortoise Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of the CPM. The goals of the Desert Tortoise Translocation Plan shall be to: relocate/translocate all desert tortoises from the project site to nearby suitable habitat; minimize impacts on resident desert tortoises outside the project site; minimize stress, disturbance, and injuries to relocated/translocated tortoises; and assess the success of the translocation effort through monitoring. The final Plan shall be based on the draft Desert Tortoise Translocation Plan submitted by the Applicant (TTEC 2010a) and shall include all revisions deemed necessary by USFWS, CDFG and Energy Commission staff.

Verification: Within 30 days prior to site mobilization or construction-related ground disturbance, the Project owner shall provide the CPM with the final version of a Plan that has been reviewed and approved by the CPM in consultation with USFWS and CDFG. All modifications to the approved Plan shall be made only after approval by the CPM, in consultation with USFWS and CDFG.

Within 30 days after initiation of relocation and/or translocation activities, the Designated Biologist shall provide to the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan.

Desert Tortoise Compliance VERIFICATION

BIO-11 The Project owner shall provide Energy Commission, BLM, USFWS and CDFG staff with reasonable access to the Project site and compensation lands under the control of the Project owner and shall otherwise fully cooperate with the Energy Commission's efforts to verify the Project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The Project owner shall hold the Designated Biologist and the Energy Commission harmless for any costs the Project owner incurs in complying with the management measures, including stop work orders issued by the CPM or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notification. Notify the CPM and at least 14 calendar days before initiating construction-related ground disturbance activities; immediately notify the CPM in writing if the Project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification.

2. Monitoring During Grubbing and Grading. Remain onsite daily in areas located outside of permanent desert tortoise exclusion fencing while vegetation salvage, grubbing, grading and other ground-disturbance construction activities are taking place to avoid or minimize take of listed species, and verify personally or use Biological Monitors to check for compliance with all impact avoidance and minimization measures, including checking all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protective zones.

3. Monthly Compliance Inspections. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly compliance report to the CPM, USFWS, and CDFG during construction.

4. Notification of Injured or Dead Listed Species. If an injured or dead listed species is detected within or near the Project Disturbance Area the CPM, the Ontario Office CDFG, and the Carlsbad Office USFWS shall be notified immediately by phone. Notification shall occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies

within two calendar days of the incident and shall include the following information as relevant:

a. Injured Desert Tortoise. If a desert tortoise is injured as a result of Project-related activities during construction, the Designated Biologist or approved Biological Monitor shall immediately take it to a CDFG-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the Project owner. Following phone notification as required above, the CPM, CDFG, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

b. Desert Tortoise Fatality. If a desert tortoise is killed by Project-related activities during construction or operation, a written report with the same information as an injury report shall be submitted to the CPM, CDFG, and USFWS. These desert tortoises shall be salvaged according to guidelines described in *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise* (Berry 2001). The Project owner shall pay to have the desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

5. Stop Work Order. The CPM may issue the Project owner a written stop work order to suspend any activity related to the construction or operation of the Project to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The Project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than 2 days following the above required notification of a sighting, injury, kill, or relocation of a listed species, the Project owner shall deliver to the CPM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of injury, kill, or relocation of a listed species, identifying who was notified, and explaining when the incidents occurred. In the case of a sighting in an active construction area, the Project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM, CDFG and USFWS.

No later than 45 days after initiation of Project operation the Designated Biologist shall provide the CPM a Final Listed Species Mitigation Report that includes, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about Project-related incidental take of listed species; 3) information about other Project impacts on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for Project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future Projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the Project. Beginning with the first month after clearing, grubbing, and grading are completed and continuing every month until construction is complete, the Project owner shall submit a report describing their results of the Monthly Compliance Inspections to the CPM, BLM, USFWS, and CDFG.

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-12 To fully mitigate for habitat loss and potential take of desert tortoise, the Project owner shall provide compensatory mitigation at a 1:1 ratio for impacts to 1750 acres, and at a 5:1 ratio for impacts to 24 acres of critical habitat, adjusted to reflect the final Project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Genesis Project, including all linears, as well as undeveloped areas inside the Project's boundaries that will no longer provide viable long-term habitat for the desert tortoise. To satisfy this condition, the Project owner shall acquire, protect and transfer no fewer than 1,864 acres of desert tortoise habitat lands (adjusted to reflect the final Project footprint), and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and comply with other related requirements in this condition. Costs of these requirements are estimated to be $4, 263,600 based on the acquisition of 1,870 acres and estimated per-acre costs of $500 for acquisition, $330 for initial habitat improvement, and $1,450 for long-term management. The actual costs to comply with this condition will vary depending on the final footprint of the Project, the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR report. The 1,870-acre habitat requirement, and associated funding requirements based on that acreage, will be adjusted up or down if there are changes in the final footprint of the Project.

Condition **BIO-29** may provide the Project owner with another option for satisfying some or all of the requirements in this condition.

The requirements for the acquisition, initial improvement, protection and long-term maintenance and management of compensation lands include all of the following:

Selection Criteria for Compensation Lands. The quality and function of the compensation lands selected for acquisition shall be equal to or better than the quality and function of the habitat impacted and:

- be within the Colorado Desert Recovery Unit, with potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise, and/or other preserve lands;
- provide habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;
- be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
- be connected to lands where desert tortoises can be reasonably expected to occur bssed on habitat or historic occurrences, ideally with populations that are stable, recovering, or likely to recover;
- not have a history of intensive recreational use or other disturbance that does not have the capacity to regenerate naturally when disturbances are removed or might make habitat recovery and restoration infeasible;
- not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;
- not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and
- have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights.

Review and Approval of Compensation Lands Prior to Acquisition. The Project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above, and must be approved by the CPM. The CPM will share the

proposal with and consult with CDFG, BLM and the USFWS before deciding whether to approve or disapprove the proposed acquisition.

Compensation Lands Acquisition Requirements. The Project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, has approved the proposed compensation lands:

- Preliminary Report. The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.
- Title/Conveyance. The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.
- Initial Protection and Habitat Improvement. The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation

lands. The costs of these activities is estimated at $330 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

- Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in- perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

- Long-term Maintenance and Management Funding. The Project owner shall provide money to establish an account with non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall either provide initial payment of $2,711,500 (calculated at $1,450 an acre for 1,870 acres) or the Project owner shall include $2,711,500 to reflect this amount in the security that is provided to the Energy Commission under section 3.h. of this condition. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the Project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will

be returned to the Project owner. The Project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the Project's long-term maintenance and management funds.

1. The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fund holder/manager to ensure the following requirements are met:

   - Interest. Interest generated from the initial capital long-term maintenance and management fund shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action that is approved by the CPM in consultation with CDFG and is designed to protect or improve the habitat values of the compensation lands.

   - Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.

   - Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM and CDFG.

   - Other expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing

compensation lands to CDFG or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.

Management plan. The Project owner or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

Mitigation Security. The Project owner shall provide financial assurances to the CPM, with copies of the final document to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") approved by the CPM in consultation with CDFG. Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG, of the form of the Security. The CPM may draw on the Security if the CPM determines the Project owner has failed to comply with the requirements specified in this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition, The CPM's use of the Security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. The Security shall be returned to the Project owner in whole or in part upon successful completion of the associated requirements in this condition.

1. Security shall be provided in the amount of $4,263,600, calculated as follows but adjusted as specified below:

   i. land acquisition costs for compensation land, calculated at $500/acre = $935,000.

   ii. initial protection and habitat improvement activities on the compensation land, calculated at $330/acre = $617,000.

iii. long-term maintenance and management on the compensation land calculated at $1,450/acre = $2,711,500.

2. The amount of security shall be adjusted for any change in the Project footprint as described above. In addition, the amount of Security specified in this section may be reduced in proportion to any of the secured mitigation requirements that the Project owner has completed at the time the Security is required to be submitted. For example, if the Project owner transfers funds for long-term management of the compensation lands to an entity approved to hold those funds, the Security would not include any amount for long-term maintenance and management of the lands. The Project owner will be entitled to partial or complete release of the Security as the secured mitigation requirements are successfully completed.

   The Project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Project owner, the Project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the Project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

Verification: The Project owner shall provide the CPM with written notice at least 30 days prior to the start of ground-disturbing activities on the Project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide the CPM with approved Security at least 30 days prior to the start of Project ground-disturbing activities

No later than 12 months after the start of ground-disturbing Project activities, the Project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the Project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The Project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the start of Project ground-disturbing activities. If NFWF or another approved third party is being used for the acquisition, the Project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline,

The Project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition. The Project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands, the Project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The Project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the Project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. This shall be the basis for the final number of acres required to be acquired.

RAVEN MANAGEMENT PLAN

BIO-13 The Project owner shall implement a raven monitoring and control plan that is consistent with the most current USFWS-approved raven management guidelines, and which meets the approval of the CPM, in consultation with USFWS. The draft Common Raven Monitoring, Management, and Control Plan (Raven Plan) submitted by the Applicant (TTEC 2010r) shall provide the basis for the final plan, subject to review and revisions and approval from the CPM and USFWS. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring proposed in the Raven Plan. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. <u>Prepare and Implement a Raven Management Plan</u> that includes the following:

    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;

b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;

c. Describe control practices for ravens;

d. Address monitoring and nest removal during construction and for the life of the Project, and;

e. Discuss reporting requirements.

2. Contribute to the USFWS Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the USFWS Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre of permanent disturbance.

Verification: No less than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

No less than 10 days prior to the start of any Project-related ground disturbance activities, the Project owner shall provide documentation to the CPM. BLM, CDFG and USFWS that the one-time fee for the USFWS Regional Raven Management Program ~~of~~ has been deposited to the REAT-NFWS subaccount for the Project. *The amount shall be a one-time payment of $105 per acre of permanent disturbance of 1754 acres.*

WEED MANAGEMENT PLAN

BIO-14 The Project owner shall implement a Weed Management Plan that meets the approval of the CPM. The objective of the Weed Management Plan shall be to prevent the introduction of any new weeds and the spread of existing weeds as a result of Project

construction, operation, and decommissioning. The draft Weed Management Plan submitted by the Applicant (TTEC 2009g) shall provide the basis for the final plan, subject to review and revisions from the CPM. The Final Weed Management Plan shall include at a minimum the following information: specific weed management objectives and measures for each target non-native weed species; baseline conditions; a map of the Weed Management Areas; weed risk assessment and measures to prevent the introduction and spread of weeds; monitoring and surveying methods; and reporting requirements.

To ensure that weed management does not have unintended adverse effects on special-status species, the final Weed Management Plan shall be revised to be consistent with guidelines for safe use of herbicides in natural areas provided by The Nature Conservancy's The Global Invasive Species Team: http://www.invasive.org/gist/products/library/herbsafe.pdf.

The final Plan shall include detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that will be used on the Project with manufacturer's guidance on appropriate use. The Plan shall Indicate where the herbicides will be used, and what techniques will be used to avoid chemical drift or residual toxicity to special-status species and their pollinators, and consistent with the Nature Conservancy guidelines and the criteria under #2, below.

The final plan shall only include weed control measures for target weeds with a demonstrated record of success, based on the best available information from sources such as: The Nature Conservancy's The Global Invasive Species Team, Cooperative Extension, California Invasive Plant Council: http://www.cal-ipc.org/ip/management/plant_profiles/index.php , and the California Department of Food & Agriculture Encycloweedia: http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm. The methods shall meet the following criteria:

1. Manual : well-timed removal of plants or seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner.

2. Chemical : Herbicides known to have residual toxicity, such as pre-emergents and pellts, shall not be used in natural areas or within the engineered channels. Only the following application methods may be used: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack & squirt (into cuts in the trunk);

basal bark girdling; foliar spot spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only on windless days, or with a squeeze bottle for small infestations.

3. Biological: Biological methods may be used subject to review and approval by CDFG and USFWS and only if approved for such use by CDFA, and are either locally native species or have no demonstrated threat of naturalizing or hybridizing with native species;

4. Mechanical: disking, tilling, and mechanical mowers or other heavy equipment shall not be employed in natural areas but hand weed trimmers (electric or gas-powered) may be used. Mechanical trimmers shall not be used during periods of high fire risk and shall only be used with implementation of fire prevention measures (GSEP 2009a).

Verification: No less than 10 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide the CPM with the final version of a Weed Management Plan that has been reviewed and approved by Energy Commission staff, USFWS, and CDFG. Modifications to the approved Weed Control Plan shall be made only after consultation with the Energy Commission staff, USFWS, and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the Project's construction phase, and which items are still outstanding.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of noxious weeds surveys and management activities for the year; a discussion of whether weed management goals for the year were met; and recommendations for weed management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND AVOIDANCE MEASURES

BIO-15 Pre-construction nest surveys for bird species other than burrowing owls shall be conducted if construction activities would occur at any time during the period of February 1 through July 31. Burrowing owl nest surveys are addressed in BIO-18.

The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). The goal of the nesting surveys shall be to identify

the general location of the nest sites, sufficient to establish a protective buffer zone around the potential nest site, and need not include identification of the precise nest locations. Surveyors performing nest surveys shall not concurrently be conducting desert tortoise surveys. The bird surveyors shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the Project site or within 500 feet of the boundaries of the site (including linear facilities);

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys shall be conducted within the 7-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, a buffer zone and monitoring plan shall be developed. The size of the buffer zone shall be developed in consultation with CDFG and shall be determined based on the species specific alert distance and flush initiation distance[2]. Nest locations shall be mapped and submitted, along with a report stating the survey results, to the CPM; and

4. The Designated Biologist or Biological Monitor shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: Prior to the start of any Project-related ground disturbance activities, the Project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor (s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-

[2] Alert distance refers to the distance between an animal and an activity when the animal becomes visibly alert (as evidenced by cessation of feeding and scrutiny of activity). Flush initiation distance, also called flight distance, refers to the distance between the animal and an activity when the animal takes flight (Taylor and Knight 2003).

disturbance buffer zone around the nest(s) that would be avoided during project construction.

No later than January 31st of every year following construction a follow-up report shall be provided to the CPM, CDFG, and USFWS describing the success of the buffer zones in preventing disturbance to nesting activity and a brief description of the outcome of the nesting effort (for example, whether young were successfully fledged from the nest or if the nest failed).

Avian Protection plan

BIO-16 The Project owner shall prepare and implement an Avian Protection Plan to monitor the death and injury of birds from collisions with facility features such as transmission lines, reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The Project owner shall use the monitoring data to inform and develop an adaptive management program that would avoid and minimize Project-related avian impacts. Project-related bird deaths or injuries shall be reported to the CPM, CDFG, and USFWS. The CPM, in consultation with CDFG and USFWS, shall determine if the Project-related bird deaths or injuries warrant implementation of adaptive management measures contained in the Avian Protection Plan. The study design for the Avian Protection Plan shall be approved by the CPM in consultation with CDFG and USFWS, and, once approved, shall be incorporated into the project's BRMIMP and implemented.

Verification: No less than 30 days prior to the start of construction-related ground disturbance activitiesthe Project owner shall submit to the CPM, USFWS and CDFG a final Avian Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from the CPM.

For one year following the beginning of power plant operation the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any Project-related bird deaths or injuries detected during the monitoring study or at any other time, and describe adaptive management measures implemented to avoid or minimize deaths or injuries. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any Project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed.

No later than January 31st of every year the Annual Report shall be provided to the CPM, CDFG, and USFWS. Quarterly reporting shall continue until the CPM, in consultation with CDFG and USFWS determine whether more years of monitoring are needed, and whether mitigation and adaptive management

measures are necessary. After two years of data collection the project owner or contractor shall prepare a report that describes the study design and monitoring results of the Avian Protection Plan. The report shall be submitted to the CPM, CDFG and USFWS no later than the third year after onset of Project operation.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-17 To avoid direct impacts to American badgers and desert kit fox, pre-construction surveys shall be conducted for these species concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the Project area, including areas within 90 feet of all Project facilities, utility corridors, and access roads. Surveys may be concurrent with desert tortoise surveys. If dens are detected each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand. If tracks are observed, and especially if high or low ambient temperatures could potentially result in harm to kit fox or badger from burrow exclusion, various passive hazing methods may be used to discourage occupants from continued use. After verification that the den is unoccupied it shall then be excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den. In the event that passive relocation techniques fail for badgers, the Applicant will contact CDFG to explore other relocation options, which may include trapping.

Verification: The Project owner shall submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, impact avoidance and minimization measures implemented, and the results of those measures.

Burrowing Owl Impact Avoidance, Minimization, AND COMPENSATION Measures

BIO-18 The Project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls:

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:

   a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

   b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Passive Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the Genesis Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS, BLM and CDFG, and shall:

   a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not

affect sensitive species habitat or existing burrowing owl colonies in the relocation area;

b. Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the proposed relocation sites shall not exceed the relative cover of non-native plants in the adjacent habitats;

c. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and

d. Prepare a monitoring and management of the relocated burrowing owl site, and provide a reporting plan. The objective of the plan shall be to manage the relocation area for the benefit of burrowing owls, with the specific goals of:

   i. maintaining the functionality of the burrows for two years

   ii. Minimizing the occurrence of weeds (species considered "moderate" or "high" threat to California wildlands as defined by CAL-IPC [2006] and noxious weeds rated "A" or "B" by the California Department of Food and Agriculture and any federal-rated pest plants [CDFA 2009]) at less than 10 percent cover of the shrub and herb layers.

4. <u>Acquire Compensatory Mitigation Lands for Burrowing Owls</u>. The following measures for compensatory mitigation shall apply only if burrowing owls that are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. Staff anticipates displacement of two owls for a total of 39 acres of compensatory mitigation land. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. All measures below that are based on a compensation lands total of 39 acres would be revised accordingly. Thirty-nine acres will be used as a placeholder for security.

The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and management of the compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification BIO-12.

a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of **BIO-12** [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the 39 acres of mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from areas occupied by burrowing owls (generally approximately 5 miles). The 39 acres of burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the 39 acre of burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Project owner shall fulfill the requirements described below in this condition.

b. Security. The Security measures described below is based on the assumption that two owls would be impacted by construction of the Project, and would therefore require 39 acres of compensatory mitigation land. If the 39 acres of burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by the Project owner to the CPM with copies of the document(s) to CDFG, BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project.

Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM and the USFWS to ensure funding. As of the publication of the RSA, this amount is $120,432 but this amount may change based on land costs or the estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on the most current guidance from the REAT agencies *(Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010*) This estimate may be revised with updated information from the REAT agencies.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notifiy the CPM, BLM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.

b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.

c. Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner shall provide the CPM with a management plan

for review and approval, in consultation with CDFG, BLM and USFWS, for the compensation lands and associated funds.

d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.

e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.

f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, BLM and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

SPECIAL-STATUS PLANT Impact Avoidance, Minimization and compensation

BIO-19 This condition contains the following four sections:

- **Section A: Special-Status Plant Impact Avoidance and Minimization Measures** contains the Best Management Practices and other measures designed to avoid accidental impacts to plants occurring outside of the Project Disturbance Area and within 100 feet of the Project Disturbance Area during construction, operation, and closure.
- **Section B: Conduct Late Season Botanical Surveys** describes guidelines for conducting summer-fall 2010 surveys to detect special-status plants that would have been missed during the spring 2010 surveys.
- **Section C: Avoidance Requirements for Special-Status Plants** Detected **in the Summer/Fall 2010 Surveys** outlines the level of avoidance required for plants detected during the summer-fall surveys, based on the species' rarity and status codes.
- **Section D: Off-Site Compensatory Mitigation for Special-Status Plants** describes performance standards for mitigation for a range of options for compensatory mitigation through acquisition, restoration/enhancement, or a combination of acquisition and restoration/enhancement.

"Project Disturbance Area" encompasses all areas to be temporarily and permanently disturbed by the Project, including the plant site, linear facilities, and areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas, parking, storage, or by any other activities resulting in disturbance to soil or vegetation.

The Project owner shall implement the following measures in Section A, B, C, and D to avoid, minimize, and compensate for impacts to special-status plant species:

Section A: Special-Status Plant Impact Avoidance and Minimization Measures

To protect all special-status plants [3] located outside of the Project Disturbance Area and within 100 feet of the permitted Project Disturbance Area from accidental and indirect impacts during construction, operation, and closure, the Project owner shall implement the following measures:

1. Designated Botanist. An experienced botanist who meets the qualifications described in Section **B-2** below shall oversee compliance with all special-status plant avoidance, minimization, and compensation measures described in this condition throughout construction and closure. The Designated Botanist shall oversee and train all other Biological Monitors tasked with conducting botanical survey and monitoring work. During operation of the Project, the Designated Biologist shall be responsible for protecting special-status plant occurrences within 100 feet of the Project boundaries.

2. Special-Status Plant Impact Avoidance and Minimization Measures. The Project owner shall incorporate all measures for protecting special-status plants in close proximity to the site into the BRMIMP (**BIO-7**). These measures shall include the following elements:

   a. Site Design Modifications: Incorporate site design modifications to minimize impacts to special-status plants along the Project linears: limiting the width of the work area; adjusting the location of staging areas, lay downs, spur roads and poles or towers; driving and crushing vegetation as an alternative to blading temporary roads to preserve the seed bank, and minor adjustments to the alignment of the roads and pipelines within the constraints of the ROW. Design the engineered channel discharge points to maintain the natural surface drainage

[3] Staff defines special-status plants as described in *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (California Natural Resources Agency, Department of Fish and Game, issued November 24, 2009).

patterns between the engineered channel and the outlet of the natural washes that flow toward the south and east, downstream of the Project These modifications shall be clearly depicted on the grading and construction plans, and on report-sized maps in the BRMIMP.

b. Establish Environmentally Sensitive Areas (ESAs). Prior to the start of any ground- or vegetation-disturbing activities, the Designated Botanist shall establish ESAs to protect avoided special-status plants that occur outside of the Project Disturbance Areas and within 100 feet of Project Disturbance Areas. This includes plant occurrences identified during the spring 2009-2010 surveys and the late season 2010 surveys. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs shall be placed a minimum of 20 feet from the uphill side of the occurrence and 10 feet from the downhill side. Where this is not possible due to construction constraints, other protection measures, such as silt-fencing and sediment controls, may be employed to protect the occurrences. Equipment and vehicle maintenance areas, and wash areas, shall be located 100 feet from the uphill side of any ESAs. ESAs shall be clearly delineated in the field with temporary construction fencing and signs prohibiting movement of the fencing or sediment controls under penalty of work stoppages and additional compensatory mitigation. ESAs shall also be clearly identified (with signage or by mapping on site plans) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.

c. Special-Status Plant Worker Environmental Awareness Program (WEAP). The WEAP **(BIO-6)** shall include training components specific to protection of special-status plants as outlined in this condition.

d. Herbicide and Soil Stabilizer Drift Control Measures. **S**pecial-status plant occurrences within 100 feet of the Project Disturbance Area shall be protected from herbicide and soil stabilizer drift. The Weed Control Program (**BIO-14**) shall include measures to avoid chemical drift or residual toxicity to special-status plants consistent with guidelines such as those provided by the Nature Conservancy's *The Global Invasive*

Species Team[4], the U.S. Environmental Protection Agency, and the Pesticide Action Network Database[5].

e. Erosion and Sediment Control Measures. Erosion and sediment control measures shall not inadvertently impact special-status plants (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.). These measures shall be incorporated in the Drainage, Erosion, and Sedimentation Control Plan required under **SOIL&WATER-1**.

f. Avoid Special-Status Plant Occurrences. Areas for spoils, equipment, vehicles, and materials storage areas; parking; equipment and vehicle maintenance areas, and wash areas shall be placed at least 100 feet from any ESAs.

g. Monitoring and Reporting Requirements. The Designated Botanist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences during construction and decommissioning activities.

Section B: Conduct Late-Season Botanical Surveys

The Project owner shall conduct late-summer/fall botanical surveys for late-season special-status plants prior to start of construction or by the end of 2010, as described below:

1. Survey Timing. Surveys shall be timed to detect: a) summer annuals triggered to germinate by the warm, tropical summer storms (which may occur any time between June and October). Fall-blooming perennials that respond to the cooler, later season storms (typically beginning in September or October) shall only be required if blooms and seeds are necessary for identification or the species are summer-deciduous and require leaves for identification. The surveys shall not be timed to coincide with the statistical peak bloom period of the target species but shall instead, if possible, be based on plant phenology and the timing of a significant storm event (e. g., a 10mm or greater rain or multiple storm events of sufficient volume to trigger germination as determined by a qualified botanist.). If possible, surveys shall occur at the appropriate time to capture the characteristics necessary to identify the taxon. Construction is authorized to commence following a 2010 late season survey.

[4] Hillmer, J. & D. Liedtke. 2003. Safe herbicide handling: a guide for land stewards and volunteer stewards. Ohio Chapter, The Nature Conservancy, Dublin, OH. 20 pp. Online: <http://www.invasive.org/gist/products.html.

[5] Pesticide Action Network of North America. Kegley, S.E., Hill, B.R., Orme S., Choi A. H., PAN Pesticide Database, Pesticide Action Network, North America. San Francisco, CA, 2010 <http://www.pesticideinfo.org>

2. Surveyor Qualifications and Training. Surveys shall be conducted by a qualified botanist knowledgeable in the complex biology of the local flora, and consistent with CDFG protocols (CDFG 2009). Each surveyor shall be equipped with a GPS unit and record a complete tracklog; these data shall be compiled and submitted along with the Summer-Fall Survey Botanical Report (described below). Prior to the start of surveys, all crew members shall, at a minimum, visit reference sites (where available) and/or review herbarium specimens of all BLM Sensitive plants, CNPS List 1B or 2 (NatureServe rank S1 and S2) or proposed List 1B or 2 taxa, and any new reported or documented taxa, to obtain a search image. Because the potential for range extensions is unknown, the list of potentially occurring special-status plants shall include all special-status taxa known to occur within the Sonoran Desert region and the eastern portion of the Mojave in California. The list shall also include taxa with bloom seasons that begin in fall and extend into the early spring as many of these are reported to be easier to detect in fall, following the start of the fall rains.

3. Survey Coverage. The survey coverage or intensity shall be in accordance with BLM Survey Protocols (issued July 2009) [6], which specify that intuitive controlled surveys shall only be accomplished by botanists familiar with the habitats and species that may reasonably be expected to occur in the project area.

4. Documenting Occurrences. If a special-status plant is detected, the full extent of the population onsite shall be recorded using GPS in accordance with BLM survey protocols. Additionally, the extent of the population within one mile of Project boundaries shall be assessed at least qualitatively to facilitate an accurate estimation of the proportion of the population affected by the Project. For populations that are very dense or very large, the population size may be estimated by simple sampling techniques. When populations are very extensive or locally abundant, the surveyor must provide some basis for this assertion and roughly map the extent on a topographic map. All but the smallest populations (e.g., a population occupying less than 100 square feet) shall be recorded as area polygons; the smallest populations may be recorded as point features. All GPS-recorded occurrences shall include: the number of plants, phenology, observed threats (e.g., OHV or invasive exotics), and habitat or community type. The map of occurrences submitted with the final botanical report shall be prepared to ensure consistency with definition of an occurrence by CNDDB, i.e., occurrences found within 0.25 miles of another occurrence of the same taxon, and not separated by significant

[6] Bureau of Land Management (BLM), California State Office. *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species*. Issued July 2009.

habitat discontinuities, shall be combined into a single 'occurrence'. The Project owner shall also submit the raw GPS shape files and metadata, and completed CNDDB forms for each 'occurrence' (as defined by CNDDB).

5. Reporting. Raw GPS data, metadata, and CNDDB field forms shall be provided to the CPM within two weeks of the completion of each survey. If surveys are split into two or more periods (e.g., a late summer survey and a fall survey), then a summary letter shall be submitted following each survey period.

   The Final Summer-Fall Botanical Survey Report shall be prepared consistent with CDFG guidelines (CDFG 2009), and BLM 2009 guidelines and shall include all of the following components:

   a. the BLM designation, NatureServe Global and State Rank of each species or taxon found (or proposed rank, or CNPS List);
   b. the number or percent of the occurrence that will be directly affected, and indirectly affected by changes in drainage patterns or altered geomorphic processes;
   c. the habitat or plant community that supports the occurrence and the total acres of that habitat or community type that occurs in the Project Disturbance Area;
   d. an indication of whether the occurrence has any local or regional significance (e.g., if it exhibits any unusual morphology, occurs at the periphery of its range in California, represents a significant range extension or disjunct occurrence, or occurs in an atypical habitat or substrate);
   e. a completed CNDDB field form for every occurrence (occurrences of the same species within one-quarter mile or less of each other combined as one occurrence, consistent with CNDDB methodology), and
   f. two maps: one that depicts the raw GPS data (as collected in the field) on a topographic base map with Project features; and a second map that follows the CNDDB protocol for occurrence mapping.

Section C: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys

The Project owner shall apply the following avoidance standards to late blooming special-status plants that might be detected during late summer/fall season surveys. Avoidance and/or the mitigation measures described in Section D below would reduce impacts to these special-status plant species to less than significant levels.

1. Mitigation for CNDDB Rank 1 Plants (Critically Imperiled) - Avoidance Required: If late blooming species with a CNDDB rank of 1 are detected within the Project Disturbance Area the Project owner shall prepare and implement a Special-Status Plant Mitigation Plan (Plan). The goal of the Plan shall be to retain at least 75% of the local population of the affected species. Compensatory mitigation, as described in Section D of this condition, and at a mitigation ratio of 3:1, shall be required for the 25% or portion that is not avoided. The Plan shall include, at a minimum, the following components and definitions:

   a. A description of the occurrences of the CNDDB rank 1 species on the Project, ecological characteristics such as micro-habitat requirements, ecosystem processes required for maintenance of the habitat, reproduction and dispersal mechanisms, pollinators, local distribution, a description of the extent of the population off-site, the percentage of the local population affected, and a description of how these occurrences would be impacted by the Project, including direct and indirect effects. The "local population" shall be measured by the number of individuals occurring on the Project Site and within the immediate watershed of the Project for wash dependent-species or species of unknown dispersal mechanism, or within the local sand transport corridor for wind dispersed species. Occurrences shall be considered impacted if they are within the Project footprint, and if they would be affected by Project-related hydrologic changes or changes to the local sand transport system.

   b. A description of the avoidance and minimization measures that would achieve complete avoidance of occurrences on the Project linears and construction laydown areas, unless such avoidance would cause disturbance to areas not previously surveyed for biological resources (GSEP 2009a, TTEC 2010m) or would create greater environmental impacts in other resource areas (e.g. Cultural Resource Sites) or other restrictions (e.g., FAA or other restrictions for placement of transmission poles).

   c. A description of the measures that would be implemented to avoid or minimize impacts to occurrences on the solar facility. Avoidance is generally considered not feasible if the species is located within the Permanent Project Disturbance Area (bounded by the permanent tortoise exclusion fence and the drainage channels).

   d. If avoidance on the linears, construction laydown areas, and solar facility combined protect less than 75% of the local population of the affected species, the project owner shall implement offsite mitigation that demonstrates that the impacts

will not cause a loss of viability for that species. Implementation of the compensatory offsite mitigation must meet the performance standards described in section D of this Condition, and may include land acquisition or implementation of a restoration/enhancement program for the species.

e. "Avoidance" shall include protection of the ecosystem processes essential for maintenance of the protected plant occurrence. For all but one of the late blooming plant species with potential to occur, the plant species are annuals that depend on a viable seed bank to maintain population health and persistence. The primary goal of avoidance for these annual species will be protection of the soil integrity and the seed bank that is closely associated with undisturbed soils. Any impacts to the soil structure or surface features will be considered an impact, but measures like temporary mowing or brush removal that does not disturb the soil will not be considered impacts to the population. Isolated 'islands' of protected plants disconnected by the Project from natural fluvial, aeolian (wind), or other processes essential for maintenance of the species, shall not be considered to be protected and shall not be credited as contributing to the 75% avoidance requirement because such isolated populations are not sustainable.

2. <u>Mitigation for CNDDB Rank 2 Plants (Imperiled) –Avoidance on Linears Required:</u> If species with a CNDDB rank of 2 are detected within the Project Disturbance Area, the Project owner shall prepare and implement a Special-Status Plant Mitigation Plan (Plan) that describes measures to achieve complete avoidance of occurrences on the Project linears and construction laydown areas, unless such avoidance would cause disturbance to areas not previously surveyed for biological resources (GSEP 2009a, TTEC 2010m) or would create greater environmental impacts in other resource areas (e.g. Cultural Resource Sites) or other restrictions (e.g., FAA or other restrictions for placement of transmission poles). The Project owner shall provide compensatory mitigation, at a ratio of 2:1, as described below in Section D for impacts to Rank 2 plants that could not be avoided. The content of the Plan and definitions shall be as described above in subsection C.1.

3. <u>Mitigation for CNDDB Rank 3 Plants – No On-Site Avoidance Required Unless Local or Regional Significance:</u> If species with a CNDDB rank of 3 are detected within the Project Disturbance Area, no onsite avoidance or compensatory mitigation shall be required unless the occurrence has local or regional significance, in which case the plant occurrence shall be treated as a CNDDB rank 2

plant species. A plant occurrence would be considered to have local or regional significance if:

a. It occurs at the outermost periphery of its range in California;

b. It occurs in an atypical habitat, region, or elevation for the taxon that suggests that the occurrence may have genetic significance (e.g., that may increase its ability to survive future threats), or;

c. It exhibits any unusual morphology that is not clearly attributable to environmental factors that may indicate a potential new variety or sub-species.

4. Pre-Construction Notification for State- or Federal-Listed Species, or BLM Sensitive Species. If a state or federal-listed species or BLM Sensitive species is detected, the Project owner shall immediately notify the CDFG, USFWS, BLM, and the CPM.

5. Preservation of the Germplasm of Affected Special-Status Plants. For all significant impacts to special-status plants, regardless of whether compensatory mitigation is required, mitigation shall include seed collection from the affected special-status plants on-site prior to construction to conserve the germplasm and provide a seed source for restoration efforts. The seed shall be collected under the supervision or guidance of a reputable seed storage facility such as the Rancho Santa Ana Botanical Garden Seed Conservation Program, San Diego Natural History Museum, or the Missouri Botanical Garden. The costs associated with the long-term storage of the seed shall be the responsibility of the Project owner. Any efforts to propagate and reintroduce special-status plants from seeds in the wild shall be carried out under the direct supervision of specialists such as those listed above and as part of a Habitat Restoration/Enhancement Plan approved by the CPM.

Section D: Off-Site Compensatory Mitigation for Special-Status Plants

1. Where compensatory mitigation is required under the terms of Section C, above, the Project owner shall mitigate Project impacts to special-status plant occurrences with compensatory mitigation. Compensatory mitigation shall consist of acquisition of habitat supporting the target species, or restoration/enhancement of populations of the target species, and shall meet the performance standards for mitigation described below. In the event that no opportunities for acquisition or restoration/enhancement exist, the Project owner can fund a species distribution study designed to promote the future preservation, protection or recovery of the species. Compensatory mitigation shall be at a ratio of 3:1 for Rank 1 plants, with three acres of habitat acquired or restored/enhanced for every acre of habitat occupied by the special status plant that will be disturbed by the Project Disturbance Area (for example if the

area occupied by the special status plant collectively measured is ¼ acre than the compensatory mitigation will be ¾ of an acre). The mitigation ratio for Rank 2 plants shall be 2:1. So, for the example above, the mitigation ratio would be one-half acre for the Rank 2 plants.

2. The Project owner shall provide funding for the acquisition and/or restoration/enhancement, initial improvement, and long-term maintenance and management of the acquired or restored lands. The actual costs to comply with this condition will vary depending on the Project Disturbance Area, the actual costs of acquiring compensation habitat, the actual costs of initially improving the habitat, the actual costs of long-term management as determined by a Property Analysis Record (PAR) report, and other transactional costs related to the use of compensatory mitigation.
3. The Project owner shall comply with other related requirements in this condition:

I. Compensatory Mitigation by Acquisition: The requirements for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of special-status plant compensation lands include all of the following:

1. Selection Criteria for Acquisition Lands. The compensation lands selected for acquisition may include any of the following three categories:
   a. Occupied Habitat, No Habitat Threats: The compensation lands selected for acquisition shall be occupied by the target plant population and shall be characterized by site integrity and habitat quality that are required to support the target species, and shall be of equal or better habitat quality than that of the affected occurrence. The occurrence of the target special-status plant on the proposed acquisition lands should be viable, stable or increasing (in size and reproduction).
   b. Occupied Habitat, Habitat Threats. Occupied compensation lands characterized by habitat threats may also be acquired as long as the population could be reasonably expected to recover with habitat restoration efforts (e.g., OHV or grazing exclusion, or removal of invasive non-native plants) and is accompanied by a Habitat Enhancement/Restoration Plan as described in Section D.II, below.
   c. Unoccupied but Adjacent. The Project owner may also acquire habitat for which occupancy by the target species has not been documented, if the proposed acquisition lands are adjacent to occupied habitat. The Project owner shall provide evidence that

acquisitions of such unoccupied lands would improve the defensibility and long-term sustainability of the occupied habitat by providing a protective buffer around the occurrence and by enhancing connectivity with undisturbed habitat. This acquisition may include habitat restoration efforts where appropriate, particularly when these restoration efforts will benefit adjacent habitat that is occupied by the target species.

2. Review and Approval of Compensation Lands Prior to Acquisition. The Project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for special-status plants in relation to the criteria listed above, and must be approved by the CPM.

3. Management Plan. The Project owner or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The goal of the management plan shall be to support and enhance the long-term viability of the target special-status plant occurrences. The Management Plan shall be submitted for review and approval to the CPM.

4. Integrating Special-Status Plant Mitigation with Other Mitigation lands. If all or any portion of the acquired Desert Tortoise, Waters of the State, or other required compensation lands meets the criteria above for special-status plant compensation lands, the portion of the other species' or habitat compensation lands that meets any of the criteria above may be used to fulfill that portion of the obligation for special-status plant mitigation.

5. Compensation Lands Acquisition Requirements. The Project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, has approved the proposed compensation lands:

   Preliminary Report. The Project owner, or an approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   Title/Conveyance. The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as

required by the CPM. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM of the terms of any transfer of fee title or conservation easement to the compensation lands.

Initial Protection and Habitat Improvement. The Project owner shall fund activities that the CPM requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated based on the most current guidance from the REAT agencies (*Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010*) This estimate may be revised with updated information from the REAT agencies. The cost estimate shall use the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at the ratio of 3:1 for Rank 1 plants and 2:1 for Rank 2 plants, but actual costs will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands.

The PAR or PAR-like analysis must be approved by the CPM before it can be used to establish funding levels or management activities for the compensation lands.

Long-term Maintenance and Management Funding. The Project owner shall deposit in NFWF's REAT Account a non-wasting capital long-term maintenance and management fee in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis conducted for the compensation lands.

4. The CPM, in consultation with CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision. .

Interest, Principal, and Pooling of Funds. The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fund (endowment) holder/manager to ensure the following requirements are met:

Interest. Interest generated from the initial capital long-term maintenance and management fund shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action that is approved by the CPM and is designed to protect or improve the habitat values of the compensation lands.

Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.

Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation

lands for special-status plants. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM.

Other Expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing compensation lands to CDFG or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.

Mitigation Security. The Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") approved by the CPM. The amount of the Security shall be based on the most current guidance from the REAT agencies (*Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010*) This estimate may be revised with updated information from the REAT agencies. The cost estimate shall use $2,280 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a ratio of 3:1 for Rank 1 plants and 2:1 for Rank 2 plants, for every acre of habitat supporting the target special-status plant species which is significantly impacted by the project. The actual costs to comply with this condition will vary depending on the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR report. Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval of the form of the Security. The CPM may draw on the Security if the CPM determines the Project owner has failed to comply with the requirements specified in this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the Security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition, and the Project owner remains responsible for satisfying the obligations under this condition if the Security is insufficient. The unused Security shall be returned to the Project

owner in whole or in part upon successful completion of the associated requirements in this condition.

The Project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Project owner, the Project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, and the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the Applicant, the remaining balance shall be returned to the Project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organizations supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegations shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the start of ground disturbance.

<u>II. Compensatory Mitigation by Habitat Enhancement/Restoration</u>: As an alternative or adjunct to land acquisition for compensatory mitigation the Project owner may undertake habitat enhancement or restoration for the target special-status plant species. Habitat enhancement or restoration activities must achieve protection at a 3:1 ratio for Rank 1 plants and 2:1 for Rank 2 plants, with improvements applied to three acres, or two acres, respectively, of habitat for every acre special-status plant habitat directly or indirectly disturbed by the Project Disturbance Area (for example if the area occupied by the special status plant collectively measured is ¼ acre than the

improvements would be applied to an area equal to ¾ of an acre at a 3:1 ratio, or one-half acre at a 2:1 ratio). Examples of suitable enhancement projects include but are not limited to the following: i) control unauthorized vehicle use into an occurrence (or pedestrian use if clearly damaging to the species); ii) control of invasive non-native plants that infest or pose an immediate threat to an occurrence; iii) exclude grazing by wild burros or livestock from an occurrence; or iv) restore lost or degraded hydrologic or geomorphic functions critical to the species by restoring previously diverted flows, removing obstructions to the wind sand transport corridor above an occurrence, or increasing groundwater availability for dependent species.

If the Project owner elects to undertake a habitat enhancement project for mitigation, the project must meet the following performance standards: The proposed enhancement project shall achieve rescue of an off-site occurrence that is currently assessed, based on the NatureServe threat ranking system [7] with one of the following threat ranks: a) long-term decline >30%; b) an immediate threat that affects >30% of the population, or c) has an overall threat impact that is High to Very High. "Rescue" would be considered successful if it achieves an improvement in the occurrence trend to "stable" or "increasing" status, or downgrading of the overall threat rank to slight or low (from "High" to "Very High").

If the Project owner elects to undertake a habitat enhancement project for mitigation, they shall submit a Habitat Enhancement/Restoration Plan to the CPM for review and approval, and shall provide sufficient funding for implementation and monitoring of the Plan. The amount of the Security shall be based on the most current guidance from the REAT agencies (*Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010*) This estimate may be revised with updated information from the REAT agencies. The cost estimate shall use $2,280 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at the ratio of 3:1 for Rank 1 plants and 2:1 for Rank 2 plants, for every acre of habitat supporting the target special-status plant species which is directly or indirectly impacted by the project. The amount of the security may be adjusted based on the actual costs of implementing

[7] Master, L., D. Faber-Langendoen, R. Bittman, G. A., Hammerson, B. Heidel, J. Nichols, L. Ramsay, and A. Tomaino. 2009. *NatureServe Conservation Status Assessments: Factors for Assessing Extinction Risk.* NatureServe, Arlington, VA. Online: http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf, "Threats". See also: Morse, L.E., J.M. Randall, N. Benton, R. Hiebert, and S. Lu. 2004. An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity. Version 1. NatureServe, Arlington, Virginia. Online: http://www.natureserve.org/publications/pubs/invasiveSpecies.pdf

the enhancement, restoration and monitoring. The implementation and monitoring of the enhancement/restoration may be undertaken by an appropriate third party such as NFWF, subject to approval by the CPM. The Habitat Enhancement/Restoration Plan shall include each of the following:

1. Goals and Objectives. Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The objective of the proposed habitat enhancement plan shall include restoration of a target special-status plant occurrence that is currently threatened with a long-term decline. The proposed enhancement plan shall achieve an improvement in the occurrence trend to "stable" or "increasing" status, or downgrading of the overall threat rank to slight or low (from "High" to "Very High").
2. Historical Conditions. Provide a description of the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions.
3. Site Characteristics. Describe other site characteristics relevant to the restoration or enhancement project (e.g., composition of native and pest plants, topography and drainage patterns, soil types, geomorphic and hydrologic processes important to the site or species.
4. Ecological Factors. Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.
5. Methods. Describe the restoration methods that will be used (e.g., invasive exotics control, site protection, seedling protection, propagation techniques, etc.) and the long-term maintenance required. The implementation phase of the enhancement must be completed within five years.
6. Budget. Provide a detailed budget and time-line, and develop clear, measurable, objective-driven annual success criteria.
7. Monitoring. Develop clear, measurable monitoring methods that can be used to evaluate the effectiveness of the restoration and the benefit to the affected species. The Plan shall include a minimum of five years of quarterly monitoring, and then annual monitoring for the remainder of the enhancement project, and until the performance standards for rescue of a threatened occurrence are met. At a minimum the progress reports shall include: quantitative measurements of the projects progress in meeting the enhancement project success criteria, detailed description of remedial actions taken or proposed, and contact information for the responsible parties.

8. Reporting Program. The Plan shall ensure account ability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.

9. Contingency Plan. Describe the contingency plan for failure to meet annual goals.

10. Long-term Protection. Include proof of long-term protection for the restoration site. For private lands this would include conservations easements or other deed restrictions; projects on public lands must be contained in a Desert Wildlife Management Area, Wildlife Habitat Management Area, or other land use protections that will protect the mitigation site and target species.

III. Compensatory Mitigation by Conducting or Contributing to a Distribution and Status Study for the Affected Species: As determined by the CPM, in the event there are no opportunities for mitigation through acquisition or restoration/enhancement, a Study of Distribution and Status for the affected special-status plant species may be implemented or funded. Information on the distribution, status or health of known occurrences, ecological requirements, and ownership and management opportunities is very limited for many of the special-status plant species that occur on the Project or have potential to occur on the project, especially the late summer and fall blooming species. Some of these late blooming species are only known from a few viable occurrences in California, and historic occurrences that have not been re-located or surveyed since they were first documented. The objectives of this study would be to better understand the full distribution of the affected species, the degree and immediacy of threats to occurrences, and ownership and management opportunities, with the primary goal of future preservation, protection, or recovery of the affected species within California. Additionally the study should delineate other areas in the region that should be avoided or protected due to rare plant presence. To further ensure protection, study data shall be published in the state's rare plant database.

At a minimum, the study shall include the following:

1. Occurrence and Life History Review. The Study shall include an evaluation of all documented, historical and reported localities for the affected species, and a review of current information on the species life history. This would include a review of the CNDDB database, records from regional and national herbaria, literature review, consultation with U.C. Riverside, San Diego Natural History Museum, and other educational institutions or natural heritage organizations in California, Arizona, and Nevada, etc.), other biotechnical survey reports from the region, and information from regional botanical experts.

2. Conduct Site Visits to Documented and Reported Localities. Documented and reported occurrences would be evaluated in the field during the appropriate time of the year for each late blooming species. If located, these occurrences would be evaluated for population size (area and quantity), population trend, ecological characteristics, soils, habitat quality, potential threats, degree and immediacy of threats, ownership and management opportunities. GPS location data would also be collected during these site visits.

3. Survey Surrounding Areas. Areas surrounding the occurrences that contain habitat suitable to support the affected species shall be surveyed to determine the full extent of its range and distribution. If additional populations are found, collect data (GPS and assessment) on these additional populations consistent with III.2 above.

4. Prepare a Status and Distribution Study Report. A report shall be prepared that contains the results of the surveys and assessment. The report shall contain the following components: a) Range and Distribution (including maps and GPS data); b) Abundance and Population Trends; c) Life History; d) Habitat Necessary for Survival; d) Factors Affecting Ability to Survive and Reproduce; e) Degree and Immediacy of Threat; f) Ownership and Management Opportunities for Protection or Recovery; g) Sources of Information, and g) Conclusions. The conclusions shall contain an explanation of whether the species' survival is threatened by any of the following factors: i) present or threatened modification or destruction of its habitat; ii) competition; iii) disease; iv) or other natural occurrences (such as climate change) or human-related activities. This valuable information will provide a better understanding of the ecological factors driving the distribution of these species, and will identify opportunities for mitigation and management opportunities for recovery. All data from this study will be submitted for incorporation into the CNDDB system and the study report will be made available to resource agencies, and conservation groups, and other interested parties.

Verification: The Special-Status Plant Impact Avoidance and Minimization Measures shall be incorporated into the BRMIMP as required under Condition of Certification **BIO-7.**

Raw GPS data, metadata, and CNDDB field forms shall be submitted to the CPM within two weeks of the completion of each survey. A preliminary summary of results for the late summer/fall botanical surveys shall also be submitted to the CPM and BLM's State Botanist within two weeks following the completion of the surveys. If surveys are split into more than one period, then a summary letter shall be submitted following each survey period. The Final Summer-Fall Botanical Survey Report, GIS shape files and metadata shall be submitted to the BLM State Botanist and the CPM no less than 30 days prior to the start of ground-disturbing activities. The Final Report shall include a detailed accounting of the acreage of Project impacts to special-status plant occurrences.

The draft conceptual Special- Status Plant Mitigation Pl an shall be submitted to the CPM f or review and approval no les s than 30 days prior to the start of ground-disturbing activities.

The Projec t owner s hall immediately prov ide written notificat ion to the CPM, CDFG, USFWS, and BLM if it detects a State- or Federal-Listed Species, or BLM Sensitive Species at any time during its late summer/fall botanic al surveys or at any time thereafter through the life of t he Project, including c onclusion of Project decommissioning.

No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit grading plans and construction drawings to the CPM whic h depict the location of Environmentally Sensitive Areas and the Avoidanc e and Minimization Measures contained in Section A of this Condition.

If compensatory mitigation is required, no less than 30 days prior to the start of ground-disturbing activities, the Project owner shall s ubmit to the CPM the form of Security adequate to ac quire compensatory mitigati on lands and/ or undertake habitat enhancement or restoration activiti es, as described in this condition. Actual Sec urity shall be provided 7 days prior to start of ground-distur bing activities.

No fewer t han 90 day s prior to acquisiti on of compensatory mitigation lands , the Project owner shall s ubmit a formal ac quisition propos al and draft Management Plan for the proposed lands to the CPM, with copies to CDFG , USFWS, and BLM, describing the parcels intended for purchase and shall obtain approval from the CPM prior to the acquis ition. No fe wer than 90 days prior to acquis ition of compensatory mitigation lands, the Projec t owner shall submit to the CPM and obtain CPM approval of any agreements to delegate land ac quisition to an approved third party, or to manage compensation lands; such agreement shall be executed and implemented within 18 months of the start of ground disturbance.

No fewer than 30 days after acquisition of the property the Project owner shall deposit the funds required by Sect ion I e above (long term management and maintenance fee) and provide proof of the deposit to the CPM.

The Project owner or an approved third par ty shall c omplete the acquis ition and all required transfers of the compensation lands, and pr ovide written verification to the CPM of such completion no later than 18 months after the start of P roject ground-disturbing activities. If NFWF or another app roved third party is being used for the acquis ition, the Project owne r shall ens ure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ens ure the land c an be acqui red and transferred prior to the 18-month deadline. If habitat enhance ment is proposed, no later than six months following the start of ground-disturbing activities , the Project owner shall obtain CPM approval of the final Habi tat Enhancement/Restoration Plan, prepared in accordance with Se ction D, and submit to the CPM or a third party

approved by the CPM Security adequate for long-term implementation and monitoring of the Habitat Enhancement/Restoration Plan.

Enhancement/restoration activities shall be initiated no later than 12 months from the start of construction. The implementation phase of the enhancement project shall be completed within five years of initiation. Until completion of the five-year implementation portion of the enhancement action, a report shall be prepared and submitted as part of the Annual Compliance Report. This report shall provide, at a minimum: a summary of activities for the preceding year and a summary of activities for the following year; quantitative measurements of the Project's progress in meeting the enhancement project success criteria; detailed description of remedial actions taken or proposed; and contact information for the responsible parties.

If a Status and Distribution Study is proposed, the study shall commence no later than six months following the start of ground-disturbing activities. The draft study shall be submitted to the CPM and BLM Botanist for review and approval no more than two years following the start of ground-disturbing activities. The final study shall be submitted no more than 30 months following the start of ground-disturbing activities.

If a Distribution Study is implemented as contingency mitigation, the study shall be initiated no later than 6 months from the start of construction. The implementation phase of the study shall be completed within two years of the start of construction.

Within 18 months of ground-disturbing activities, the Project owner shall transfer to the CPM or an approved third party the difference between the Security paid and the actual costs of (1) acquiring compensatory mitigation lands, completing initial protection and habitat improvement, and funding the long-term maintenance and management of compensatory mitigation lands; and/or (2) implementing and providing for the long-term protection and monitoring of habitat enhancement or restoration activities.

Implementation of the special-status plant impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval, in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided special-status plants to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, completed CNDDB field forms for each avoided occurrence on-site and within 100 feet of the Project boundary off-site, and description of the remedial action, if warranted

and planned for the upcoming year. The completed forms shall include an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends.

BIO-20 The Project owner shall mitigate for direct and indirect impacts to stabilized and partially stabilized sand dunes and other Mojave fringe-toed lizard habitat by acquisition of 136 acres of Mojave fringe-toed lizard habitat. The Project owner shall provide funding for the acquisition, initial habitat improvements and long-term management of the compensation lands. The 136-acre acquisition requirement, and associated funding requirements based on that acreage will be adjusted if there are changes in the final footprint of the Project. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification BIO-12. Condition of Certification BIO-29 may provide the Project owner with another option for satisfying some or all of the requirements in this condition.

2. Security for Implementation of Mitigation: The Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement the acquisitions and enhancement of Mojave fringe-toed lizard habitat as described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or Security prior to initiating ground-disturbing project activities. The Security shall be approved by the CPM, in consultation with CDFG and the USFWS, to ensure sufficient funding. The amount is $422,668 *based on the most current guidance from the REAT agencies (Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010)*. This amount may change based on land costs or the estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of $1,450 per acre to fund acquisition, enhancement and long-term management).

3. Preparation of Management Plan: The Project owner shall submit to the CPM, CDFG and USFWS a draft Management Plan that that reflects site-specific enhancement measures for

the Mojave fringe-toed lizard habitat on the acquired compensation lands. The objective of the Management Plan shall be to enhance the value of the compensation lands for Mojave fringe-toed lizards, and may include enhancement actions such as weed control, fencing to exclude livestock, erosion control, or protection of sand sources or sand transport corridors.

The requirements for acquisition, initial improvement and long-term management of compensation lands include all of the following:

1. Criteria for Compensation Lands: The compensation lands selected for acquisition shall:

   a. *Provide suitable habitat for Mojave fringe-toed lizards that is equal to or better than that found in the Project disturbance area, and may include stabilized and partially stabilized desert dunes or sand drifts over playas or Sonoran creosote bush scrub;*

   b. Be within the Chuckwalla Valley with potential to contribute to Mojave fringe-toed lizard habitat connectivity and build linkages between known populations of Mojave fringe-toed lizards and preserve lands with suitable habitat;

   c. Be connected to lands that are either currently occupied or have high potential to be occupied by Mojave fringe-toed lizard based on patch size and habitat quality;

   d. Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

   e. Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

   f. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;

   g. Not contain hazardous wastes;

   h. Not be subject to property constraints (i.e. mineral leases, cultural resources); and

i. Be on land for which long-term management is feasible.

Verification: No later than 30 days prior to beginning construction-related ground-disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification. The Project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities.

The Project owner, or an approved third party, shall provide the CPM, CDFG and USFWS with a management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. The CPM shall review and approve the management plan, in consultation with CDFG and the USFWS.

No less than 90 days prior to acquisition of the property, the Project owner shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcels intended for purchase. At the same time the project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, in consultation with BLM, CDFG and USFWS.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of Mojave fringe-toed lizard habitat disturbed during Project construction.

The Project owner shall provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the initiation of construction related ground-disturbance activities.

EVAPORATION POND NETTING AND MONITORING

BIO-21 The Project owner shall cover the evaporation ponds prior to any discharge with 1.5-inch mesh netting designed to exclude birds and other wildlife from drinking or landing on the water of the ponds. Netting with mesh sizes other than 1.5-inches may be installed if approved by the CPM in consultation with CDFG and USFWS. The netted ponds shall be monitored regularly 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 ponds shall include a visual deterrent in addition to the netting, and the pond shall be designed such that the netting shall never contact the water. Monitoring of the evaporation ponds shall include the following:

1. Monthly Monitoring. The Designated Biologist or Biological Monitor shall regularly survey the ponds at least once per month starting with the first month of operation of the evaporation ponds. The purpose of the surveys shall be to determine if the

netted ponds are effective in excluding birds, if the nets pose an entrapment hazard to birds and wildlife, and to assess the structural integrity of the nets. The monthly survey shall be conducted in one day for a minimum of two hours following sunrise (i.e., dawn), a minimum of one hour mid-day (i.e., 1100 to 1300), and a minimum of two hours preceding sunset (i.e., dusk) in order to provide an accurate assessment of bird and wildlife use of the ponds during all seasons. Surveyors shall be experienced with bird identification and survey techniques. Operations staff at the Project site shall also report finding any dead birds or other wildlife at the evaporation ponds to the Designated Biologist within one day of the detection of the carcass. The Designated Biologists shall report any bird or other wildlife deaths or entanglements within two days of the discovery to the CPM, CDFG, and USFWS.

2. Dead or Entangled Birds. If dead or entangled birds are detected, the Designated Biologist shall take immediate action to correct the source of mortality or entanglement. The Designated Biologist shall make immediate efforts to contact and consult the CPM, CDFG, and USFWS by phone and electronic communications prior to taking remedial action upon detection of the problem, but the inability to reach these parties shall not delay taking action that would, in the judgment of the Designated Biologist, prevent further mortality of birds or other wildlife at the evaporation ponds.

3. Quarterly Monitoring. If after 12 consecutive monthly site visits no bird or wildlife deaths or entanglements are detected at the evaporation ponds by or reported to the Designated Biologist, monitoring, as described in paragraph 1, can be conducted on a quarterly basis.

4. Biannual Monitoring. If after 12 consecutive quarterly site visits no bird or wildlife deaths or entanglements are detected by or reported to the Designated Biologist and with approval from the CPM, USFWS and CDFG, future surveys may be reduced to two surveys per years, during the spring nesting season and during fall migration. If approved by the CPM, USFWS and CDFG, monitoring outside the nesting season may be conducted by the Environmental Compliance Manager.

5. Modification of Monitoring Program. CDFG or USFWS may submit a request for modifications to the evaporation pond monitoring program based on information acquired during monitoring, and may also suggest adaptive management measures to remedy any problems that are detected during

monitoring or modifications if bird impacts are not observed. Modifications to the evaporation pond monitoring described above and implementation of adaptive management measures shall be made only after approval from the CPM, in consultation with USFWS and CDFG.

Verification: No less than 30 days prior to operation of the evaporation ponds the project owner shall provide to the CPM as-built drawings and photographs of the ponds indicating that the bird exclusion netting has been installed. For the first year of operation the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations and results of site visits conducted at the evaporation ponds. Thereafter the Designated Biologist shall submit annual monitoring reports with this information. The quarterly and annual reports shall fully describe any bird or wildlife death or entanglements detected during the site visits or at any other time, and shall describe actions taken to remedy these problems. The annual report shall be submitted to the CPM, CDFG, and USFWS no later than January 31st of every year for the life of the project.

MITIGATION FOR IMPACTS TO STATE WATERS

BIO-22 The Project owner shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and to satisfy requirements of California Fish and Game Code sections 1600 and 1607.

1. Acquire Off-Site State Waters: The Project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least 111 acres of state jurisdictional waters, or the area of state waters directly or indirectly impacted by the final Project footprint. The Project footprint means all lands disturbed by construction and operation of the Genesis Project, including all Project linears. The parcel or parcels comprising the 111 acres of ephemeral washes shall include at least 48 acres of microphyll woodland. If the Reduced Acreage Alternative were constructed the mitigation requirements for impacts to state waters would be a minimum of 109 acres that included at least 48 acres of microphyll woodland. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-12**, #2 and #3. Mitigation for impacts to state waters shall occur within the Chuckwalla-Ford Dry Lake or surrounding watersheds, as close to the Project site as possible. The 111-acre acquisition of state waters may be integrated with the desert tortoise mitigation acquisition if the criteria described in this condition are met.

2. Security for Implementation of Mitigation: The Project owner shall provide financial assurances to the CPM and CDFG to guarantee that an adequate level of funding is available to

implement the acquisitions and enhancement of state waters as described in this condition. These funds shall be used solely for implementation of the measures associated with the project. Financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter of credit, a pledged savings account or Security prior to initiating construction-related ground disturbing activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG and the USFWS, to ensure sufficient funding. The amount is $342,768, based on the most current guidance from the REAT agencies (*Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account, July 23, 2010*) This estimate may be revised with updated information from the REAT agencies.

3. Title/Conveyance. The Project owner shall transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Transfer of either fee title or an approved conservation easement will usually be sufficient, but some situations, e.g., the donation of lands burdened by a conservation easement to BLM, will require that both types of transfers be completed. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM under terms approved by the CPM in consultation with CDFG. If an approved non-profit organization holds title to the compensation lands, a conservation easement shall be recorded in favor of CDFG in a form approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary.

4. Preparation of Management Plan: The Project owner shall submit to the CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control.

5. Stop Work Provisions. The Project owner shall provide a copy of this condition (Condition of Certification **BIO-22)** from the Energy Commission Final Decision to all contractors, subcontractors, and other on-site personnel. Copies shall be readily available at work sites at all times during periods of

active work and must be presented to any CDFG personnel upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the Project owner and the CPM if the CPM, in consultation with CDFG, determines that the Project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

a. The information provided by the Applicant regarding impacts to waters of the state is incomplete or inaccurate;

b. New information becomes available that was not known to staff in preparing the terms and conditions; or

c. The Project or Project activities as described in the Staff Assessment have changed.

6. Notification: The project owner shall notify the CPM and CDFG in writing before conducting Project activities in jurisdictional areas. The Project owner shall notify the CPM and CDFG of any change of conditions to the Project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of a proposed Project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed Project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports. A change of conditions is defined as follows:

a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the Project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the Project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or substantial

changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

7. Best Management Practices: The Project owner shall also comply with the following conditions to protect drainages near the approved impact areas as defined in the approved construction documents:

   a. The Project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

   b. The Project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

   c. The Project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the Project owner to ensure compliance.

   d. Spoil sites shall be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.

   e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage, shall be removed immediately.

f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into waters of the state.

g. When operations are completed, any excess materials or debris shall be removed from the work area.

h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No less than 30 days prior to the start of construction-related ground disturbance activities potentially affecting waters of the state, the Project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices shall be implemented. The Project owner shall also provide a discussion of work in waters of the state in Compliance Reports for the duration of the Project.

No less than 30 days prior to beginning construction-related ground-disturbing activities the Project owner shall provide written verification of Security in accordance with this condition of certification. The Project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities.

The Project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of construction-related ground-disturbing activities in jurisdictional state waters and at least five days prior to completion of Project activities in jurisdictional areas. The Project owner shall notify the CPM and CDFG of any change of conditions to the Project, impacts to state waters, or the mitigation efforts. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a Project; the biological and physical characteristics of a Project area; or the laws or regulations pertinent to the Project as defined below. A copy of the notifying Change of Conditions report shall be included in the annual reports or until it is deemed unnecessary by the CPM, in consultation with CDFG.

The Project owner, or an approved third party, shall provide the CPM, CDFG and USFWS with a draft management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. The CPM shall review and approve the management plan, in consultation with CDFG.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of jurisdictional state waters disturbed during Project construction.

The Project owner shall provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the start of construction-related ground-disturbing activities.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM, BLM, USFWS and CDFG that describes the results of monitoring and management of the acquisition lands. The annual report shall describe actions taken to implement the management plan (for example, fencing, erosion control, weed control) during the year and recommendations for enhancement actions that should be implemented the following year.

DECOMMISSIONING AND CLOSURE PLAN

BIO-23 Upon Project closure the Project owner shall implement a final Decommissioning and Closure Plan for the Project site. The Decommissioning and Closure Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities, and shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from the CPM in consultation with BLM, USFWS, and CDFG. The Project owner shall submit a draft Decommissioning and Closure Plan for review to the CPM, BLM, USFWS and CDFG. The Project owner shall finalize the plan only after approval from the CPM, in consultation with BLM, USFWS, and CDFG. Throughout the life of the Project the Project owner plan shall regularly submit the plan to the CPM for review and updating, if warranted, as described in Verification below. Modifications to the final Decommissioning and Closure Plan shall be made only after approval from the CPM, in consultation with BLM, USFWS, and CDFG.

Verification: No less than 30 days prior to initiating construction-related ground disturbance activities, the Project owner shall provide to BLM and the CPM a draft Decommissioning and Closure Plan. The plan shall be finalized prior to the start of commercial operation and reviewed every five years thereafter and submitted to the CPM for approval, in consultation with BLM. Modifications to the approved Decommissioning and Closure Plan shall be made only after approval from the CPM, in consultation with BLM, USFWS, and CDFG.

No less than 10 days prior to initiating construction-related ground disturbance activities the Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding would be available to implement measures described in the Decommissioning and Closure Plan, consistent with the provisions set forth in 43 C.F.R. sections 2805.12 and 3809.500-.599.

Revegetation of temporarily disturbed areas

BIO-24 The Project owner shall prepare and implement a Revegetation Plan to restore all areas subject to temporary disturbance. The final Revegetation Plan shall be based on the draft Revegetation Plan submitted by the Applicant (TTEC 2010i) and shall include all revisions deemed necessary by the CPM in consultation with BLM. The objectives of the Revegetation Plan shall be to stabilize disturbed soils, minimize erosion and sedimentation impacts to soil and water resources, prevent colonization by noxious weeds and other non-native plants, salvage native plantings and seed from Project Disturbance Areas, and to achieve restoration of disturbed areas to functioning, established early-successional native plant communities.

Target performance standards at the end of the monitoring period shall be as follows:

a. total absolute cover of all plants shall equal at least 30 percent;

b. survivorship of salvaged and transplanted cacti and other native plantings shall equal 30% percent;

c. at least 90 percent (relative cover) of the perennial species observed within the temporarily disturbed areas shall be locally native species that naturally occur in the adjacent desert scrub or dune habitats;

d. relative cover of perennial plant species shall equal at least 60 percent of the total vegetative cover; and

e. Relative cover of non-native plants within the temporarily disturbed areas shall not exceed the relative cover of non-native plants in the adjacent habitats.

Verification: No less than 30 days prior to construction-related ground-disturbance activities the Project owner shall submit to the CPM a final agency-approved Revegetation Plan that has been reviewed and approved by the CPM. All modifications to the Revegetation Plan shall be made only after approval from the CPM.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval a report identifying which items of the Revegetation Plan have been completed, a summary of all modifications to revegetation measures made during the Project's construction phase, and which items are still outstanding.

The Designated Biologist shall provide reports to the CPM according to the reporting schedule in the Revegetation Plan that that includes: a summary of

revegetation activities for the year, a discussion of whether revegetation performance standards for the year were met; and recommendations for revegetation remedial action, if warranted, planned for the upcoming year. Reports shall be submitted on January 31st following the relevant reporting year.

BIO-25 **Deleted.**

BIO-26 **Deleted.**

Couch's spadefoot toad impact avoidance and minimization measures

BIO-27 The Project owner shall prepare and implement a Couch's Spadefoot Toad Protection and Mitigation Plan (Protection and Mitigation Plan) to avoid, minimize or mitigate impacts to Couch's spadefoot toads and their breeding habitat during construction and operation of the Project. The Protection and Mitigation Plan shall be approved by the CPM in consultation with CDFG, and shall be incorporated into the Project's BRMIMP and implemented. It is expected that, as currently proposed, the Project could avoid the known breeding pond south of I-10 near Wiley Well Road and minimize impacts to the surrounding upland buffer. The Protection and Mitigation Plan shall address methods to achieve this avoidance and minimization, and shall include avoidance, minimization, and mitigation measures that would be required if additional habitat is found during habitat surveys. The Protection and Mitigation Plan shall include, at a minimum:

1. <u>Habitat Survey Results</u>:

   a. Survey methodology;

   b. Survey results, including a detailed discussion of potential breeding sites, and a description of areas determined not to include breeding habitat; and

   c. Figures showing the areas surveyed and the location of potential breeding habitat in relation to proposed Project features.

2. <u>Impacts Assessment from</u>:

   a. Habitat disturbance from construction;

   b. Noise from construction, operations, and potential ORV traffic;

   c. Increased access for vehicles from road construction or improvements;

   d. Changes in breeding habitat due to changes in flow levels and flow patterns to breeding ponds;

e. Increased traffic from construction and operations;

f. Increased risk of predation.

3. Avoidance and Minimization Measures:

a. Description of measures that would be implemented to avoid impacts to potential breeding ponds, such as design strategies; protective fencing or other barriers, worker's education, minimizing construction traffic within the vicinity of breeding ponds, and biological monitoring;

b. Designation of a Management Area around breeding ponds that includes an appropriate upland buffer, and a description of measures used to minimize impacts within this buffer.

4. Mitigation: If complete avoidance of the pond south of I-10 or other breeding sites identified during surveys is not possible, the Protection and Mitigation Plan shall include plans to create additional breeding habitats (ephemeral pond) at least equal in area to the acreage of ponds being impacted. The created ponds shall be capable of holding water for at least nine days during the spadefoot toad breeding season, and shall be established as close as possible (no more than ¼ mile) from the location of the impacted ponds. The created ponds shall be monitored and managed to ensure fulfillment of this performance standard by site visits at the pond following summer rainfall events. If the created ponds fail to achieve this standard, remedial action shall be implemented (for example, by compacting the soil in the pond to increase water-holding capacity).

Verification: No less than 30 days prior to construction-related ground-disturbance the Project owner shall submit to the CPM and CDFG a final Protection and Mitigation Plan. Modifications to the Protection and Mitigation Plan shall be made only after approval from the CPM, in consultation with CDFG.

If the Protection and Mitigation Plan includes creation of ponds, the number and acreage of created ponds shall be described in the plan. No less than 90 days prior to operation of Project the Project owner shall provide to the CPM as-built drawings and photographs of the created ponds and maps showing the size and location of the ponds in relation to project features. On January 31st of every year following initiation of operation of the Project the Project owner shall submit reports to the CPM documenting the capacity of the created ponds to hold water for at least 9 days during the spadefoot toad breeding season. If ponds fail to hold water as described above the Project owner shall implement remedial actions. The annual reporting may be terminated upon satisfactory demonstration of this performance standard, and with approval of the CPM.

GOLDEN EAGLE INVENTORY AND MONITORING

BIO-28 The Project owner shall implement the following measures to avoid or minimize Project-related construction impacts to golden eagles.

1. Annual Inventory During Construction. For each calendar year during which construction will occur an inventory shall be conducted to determine if golden eagle territories occur within one mile of the Project boundaries. Survey methods for the inventory shall be as described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS.

2. Inventory Data: Data collected during the inventory shall include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location, nest elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed.

3. Determination of Unoccupied Territory Status: A nesting territory or inventoried habitat shall be considered unoccupied by golden eagles ONLY after completing at least 2 full surveys in a single breeding season.

4. Monitoring and Adaptive Management Plan: If an occupied nest is detected within one mile of the Project boundaries, the Project owner shall prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles.

Verification: No fewer than 30 days from completion of the golden eagle inventory the project owner shall submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory.

If an occupied nest is detected within one mile of the Project boundary during the inventory the Project shall contact staff at the USFWS Carlsbad Office and CDFG within one working day of detection of the nest for interim guidance on monitoring and nest protection. The project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Monitoring and Management Plan within 30 days after detection of the nest. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS and CDFG.

IN-LIEU FEE MITIGATION OPTION

BIO-29 The Project owner may choose to satisfy its mitigation obligations identified in this Decision by paying an in lieu fee instead of acquiring compensation lands, pursuant to Fish and Game code sections 2069 and 2099 or any other applicable in-lieu fee provision, provided that the Project's in-lieu fee proposal is found by the Commission to be in compliance with CEQA and CESA requirements. If the in-lieu fee proposal is found by the Commission to be in compliance, and the Project Owner chooses to satisfy its mitigation obligations through the in-lieu fee, the Project Owner shall provide proof of the in-lieu fee payment to the CPM prior to construction related ground disturbance.

Verification: If electing to use this provision, the Project owner shall notify the Commission and all parties to the proceeding that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements. Prior to construction related ground disturbance the Project Owner shall provide proof of the in lieu fee payment to the CPM. *If the Project owner elects to use this provision after posting such Security, the Project owner shall provide proof of the in lieu fee payment prior to the time required for habitat compensation lands to be surrendered in accordance with the Conditions of Certification.*

APPENDIX B

USFWS SECTION 7 BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-ERIV-08B0060-10F0878

NOV 02 2010

MEMORANDUM

To: Field Manager, Bureau of Land Management, Palm Springs South Coast Field Office, Palm Springs, California

From: Field Supervisor, Carlsbad Fish and Wildlife Office
Carlsbad, California

Subject: Section 7 Biological Opinion on the Genesis Solar Energy Project, Riverside County, California

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the construction, operation, and maintenance of the proposed Genesis Solar Energy Project (project or GSEP) located in Riverside County, California, and its effects on the threatened desert tortoise (*Gopherus agassizii*, "tortoise") and its designated critical habitat in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*). Your request for formal consultation dated July 1, 2010, was received on July 6, 2010.

This biological opinion is primarily based on information provided in the following documents and communications: (1) the Bureau of Land Management/California Energy Commission's (BLM/CEC) joint *Staff Assessment and Environmental Impact Statement* (EIS), *Genesis Solar Power Project* (BLM and CEC 2010); (2) the BLM's *Plan Amendment/Final Environmental Impact Statement for the Genesis Solar Power Project* (BLM 2010); (3) the CEC's *Genesis Solar Power Project Revised Staff Assessment* (CEC 2010a); (4) the *Genesis Solar Energy Project Biological Assessment* (Tetra Tech 2010); (5) the CEC's Genesis Solar Power Project Commission Decision (CEC 2010b); (6) pre-project desert tortoise survey reports (Tetra Tech and Karl 2009, 2010); (7) final and draft revised desert tortoise recovery plans (Service 1994a, 2008); (8) supplemental materials provided during the consultation process, (9) electronic transmissions from BLM and Genesis Solar (applicant); and (10) pertinent literature contained in our files. The project file for this consultation is located at the Carlsbad Fish and Wildlife Office (CFWO).

CONSULTATION HISTORY

The Service received a request from the applicant for information on endangered and threatened species in the vicinity of the proposed project on October 4, 2007, and began early consultation

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on this project. Between October 2007 and October 2010, the Service, BLM, CEC, California Department of Fish and Game (CDFG), and/or the applicant participated in numerous meetings and conference calls regarding this project, including participating in CEC public workshops and the July 12, 2010, CEC evidentiary hearing. The Service coordinated early with BLM, CEC, and CDFG on the development of measures in the CEC/BLM staff assessment/draft environmental impact statement to avoid, minimize, and offset impacts to the desert tortoise.

In preparing this biological opinion, we provided a draft project description to the BLM and applicant on October 1, 2010, and October 27, 2010, and a draft biological opinion was provided to the BLM on October 28, 2010. All comments received from the BLM and applicant were incorporated into this biological opinion as appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the BLM's issuance of a right-of-way (ROW) grant that will authorize construction, operation, maintenance, and decommission of a commercial solar power-generating facility on approximately 809 hectares (ha) [2,000 acres (ac)] of BLM-managed lands. The proposed project in Riverside County, California, is located approximately 40 kilometers (km) [25 miles (mi)] west of the Blythe, 43 km (27 mi) east of Desert Center, and 5 km (3 mi) north of the Interstate 10 (I-10) corridor. Surrounding features include the McCoy Mountains to the east, the Palen Mountains (including the Palen/McCoy Wilderness Area) to the north, and Ford Dry Lake, a dry lakebed, to the south (Figure 1).

Construction

The project includes construction of a 250-megawatt (MW) nominal commercial solar thermal power-generating facility that will use solar parabolic trough technology to generate electricity. Arrays of parabolic mirrors will collect heat from the sun to warm the heat transfer fluid (HTF) in the solar field piping. Through a series of heat exchangers, heat will be released to generate high-pressure steam that will then be fed to a steam turbine generator to generate electricity. Project components generally include the solar power plant site and associated support facilities, and linear facilities, including an access road and transmission line. See Tetra Tech (2010) for a detailed project description.

Project construction is anticipated to begin in late 2010 on the access road and continue for approximately 37 months. Project construction will require an average of about 646 employees, peaking at approximately 1,085 workers in month 23 of construction. Commercial operation is anticipated to begin in mid-2013.

Solar Power Plant and Support Facilities

The solar power plant site, or plant site, will consist of two independent 125-MW nominal power units (Figure 2) within a permanently fenced area. Support facilities inside the plant site will include such structures as power blocks, solar arrays, two 2-ha (5-ac) evaporation ponds, water storage tanks, leach fields, auxiliary systems, administration buildings, parking, and other support facilities. The plant site will be cleared of all vegetation and graded. Laydown and parking areas needed during construction of the solar plant and support facilities will be located within the fenced plant site.

The GSEP will use dry cooling. Water for solar mirror washing, feed water makeup, fire water supply, onsite domestic use, and cooling water for auxiliary equipment heat rejection (auxiliary cooling tower and auxiliary boiler) will be supplied from groundwater wells on the plant site, and stored in several onsite storage tanks. Sanitary wastewater will be collected for treatment in septic tanks and disposed of via leach fields on the plant site.

A permanent security fence will be installed along the perimeter of the plant site and will be a 2.4-meter (m) [8.0-foot (ft)] tall chain-link fence, topped with 0.30 m (1 ft) of barbed wire (three strands) mounted on 45-degree extension arms and posts set in concrete. Controlled access gates will be located at the entrances to the facility to restrict access. Permanent tortoise exclusion fencing will be installed along the outside of the entire security fence and the entrance gates.

Development of the plant site will also include channelizing and rerouting storm flows along the perimeter into three channels, one along each of the west and east boundaries (outside the perimeter fence), and one on the plant site between the two units. Flows will be returned to their sheet flow regime south and southwest of the project footprint. The rerouted channels and associated diversion berms will be designed to contain a 100-year, 24-hour storm event within the channel, be armored as necessary for erosion protection using natural gravel derived during site grading activities, and be maintained periodically or after major storm events as needed to sustain their proper function. The perimeter security fence will completely enclose the two power units, though the fence will not be installed across the inlets and outlets of the central re-routed drainage channel traversing the power plant. Instead, this channel will remain unfenced.

Access Road and Linear Facilities

The plant site will be accessed via a new road extending approximately 10.5 km (6.5 mi) from Wiley's Well Rest Area at the I-10 interchange to the plant site (Figure 2). The new access road will be paved with approximately 3,000 tons of imported asphalt concrete material. Crossings for all major washes will be Arizona-type crossings.

Linear facilities, including distribution and communication lines, natural gas and water pipelines, and a generation tie transmission line (gen-tie line) will be constructed within a utility corridor extending approximately 10.5 km (6.5 mi) adjacent to the access road from Wiley's Well Rest Area to the plant site (Figure 2). The gen-tie line will be a 230-kilovolt (kV) bundled circuit line

supported by concrete or steel monopole or tower structures. The distribution line will provide temporary power and communication during project construction and will tie into electrical power from an existing Southern California Edison (SCE) distribution line near the Wiley's Well Rest Area. The new distribution line will be installed either above or below ground. If the line is installed above ground, it will be supported by single poles. A primary fiber-optic communication line will be mounted on the gen-tie line poles and a secondary (redundant) fiber-optic communication line will be mounted on the new distribution line poles and buried underground. Auxiliary boilers on the plant site will be fueled by natural gas supplied from a new pipeline connecting to an existing Southern California Gas pipeline located north of I-10. A water pipeline will be co-located with the natural gas pipeline in the utility corridor.

The gen-tie line will extend an additional 2.4 km (1.5 mi) from the Wiley's Well Rest Area, cross Interstate 10 (I-10), and tie into the Blythe Energy Project transmission line (BEPTL). The gen-tie line will use the existing pole structures of the BEPTL to interconnect with SCE's future Colorado River Switchyard (CRS) Substation to the east. However, six new transmission line poles will be constructed from the BEPTL to tie into the CRS as part of the proposed project. To the extent possible, the existing BEPTL maintenance road, laydown areas, and pulling sites will be used to install the six new poles and line. Laydown/staging and parking areas needed for construction of the access road and linear facilities will be located within the power plant site or along the access road.

Construction Timing Relative to Desert Tortoise Clearance Surveys

Prior to construction of linear facilities (i.e., access road, distribution and communication lines, natural gas and water pipelines, and gen-tie line), rerouted drainage channels off the plant site, or perimeter security fence, either temporary tortoise exclusion fencing will be installed, or a biological monitor will be present in the immediate vicinity of construction activities.

Clearance surveys for desert tortoise along linear facilities off the plant site, rerouted drainage channels off the plant site, or perimeter security fencing may be conducted during any season. Any tortoise found during clearance surveys of the linear facilities off the plant site will be moved out of harm's way within 500 m (1,640 ft) of the disturbance area in accordance with the Service's *Desert Tortoise Field Manual* (Service 2009a) or more recent Service guidance. However, any tortoises found during clearance surveys along the rerouted drainage channels off the plant site or perimeter security fence will be considered translocatees[1].

Desert tortoise clearance surveys associated with all components within the fenced plant site will be conducted during the desert tortoise's most active season (April to May, September to October). Surveys outside of these periods require approval by CFWO. Clearance surveys will be conducted in accordance with the Service's *Desert Tortoise Field Manual* (Service 2009a) or

[1] "Translocatee" refers to tortoises found on the plant site, along the security fence line, or along rerouted drainage channels off the plant site that will be transmittered, given health assessments, and moved and monitored in accordance with the final Relocation/Translocation Plan.

the latest Service guidance. Any tortoises found during clearance surveys of the plant site also will be considered translocatees.

Operations and Maintenance

Operation and maintenance (O&M) will occur during the 30-year life of the project. While electrical power is to be generated only during daylight hours, GSEP will be staffed 24 hours a day, 7 days per week. A total estimated workforce of 40 to 50 fulltime employees will be needed once the GSEP is fully operational.

Within the fenced plant site, routine O&M will include such activities as maintenance and repair of the perimeter security fence, access gates, solar array components, support facilities, and evaporation ponds, mirror washing, vehicle and equipment movement, and vegetation removal. Solar mirrors will be sprayed with treated water once or twice per week, determined by the reflectivity monitoring program. Washing is anticipated to require 2 ac-ft per year, and will generally be done at night and will involve a water truck spraying treated (i.e., demineralized) water on the mirrors in a drive-by fashion. Because the mirrors will be angled down for washing, water will not accumulate on the mirrors; instead, it will fall from the mirrors to the ground. Due to the small volume, the applicant anticipates the water will soak into the soil with no appreciable runoff. Any remaining rinse water from the washing operation is expected to evaporate on the mirror surface.

Outside of the fenced plant site, O&M activities will be conducted along the access road and in the utility corridor, rerouted drainage channels, and along the outer side of the perimeter security fence. Routine O&M activities will include activities such as periodic cleaning of the line conductors and replacement and/or repair of equipment damaged by wind, dust, or accident, road grading and drainage structure repairs to maintain a drivable surface along the access roads, and repair of the perimeter security fence. Such activities are anticipated to occur throughout the year as needed. O&M of the rerouted channels will occur to reduce the hydraulic roughness, improve flood conveyance capacity, and maintain adequate protection of the stream banks from erosion, and will include vegetation management to maintain cover at less than 38 centimeters (cm) [15 inches (in)] in height, periodic debris removal, and erosion repairs. Maintenance will occur predominantly by hand crews and pickup truck; however, it may be necessary to use heavy equipment (e.g., loader, excavator, and wheel dump trucks) to repair structural features and clean out debris following large storm events. The newly constructed access road to the plant site will provide O&M access to the utility corridor. A dirt road created during construction will provide O&M access to rerouted drainage channels and the outer side of the perimeter security fence.

According to information provided by the applicant, routine O&M activities are expected to occur along existing access roads, access roads created for the project, and areas previously disturbed during construction-related activities. Therefore, we do not expect routine O&M activities will result in additional direct habitat disturbance above what will be disturbed during construction activities.

The proposed project will disturb approximately 789 ha (1,950 ac), of which approximately 718 ha (1,774 ac) is desert tortoise habitat, including approximately 10 ha (24 ac) in tortoise critical habitat. This impact acreage includes all permanent and long-term/temporary habitat disturbance associated with construction and O&M of the (1) plant site [approximately 693 ha (1,712 ac)] and perimeter security fence, (2) rerouted drainage channels on and off the plant site, and (3) linear facilities[2], including the 6-pole extension from the BEPTL to the future CRS Substation. Any non-emergency expansion of construction or O&M activities into areas outside of the areas considered in this biological opinion will require BLM approval and tortoise clearance surveys, and may require reinitiation of consultation with the Service.

Decommissioning

The planned operational life of the proposed project is 30 years, but the facility conceivably could operate for a longer or shorter period depending on economic or other circumstances. However, if the facility were to become economically non-viable before 30 years of operation, permanent closure could occur sooner. In any case, BLM will require a Decommissioning Plan be prepared and put into effect when permanent closure occurs. The procedures provided in the Decommissioning Plan will be developed to ensure compliance with applicable laws and regulations, and to ensure public health and safety and protection of the environment. The Decommissioning Plan will be submitted to the BLM for review and approval prior to a planned closure. When the BLM begins to consider decommissioning, they will contact the Service to determine if additional consultation, pursuant to section 7(a)(2) of the Act, would be appropriate. Consequently, we will not analyze the potential effects of decommissioning on the desert tortoise in this biological opinion.

Translocation

The applicant will develop a final Relocation/Translocation Plan (Plan) that requires approval by the Service prior to the initiation of any ground-disturbing construction activities on the plant site or along the perimeter security fence or rerouted drainage channels off the plant site. The Plan will incorporate the Service's desert tortoise translocation guidance (Service 2010a), as appropriate for the GSEP project, and will include detailed descriptions of how and where tortoises found on the plant site and along the security fence and rerouted drainage channels off the plant site will be translocated, and include such information as: maps identifying the recipient sites, a description of how disease prevalence of resident tortoises at the recipient sites will be documented, and how translocated tortoises will be monitored.

Two sites have been identified to serve as recipient sites for tortoises from the plant site, the security fence line, and rerouted drainage channels off the plant site: the Genesis recipient site (primary site) and the Upper McCoy Wash recipient site (secondary site). The "Environmental

[2] Linear facilities include the new access road, distribution and communication lines, natural gas and water pipelines, and gen-tie transmission line. Impact acreages associated with the distribution and gen-tie lines include crossing structures, pole pads, crane pads, pulling/splicing sites, and spur roads.

Baseline" section below includes descriptions of the general areas where these recipient sites will be located. The exact locations of these sites will be defined in the final Plan.

Desert tortoises located during clearance surveys will undergo varying levels of health assessments, depending on where they are found on the plant site, security fence line, or rerouted drainage channels off the plant. For tortoises that will be translocated less than 500 m (1,640 ft) to the recipient site, only visual health assessments will be conducted prior to release at the recipient site. For tortoises that will be translocated greater than 500 m (1,640 ft) to the recipient site, visual health assessments and blood draw for enzyme-linked immunosorbent assay (ELISA) testing for *Mycroplasma testudineuim* or *M. agassizii* will be conducted prior to release at the recipient site. Tortoises to be translocated greater than 500 m (1,640 ft) will be monitored on the plant site or remain in quarantine pending the receipt of ELISA test results. All blood samples will be drawn between May 15 and October 31. Blood draw outside of this period requires approval by CFWO.

To determine disease prevalence in the resident population at the recipient sites, the applicant will perform health assessments on all resident desert tortoises within contiguous tortoise habitat 1.5 km (0.9 mi) of the point of release of each translocated tortoise prior to their release. When the recipient site will be receiving tortoises that will be moved less than 500 m (1,640 ft) from the point of collection, health assessments of the resident tortoises will only include a visual assessment for the clinical signs of disease (no disease testing required). When the recipient site will be receiving tortoises that will be moved greater than 500 m (1,640 ft) from the point of collection, health assessments of the resident tortoises will include a visual assessment and disease testing via blood samples for ELISA testing.

Translocated tortoises will not be released within 1.5 km (0.9 mi) of a diseased [documented seropositive or clinically ill (showing signs of disease)] resident tortoise at the recipient site. Therefore, if a diseased tortoise is found within this 1.5 km (0.9 mi) area and the recipient site is not large enough to release translocated tortoises at least 1.5 km (0.9 mi) from diseased resident tortoises, then translocated tortoises will be translocated to the Upper McCoy Wash recipient site. Prior to release of translocated tortoises to the Upper McCoy Wash recipient site, the applicant will perform surveys to determine disease prevalence in the resident population by performing visual health assessments and collecting blood for ELISA testing on all resident tortoises within contiguous tortoise habitat 1.5 km (0.9 mi) of the point of release of each translocated tortoise.

Prior to release at the recipient site, the applicant will attach transmitters to all tortoises that will be translocated from the plant site, security fence line, or rerouted drainage channels off the plant site. The applicant will monitor all transmittered tortoises for 5 years (starting from the date of release) as described in the Service's translocation guidance (Service 2010a). During monitoring, the applicant will, at a minimum, collect information on survivorship, mortality rates, health status, body condition, movement of individuals, and predation of each translocated tortoise. The applicant will also collect blood for ELISA testing annually from each transmittered tortoise.

Conservation Measures

The proposed project includes conservation measures that will be implemented to avoid, minimize, and offset potential adverse effects to the tortoise. These measures were developed in coordination with the BLM, CEC, CDFG, and applicant, and correspond directly to the CEC's conditions of certification BIO-1 thru BIO-14 and BIO-29 described in the CEC's Final Decision on the GSEP (CEC 2010b). Therefore, we are incorporating by reference into this biological opinion, the CEC's conditions of certification BIO-1 thru BIO-14 and BIO-29 as described in the CEC's Final Decision, as the conservation measures that will be implemented by the applicant and BLM to avoid, minimize, and offset the impacts to the tortoise associated with the GSEP project. We have provided additional clarification of the requirements outlined in BIO-8, BIO-9, BIO-10, and BIO-13 below. The project description, including the CEC's conditions of certification BIO-1 thru BIO-14 and BIO-29 and the additional clarifications provided below, provide the basis of the effects analysis provided in this biological opinion. The CEC's Final Decision (CEC 2010b) and BLM's final EIS (BLM 2010) include additional measures to offset proposed project impacts on rare and sensitive species and natural communities, which will be implemented to further reduce impacts to biological resources, including those associated with dust, light, and noise, resulting from the proposed project.

BIO-8: Impact Avoidance and Minimization Measures - CEC's condition of certification BIO-8 specifies the measures that will be implemented to manage the project site and related facilities in a manner to avoid or minimize impacts to biological resources, including the desert tortoise. To clarify, these measures will also be implemented during all ground-disturbing construction and O&M activities.

BIO-9: Desert Tortoise Clearance Surveys and Fencing - CEC's condition of certification BIO-9 specifies the procedures, including seasonal restrictions, for conducting tortoise clearance surveys and handling and moving tortoise out of the disturbance area during construction activities. BIO-9 also specifies that once the area is cleared of tortoise, temporary tortoise exclusion fencing will be installed along linear features unless a biological monitor is present during construction activities. To clarify, these procedures for conducting tortoise clearance surveys, handling and moving tortoises out of the disturbance area, and ensuring tortoises do not re-enter the disturbance area, will also be implemented in areas not enclosed with tortoise-exclusion fencing during any new ground-disturbing activities associated with O&M of the access road, utility corridor, rerouted drainage channels off the plant site, and perimeter security fence.

BIO-10: Desert Tortoise Relocation/Translocation Plan - CEC's condition of certification BIO-10 specifies that the Desert Tortoise Relocation/Translocation Plan will be consistent with Service-approved guidelines, and that the final Plan will include all revisions deemed necessary by BLM, Service, CDFG, and CEC, and be approved by the CEC in consultation with the BLM, Service, and CDFG prior to ground-disturbing construction activities. To clarify, the final Desert Tortoise Relocation/Translocation Plan will incorporate the Service's desert tortoise translocation guidance (Service 2010a) and subsequent guidance from the Service, as appropriate for

the GSEP project. The final Desert Tortoise Relocation/Translocation Plan also requires approval by the Service prior to initiation of any ground-disturbing construction activities on the plant site, perimeter security fence line, or rerouted drainage channels off the plant site.

BIO-12: Desert Tortoise Compensatory Mitigation - CEC's condition of certification BIO-12 specifies that the applicant will provide compensatory mitigation at a 1:1 ratio for impacts to approximately 708 ha (1,750 ac), and at a 5:1 ratio for impacts to approximately 10 ha (24 ac) of critical habitat. According to BIO-12, these lands will be acquired to benefit tortoise habitat linkages and population connectivity within and between tortoise critical habitat units, known populations of tortoises, and/or or other preserve lands in the Colorado Desert Recovery Unit. To clarify, to compensate for impacts to approximately 10 ha (24 ac) in the Chuckwalla Critical Habitat Unit, approximately 48 ha (120 ac) will be acquired in the Chuckwalla Critical Habitat Unit.

BIO-13: Raven Management Plan - As stated in the CEC's condition of certification BIO-13, the applicant will submit payment to the project sub-account of the Renewable Energy Action Team (REAT) account held by the National Fish and Wildlife Foundation (NFWF) to support the Service Regional Raven Management Program. The amount will be a one-time payment of $105 per acre of permanent disturbance. To clarify, the applicant will contribute a one-time fee of $105 per acre[3] of disturbance to 718 ha (1,774 ac) of desert tortoise habitat that will be impacted by the proposed project. Accordingly, a fee of $186,270 will be assessed to fund the project's portion of the regional management plan for the 30-year ROW grant by the BLM. Documentation for payment of this fee will be submitted to the Service prior to the initiation of ground-disturbing construction activities.

Action Area

The implementing regulations to section 7(a)(2) of the Act describe the action area to be all areas affected directly or indirectly by the Federal action and not merely the immediate area affected by the proposed project (50 CFR §402.02). The action area is the area of potential direct or indirect effects of the proposed action and any interrelated or interdependent human activities; the direct and indirect effects of these activities include associated physical, chemical, and/or biological effects of considerable likelihood (Service and NMFS 1998). Indirect effects are those that are caused by the proposed action and are later in time but are still reasonably certain to occur (Service and NMFS 1986). Analyses of the environmental baseline, effects of the action on the species and designated critical habitat, cumulative effects, and the impacts of the incidental taking, are based upon the action area as determined by the Service (Service and NMFS 1998).

The action area for the proposed project consists of the 718 ha (1,774 ac) of desert tortoise habitat that will be impacted in the project footprint/site [includes the plant site, perimeter

[3] Based on the cost allocation methodology described in *Renewable Energy Development And Common Raven Predation on the Desert Tortoise –Summary* (May 2010) and *Cost Allocation Methodology for Implementation* of *the Regional Raven Management Plan* (July 9, 2010).

security fence, rerouted drainage channels on and off the plant site, access road, and linear facilities (distribution and communication lines, natural gas and water pipelines, and gen-tie line)]. Along the access road and linear facilities off the plant site, the action area also includes a distance of up to 500 m (1,640 ft) where any tortoises will be moved out of harm's way to avoid injury from construction or O&M-related activities. The action area also includes the applicant's proposed desert tortoise recipient (translocation) sites as will be identified in the Relocation/ Translocation Plan, and all contiguous tortoise habitat within 6.5 km (4.0 mi) of the recipient sites. By including habitat within 6.5 km (4.0 mi) of the recipient sites, we are including all areas where tortoises may move following translocation[4].

Finally, the action area encompasses conservation areas that will be acquired to offset the loss of desert tortoise habitat resulting from construction and O&M of the proposed project. The acquisition, management, and monitoring of these conservation areas are expected to have only beneficial effects to tortoises; however, the locations of these conservation areas are currently unknown. As discussed in the condition of certification BIO-12 of the CEC's Final Decision, lands selected for acquisition will be within the Colorado Desert Recovery Unit (Service 2008) and contribute to desert tortoise habitat linkages and population connectivity within and between desert tortoise critical habitat, known populations of tortoises, and/or or other preserve lands. The REAT agencies have agreed that improved connectivity along the I-10 corridor is the priority habitat acquisition objective. Prior to the initiation of ground-disturbing construction activities, either conservation lands will be acquired directly by the applicant or the applicant will provide a security to guarantee an adequate level of funding is available for acquisition and management of conservation lands [see CEC condition of certification BIO-12 and BIO-29 (CEC 2010b)].

STATUS OF THE SPECIES/CRITICAL HABITAT

The following section summarizes information about the desert tortoise on the legal/listing status, distribution and population trends, current threats, and status of critical habitat as discussed in the Service's biological opinion on the California Desert Conservation Area Plan Amendment for the Coachella Valley (Service 2010b). Please refer to that document as well as the draft revised recovery plan (Service 2008) for additional detailed information about these topics and the species' description, life history, and habitat affinities.

Legal/Listing Status: The Mojave population of the desert tortoise was proposed for listing by the Service on October 13, 1989, and listed as a threatened species on April 2, 1990 (Service 1989, 1990). The tortoise is also listed as a threatened species under the California Endangered Species Act. The Service designated about 2.6 million ha (6.5 million ac) of critical habitat for the tortoise in portions of California, Nevada, Arizona, and Utah on February 8, 1994 (Service 1994b). The recovery plan was developed for this species in 1994 (Service 1994a). The draft revision to the recovery plan was developed in 2008 (Service 2008), but the plan has not yet been finalized.

[4] See "Effects of the Action" section for a discussion on post-translocation dispersal.

Distribution and Population Trends: Typical desert tortoise habitat in the Mojave Desert is characterized as creosote bush scrub below 1,676 m (5,500 ft) in which precipitation ranges from 5 cm to 20 cm (2 in to 8 in), where a diversity of perennial plants is relatively high, and production of annual plants is high. The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California.

The best available information indicates the Mojave population of the desert tortoise is declining in abundance in most areas throughout its range. Line distance sampling is now being used as part of a long-term monitoring strategy to detect population trends. This program was put into place in 2001, but detecting population trends is expected to be a gradual process and surveys conducted over short periods of time (e.g., 2001 to 2007) would only reveal catastrophic declines or significant changes. However, these data do provide some information on variability in annual and regional densities between recovery units. In general, over the first 6 years of range-wide monitoring (2001-2005, 2007), tortoises were least abundant in the Northeast Mojave Desert Recovery Unit, the highest reported densities occurred in the Upper Virgin River Recovery Unit, and considerable decreases in density were reported in 2003 in the Eastern Colorado and Western Mojave recovery units (Service 2008). The proposed project occurs in the Eastern Colorado Desert Recovery Unit per the species recovery plan (Service 1994a), which was merged with the Northern Colorado Desert Recovery Unit in the draft revised recovery plan (Service 2008) and referred to simply as the Colorado Desert Recovery Unit.

Current Threats: The majority of threats to the tortoise and its habitat are associated with human land uses including urbanization, upper respiratory tract disease and possibly other diseases, predation by common ravens and domestic and feral dogs, unauthorized off-highway vehicles activity, authorized vehicular activity, illegal collecting, mortality on paved roads, vandalism, drought, livestock grazing, feral burros, nonnative plants, changes to natural fire regimes, and environmental contaminants.

Status of Critical Habitat: The Service designated about 2.6 million ha (6.5 million ac) of critical habitat for the tortoise in portions of California, Nevada, Arizona, and Utah. The primary constituent elements of desert tortoise critical habitat were identified as sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

Threats to critical habitat include urban development, military operations, and multiple-uses of public lands such as off-highway vehicle (OHV) activities and livestock grazing (Service 1994b). The introduction and spread of invasive nonnative plants, changes to natural fire regimes, and environmental contaminants also threaten critical habitat areas. In addition, threats from long-term climate trends, such as recurrent and prolonged drought, and ecological

processes, such as invasive nonnative plant infestations and consequent wildfire risk, are widespread in some areas. These threats have potentially degraded the primary constituent elements of desert tortoise critical habitat over some areas, which if continued, would threaten the viability of populations in affected areas, including habitat linkages between core populations.

The southern portion of the linear facilities associated with the proposed project would cross through and affect approximately 10 ha (24 ac) of the Chuckwalla Critical Habitat Unit. While most critical habitat areas are relatively unaffected by human uses, the critical habitat area that would be affected by the proposed project has been previously affected by ongoing O&M activities associated with an existing transmission line and the recent construction of a new transmission line.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR §402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

As discussed in the "Action Area" section above, the action area for this project includes: (1) the project area, defined as the 718 ha (1,774 ac) project footprint/site (includes the plant site, perimeter security fence line, rerouted drainage channels on and off the plant site, access road, and linear facilities), and a distance of up to 500 m (1,640 ft) from linear facilities off the plant site where any tortoises will be moved out of harm's way, (2) the proposed desert tortoise recipient (translocation) sites, and all contiguous tortoise habitat within 6.5 km (4.0 mi) of the recipient sites, and (3) conservation areas. The environmental baseline of each of these components of the action area is described below.

Species Abundance in the Action Area

Project Area

The project area is in the Eastern Colorado Desert Recovery Unit per the species recovery plan (Service 1994a), which was merged with the Northern Colorado Desert Recovery Unit in the draft revised recovery plan (Service 2008) and referred to simply as the Colorado Desert Recovery Unit. The project area lies along the alluvial fan emanating from the Palen Mountains to the north and the McCoy Mountains to the east and is underlain by a broad, valley-axial drainage that extends southward between these mountains and drains to Ford Dry Lake, located about one mile south of the project area. The project area is relatively flat and generally slopes from north to south with elevations of approximately 113 m to 122 m (370 ft to 400 ft) above mean sea level.

The project area is relatively undisturbed, although past uses in the vicinity include military training, grazing and OHV recreation. During World War II, the area was part of the General George S. Patton Desert Training Center, officially the California-Arizona Maneuver Area, a simulated theater of operations heavily used by tanks and other military vehicles. The former BLM Ford OHV area was southwest of the project area, but there is currently little evidence of OHV traffic in the area. Access to the project area is poor and limited to a four-wheel-drive track west of the proposed plant site. The I-10 freeway crosses the southern portion of the project area, where the gen-tie transmission line is proposed south of I-10.

The project area is dominated by creosote bush scrub and stabilized to partially stabilized sand dunes [see Table 2 in Tetra Tech (2010) for acreages of each vegetation type occurring in the action area]. Three invasive plant species, Russian thistle (*Salsola tragus*), Saharan mustard (*Brassica tournefortii*), and Mediterranean grass (*Schismus arabicus*), occur in disturbed areas in the project vicinity. Except for small-localized patches, none of these annual plants are prevalent on the project site. Soils are generally soft sandy-loams and loamy-sands, with scattered to 90 percent cover of fine gravel (Tetra Tech 2010). Several small deposits of loose, aeolian sand naturally intersect the linear facilities route and the southern plant site, including some of the drainages. Finer soils on the southern portion of the project area generally reflect proximity to the Ford Dry Lake bed.

Pre-project surveys of the project footprint were conducted in spring and fall 2009 and in spring 2010 (Tetra Tech and Karl 2009, 2010) following the Service's pre-project survey protocol (Service 1992). At the time of the spring 2009 surveys, the project footprint had not been finalized; therefore, 100 percent of the originally requested 1,878 ha (4,640-ac) ROW was surveyed using contiguous, 30-foot-wide belt transects. Zone of influence (ZOI) surveys, as described in the Service's 1992 protocol, were also conducted at established intervals from the ROW boundary. In addition, to comply with CEC data requirements, two additional transects were surveyed beyond the ZOI surveys. As a result of the additional CEC-requested transects and the ZOI transects, surveys were conducted at established intervals approximately 1.6 km (1 mi) from the ROW boundary.

No live tortoises and 25 bone fragments were found within the project footprint during 2009 and 2010 surveys (see Table 5 in Tetra Tech 2010). In addition, one set of tracks were found 0.8 km (0.5 mi) north of the plant site, and 115 bone fragments were found within 1.6 km (1 mi) of the project area. Three burrows (none active) and two partially intact carcasses, both estimated to be 4 or more years old, were also found approximately 6 km (4 mi) west of the project area during 2009/2010 surveys.

The relatively low amount of tortoise sign found in the project footprint and the surrounding survey area indicate that the current tortoise population level in the project area is very low. However, desert tortoises are likely present to the north, west, and east of the project area, where higher quality creosote bush scrub and well-developed washes are present (Tetra Tech 2010). South of the project area, the fine soils, few vegetated washes and sparse vegetation that characterize the habitat nearer the playa are apparently less suitable for tortoise.

While no live tortoises were found, the pre-project surveys represent single points in time, onsite tortoises may have remained undetected, and tortoises may have moved on to the site from surrounding areas after surveys were conducted, especially from the higher quality habitat north of the project area. As a result, we anticipate that a few tortoises may occur in the project footprint. To estimate the number of tortoises, we applied the method for estimating tortoises described in the 2010 survey protocol (Service 2010c). Since the calculation is based on the observation of live tortoises during pre-project surveys, and none were found, we based our calculation on the assumption that at least one tortoise may have been present in the project footprint during pre-project surveys, as indicated by the presence of tortoise tracks 0.8 km (0.5 mi) north of the plant site. Based on this assumption, our calculation yields an estimate of two subadult or adult tortoises (tortoises with a midline carapace length greater than 160 mm) in the project footprint. This estimate is based on an 80 percent probability that a tortoise is above ground based on the previous winter rainfall and a 63 percent probability of detecting a tortoise if above ground (see Service 2010c). The Service's method for estimating tortoise numbers (Service 2010c) also allows us to calculate a 95 percent confidence interval used to indicate the reliability of the data. However, since no live tortoises were found, we are unable to calculate the 95 percent confidence interval associated with the estimate and therefore, cannot determine the reliability of the estimate.

We also estimated the number of subadult and adult tortoises in the project footprint by applying density estimates for areas outside of Desert Wildlife Management Areas (DWMAs) and critical habitat within the Eastern Colorado Desert Recovery Unit, as determined in our amended biological opinion for the California Desert Conservation Area (CDCA) Plan for the Northern and Eastern Colorado Desert (NECO) Coordinated Management Plan amendment (Service 2007). As discussed in our amended biological opinion, we multiplied the average density of tortoises in the recovery unit by 0.1, resulting in a density estimate of 0.7 tortoises per square km (1.8 tortoises per square mi). We estimated the density of tortoises within the DWMAs and critical habitat in the recovery unit based on an average of the densities for the recovery unit from line-distance sampling conducted between 2001 and 2005 (Service 2006). We considered areas outside of DWMAs and critical habitat to generally support substantially lower densities of tortoises based on numerous factors, including elevation, rainfall, vegetation community composition, and other geographic variables that naturally support fewer animals where habitat conditions are not as favorable as with DWMAs and critical habitat. While a portion of the project footprint [approximately 10 ha (24 ac)] is within the Chuckwalla Critical Habitat Unit, we conclude the 0.7 tortoises (1.8 tortoises per square mi) per square km density estimate is a reasonable approximation for the project footprint and constitutes the best available information. Our conclusion is based on the relatively low habitat quality of the entire project footprint and the fact that no live tortoises and relatively little sign were found in the 1,878 ha (4,640 ac) ROW application area (which includes the project footprint). Applying this density of 0.7 tortoises per square km (1.8 tortoises per square mi) to the project footprint yields an estimate of five subadult and adult tortoises in the project footprint.

Applying these two methods, we anticipate that from two to five subadult and adult tortoises may occur in the project footprint. We acknowledge that the estimate of five tortoises likely is an

overestimate since it is based on our assumptions of tortoise densities outside of DWMAs and critical habitat. However, we determined that applying the estimate of five tortoises in the project footprint would provide a biologically conservative approach based on the best data available to establish a baseline for analysis of the potential impacts of the proposed project.

In addition to subadult and adult tortoises, the project footprint is likely to contain juvenile tortoises. Estimating densities of juvenile tortoises is difficult because they are extremely difficult to detect due to their small size and cryptic nature. However, based on a 4-year study of their population ecology, Turner et al. (1987) determined that juveniles accounted for 31 to 51 percent of the overall population. Using this range and the estimated five subadult and adult tortoises in the project footprint, we estimate that the project footprint may support from two to three juveniles. We recognize that the survey data used for these estimates come from a limited number of studies and that population levels are constantly changing. We also recognize that since our estimate of the number of subadult and adult tortoises in the project footprint is likely an overestimate (as discussed above), this estimate of juveniles in the project footprint is likely an overestimate as well, but provides the best available data available to establish a baseline for analysis.

We also expect the proposed project footprint contains tortoise eggs. Estimating the number of tortoise eggs is also extremely difficult given that the eggs are buried beneath the soil surface. To estimate the number of eggs that could be present, we used the average number of eggs found in a clutch (i.e., 5.8, see Service 1994a). Assuming a 1:1 sex ratio, three of the five tortoises estimated in the project footprint may be reproductive females that together could produce approximately 17 eggs per year. However, it is difficult to estimate the number of females or eggs within the project footprint based on the low number of tortoises found during the pre-project surveys. Given the number of assumptions and extrapolations used to estimate the number of eggs [i.e., that five tortoises may occur on site and that three of those five may be female and equally reproductive as the tortoises in the Turner et al. (1984) study area], we determined that the estimate of 17 eggs on the project site has an unknown but high level of uncertainty, and therefore, does not provide a useful measure for analyzing the effects of the proposed project. Therefore, we cannot calculate a reliable estimate for the number of eggs that may be impacted by the proposed project.

Despite the presence of lower-quality habitat in the project footprint, any portion of the project footprint may be used by tortoise for dispersal from surrounding habitat. Desert tortoises are known to use lower-quality intermountain habitat, such as on eastern parts of the project footprint, as dispersal routes, providing passage between high-quality habitat areas in the surrounding mountains (Averill-Murray and Averill-Murray 2005). Historically, tortoise populations in the Sonoran Desert have exchanged individuals at a rate of one migrant per generation (Averill-Murray and Averill-Murray 2005).

Desert Tortoise Critical Habitat

The southern portion of the linear facilities associated with the proposed project would cross through and affect approximately 10 ha (24 ac) of the Chuckwalla Critical Habitat Unit. Desert tortoise sign, but no live tortoises, was found during surveys of this area.

Proposed Recipient (Translocation) Sites

As described in the Service's translocation guidance, recipient sites must be sufficiently large to accommodate and maintain resident (if present) and translocated desert tortoises, as well as be free of disease (Service 2010a). In addition, the Service recommends that at least two recipient sites be identified in case resident tortoises at the primary site are determined to be infectious.

As described above in the "Translocation" section, tortoises from the plant site, the perimeter security fence line, and rerouted drainage channels off the plant site would be translocated to the Genesis (primary site) or the Upper McCoy Wash (secondary site) recipient sites depending on the results of health assessments of resident tortoises at these sites. If a diseased [documented seropositive or clinically ill (showing signs of disease)] tortoise is found within 1.5 km (0.9 mi) of the release point of a translocated tortoise and the recipient site is not sufficiently large to avoid contact between diseased and translocated tortoises, then tortoises will be moved to the Upper McCoy Wash recipient site. The BLM and applicant have identified the general locations of these two recipient sites (described below). The exact locations and boundaries of these sites will be identified in the final Relocation/Translocation Plan that requires approval by the Service (see "Conservation Measures" section above). No designated critical habitat occurs in or near either recipient site.

The Genesis recipient site will be located on BLM-managed lands, part of which will be within the Palen/McCoy Wilderness. No ROW or utility corridors currently exist on this site, and future demand is not anticipated. No BLM-designated routes of travel traverse the recipient site. This area historically has received lower levels of recreational use, and such use is not anticipated to increase substantially in the future. Based on recent habitat modeling, habitat value for desert tortoises in this area is similar, or better, to that of the project area (Nussear et al. 2009) and therefore is expected to fulfill the feeding, breeding, sheltering requirements of translocated tortoises. The western portion of the recipient site is within a proposed solar study area in BLM's Solar Energy Study Area Maps published in June 2009 as part of the public scoping process for the Solar Energy Development Programmatic EIS, which would be prioritized for solar development if this EIS is approved. While an application for development of a solar facility has been submitted for the area adjacent to the GSEP, we are not aware of any recent actions related to a new proposed project. In addition, for the reasons discussed above, the REAT agencies assume future conflicting uses are unlikely to be proposed or approved that would impact desert tortoises at this recipient site.

The Genesis recipient site will be located directly west, north, and east of the plant site boundary. The recipient site includes the locations where tortoise translocated from the plant site, the

perimeter security fence line, and rerouted drainage channels off the plant site would be released (referred to as released points) and the area to which translocated tortoise may disperse after translocation. The boundaries of the recipient site will be delineated by applying the distance that each translocated tortoise is anticipated to disperse from the release point following translocation. For the purposes of the GSEP, we will delineate the boundaries based on a 1.5 km (0.9 mi) dispersal distance (see "Effects of the Action" section for a discussion of post-translocation dispersal). The recipient area also represents the area in which health assessments will be conducted on resident tortoises to ensure that translocated tortoises are not released within 1.5 km (0.9 mi) of a diseased [documented seropositive or clinically ill (showing signs of disease)] resident tortoise. We anticipate that based on a dispersal distance of 1.5 km (0.9 mi) west, north, and east of the boundaries of the plant site, the Genesis recipient site may be up to approximately 1,457 ha (3,600 ac). However, the actual size of the recipient site will depend on the number of desert tortoises translocated, the locations of the release points (e.g., west, north, or east of the plant site), and the presence and location of any diseased resident tortoises. Based on our estimate that up to five subadult and adult may occur on the plant site and require translocation, the size of the recipient site described above [1,457 ha (3,600 ac)] is likely an overestimate but provides the best available data available to establish a baseline for analysis.

The Upper McCoy Wash recipient site will be on BLM-managed lands in the upper McCoy Wash area, and adjacent to designated wilderness protected from future development. The recipient site is approximately 24 km (15 mi) north of the project area through the Palen Wash, and is unobstructed topographically from the project area. The site will be chosen to avoid, to the extent possible, existing ROW or utility corridors or designated routes of travel, or areas where future demand is anticipated. The upper McCoy Wash area historically has received lower levels of recreational use, and such use is not anticipated to increase substantially in the future. Based on recent habitat modeling, habitat value for desert tortoises in this area is similar, or better, to that of the project area (Nussear et al. 2009) and therefore is expected to fulfill the feeding, breeding, sheltering requirements of translocated tortoises. The upper McCoy Wash area is not within a proposed solar study area in BLM's Solar Energy Study Area Maps published in June 2009 as part of the public scoping process for the Solar Energy Development Programmatic EIS, which would be prioritized for solar development if the EIS is approved. For these reasons, the REAT agencies assume future conflicting uses are unlikely to be proposed or approved that would impact desert tortoises at this recipient site.

As discussed above, the recipient site includes the locations where tortoises translocated from the plant site will be released and the area in which translocated tortoise may disperse after translocation. Similar to the Genesis recipient site, the boundaries of the Upper McCoy Wash recipient site will be delineated by applying a 1.5 km (0.9 mi) dispersal distance from a point of release of each translocated tortoise. The recipient area also represents the area in which health assessments will be conducted to ensure that translocated tortoises are not released within 1.5 km (0.9 mi) of a diseased tortoise. Applying this dispersal distance to a single point of release, the Upper McCoy Wash recipient site is estimated to be approximately 706 ha (1,745 ac). However, the actual size of the recipient site will depend on the number of desert tortoises translocated, the locations of the release points, and the presence and location of any diseased resident tortoises.

To estimate tortoise densities at the recipient sites, we applied the same 0.7 tortoises per square km (1.8 tortoises per square mi) density to estimate tortoise density at the Genesis and Upper McCoy Wash recipient sites as we did to estimate the density of tortoises on the project footprint. While the Genesis recipient site is within the approximately 1.6 km (1 mi) area surveyed during pre-project surveys, these surveys did not cover 100 percent of the recipient site and therefore do not provide sufficient data estimate tortoise density in the recipient site. Applying this density yields an estimate of ten subadult and adult tortoises at the approximately 1,457 ha (3,600 ac) Genesis recipient site and an estimate of five subadult and adult tortoises at the approximately 706 ha (1,745 ac) Upper McCoy Wash recipient site.

Conservation Lands

Habitat acquisition is proposed to offset impacts to tortoise habitat resulting from the proposed project. As part of the proposed project, conservation lands will be acquired within the Colorado Desert Recovery Unit as described in the species' draft revised recovery plant (Service 2008) [includes the Eastern and Northern Colorado Desert Recovery Units as identified in the species' original recovery plan (Service 1994a)]. While the location of these lands has not yet been determined, the REAT agencies have agreed that privately-owned lands will be acquired to benefit tortoise habitat linkages and population connectivity within and between tortoise critical habitat units, known populations of tortoises, and/or or other preserve lands in the Colorado Desert Recovery Unit (BIO-12), primarily along the I-10 corridor. These conservation lands will be conserved and managed in perpetuity for tortoises. Using available data on landownership and willing sellers, the Service has determined that a sufficient amount of privately owned desert tortoise habitat exists within the Colorado Desert Recovery Unit that will be available for acquisition. The Service is also aware of private lands that have been identified by private organizations as available for potential acquisition to offset impacts to desert tortoise habitat in the Eastern Colorado Desert Recovery Unit.

The abundance of tortoises in conservation areas is unknown since the specific areas have not yet been identified. However, because acquisition will focus on areas connected to lands with tortoise habitat equal to or better quality than the project footprint (BIO-12), we anticipate that these conservation lands will contain suitable habitat that is currently occupied or likely to be occupied in the future.

Factors Affecting the Species Environment within the Action Area

Project Area

Due to the lack of development, tortoises in the majority of the project area (particularly the plant site north of I-10) are not now impacted by extensive habitat loss or degradation. However, the tortoises are impacted to some extent by several unmaintained roads, invasive nonnative plants, and potentially by predation from common ravens foraging, nesting, and roosting along existing transmission lines south of the action area (south of I-10) and from common ravens nesting elsewhere in the vicinity.

The southern portion of the project area includes the gen-tie transmission line that crosses I-10 and then runs along an existing utility corridor that contains several proposed, existing, or authorized transmission lines. Existing transmission lines include the Devers to Palo Verde No. 1 and Blythe Energy lines. The Service issued biological opinions exempting take of several species, including the tortoise, associated with the Blythe Energy line in 2005, and the Desert Southwest line in 2006, and is currently in formal consultation on the potential impacts of the proposed DPV2 line on tortoises. The Blythe Energy line was recently completed but construction on the Desert Southwest line has not yet been initiated.

The Service issued a programmatic biological opinion evaluating the effects of BLM's CDCA plan amendment for the NECO on tortoises in 2002 and as amended in 2005 and 2007. The programmatic biological opinion exempted take for causal uses (recreation, mining, and vehicle use), livestock grazing, and removal of burros that BLM authorizes through approval of the CDCA Plan. Projects outside of these activity categories require separate consultation.

Actions covered under these previously issued biological opinions have allowed for additional habitat degradation in the project area, primarily along the proposed gen-tie line, likely contributing to additional habitat degradation due to factors such as introduction and spread of invasive plant species and predators associated with disturbed habitats. However, while issuance of biological opinions for the Blythe and Desert Southwest transmission line projects allowed for additional take of desert tortoises and additional degradation of habitat in the project area, these biological opinions also included avoidance, minimization, and offsetting measures that largely maintained the environmental baseline of the species.

Proposed Recipient (Translocation) Sites

The general areas of both recipient sites are undeveloped and, therefore, not affected by extensive habitat loss or degradation. However, the Genesis and Upper McCoy Wash recipient sites may be impacted to some extent by invasive nonnative plants, predation from common ravens foraging, nesting, and roosting along existing transmission lines south of the action area (south of I-10) and from common ravens nesting elsewhere in the project vicinity.

The Service issued a biological opinion for the Blythe Solar Power Project (BSPP) in 2010 (Service 2010d), which identified the Upper McCoy Wash area as a secondary recipient site for tortoises from the BSPP. However, while issuance of a biological opinion for the BSPP allowed for additional take of resident desert tortoises at the Upper McCoy Wash recipient site in the form of capture or collection for the purposes of disease testing and monitoring, the biological opinion also included numerous avoidance, minimization, and offsetting measures to enhance the survivability of any tortoises translocated to the site.

Conservation Areas

While the location of these lands has not yet been determined, privately owned lands will be acquired to benefit tortoise habitat linkages and population connectivity within and between

tortoise critical habitat units, known populations of tortoises, and/or other preserve lands in the Colorado Desert Recovery Unit in the BLM's NECO bioregional planning unit (BIO-12). These conservation lands will be conserved and managed in perpetuity for tortoises.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat that would be added to the environmental baseline, along with the effects of other activities that are interrelated or interdependent with that action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. In contrast to direct effects, indirect effects can often be more subtle, and may affect species and habitat quality over an extended period of time, long after project activities have been completed. Indirect effects are of particular concern for long-lived species such as the tortoise, because project-related effects may not become evident in individuals or populations until years later.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat.

Methodology

Permanent versus Temporary Impacts

Since full recovery of vegetation in the desert can take decades or longer, we consider all ground-disturbing impacts associated with the GSEP project to be permanent. Vasek et al. (1975) found that in the Mojave Desert transmission line construction and O&M activities result in a permanently devegetated maintenance road, enhanced vegetation along the road edge and between tower sites, and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran Deserts, Abella (2010) found that reestablishment of perennial shrub cover (to amounts found on undisturbed areas) generally occurs within 100 years but fewer than 40 years in some situations. He also found that vegetation recovery times are likely impacted by a number of variables, including but not limited to climate, invasion by nonnative plants, and level of ongoing disturbance. Based on these factors, we consider temporary impacts to be equivalent to permanent impacts for the purposes of our effects analysis relative to the 30-year life of the project.

Approximately 718 ha (1,774 ac) of tortoise habitat would be directly impacted by construction and O&M activities associated with the proposed project. As discussed in the "Description of the Proposed Action" section above, we do not anticipate additional impacts to habitat during O&M activities outside of what would be impacted during construction. The conservation measures included as part of the project description would help avoid, minimize, and offset impacts to tortoises resulting from construction and O&M activities.

As discussed in the "Environmental Baseline" section above, we estimate that up to five subadult and adult tortoises, up to three juveniles, and a relatively small but unquantifiable number of eggs may occur in the project footprint. We also estimate that up to 10 subadult and adult tortoises may occur in the recipient site. All of these individuals could be directly and indirectly impacted by the proposed project.

Direct Effects

Death and Injury

Construction and O&M

Death or injury of tortoises could result from collisions with or crushing by vehicles or heavy equipment, including crushing of individuals that take shelter under parked vehicles and are killed or injured when the vehicle is moved. Desert tortoises could also be injured or killed after being trapped in pipes or construction excavations. Other direct effects could include individual tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, tortoise may be injured or killed due to collection or vandalism associated with increased encounters with workers' or visitors' pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury.

To minimize the death and injury of tortoises residing in or entering the construction or O&M disturbance areas (e.g., plant site, linear facilities, rerouted channels), the applicant would implement the general and species-specific conservation measures proposed as part of the project. Accordingly, take of tortoises would be minimized by the presence of a Designated Biologist during ground-disturbing construction and O&M activities in the project footprint (BIO-2 and BIO-11). As specified in the CEC's condition of certification BIO-1, the Designated Biologist must meet the Service's Authorized Biologist qualifications and be approved by the Service prior to the initiation of ground-disturbing construction activities. Death or injury of tortoises during construction would also be minimized by demarcation of all sensitive biological resource areas by the Designated Biologist (BIO-2). Death or injury of tortoises would be further minimized during construction and O&M activities by demarcation of all work area boundaries prior to ground-disturbing activities, limiting vehicular and equipment traffic to existing routes of travel, and designing and installing all project components off the plant site (e.g., access roads, storage and parking areas, pulling sites, and rerouted channels) to minimize impacts to native plant communities and sensitive biological resources (BIO-8).

Construction activities on the 693-ha (1,712-ac) plant site would be conducted during the more active period of the species as described in the project description and as would be described in the Relocation/Translocation Plan, thereby maximizing the potential to locate and move tortoises out of the disturbance area during construction. Death or injury of tortoises due to construction would be minimized by the requirement for the Designated Biologist to conduct preconstruction clearance surveys of the project area prior to construction and either relocate individuals out of harm's way or translocate individuals to the recipient site as would be outlined in the Service-approved Relocation/Translocation Plan, following Service-approved methods (BIO-9 and BIO-10).

Construction and O&M disturbance areas cleared of tortoises would be either enclosed with tortoise exclusion fencing or monitored by the Designated Biologist or Biological Monitors trained by the Designated Biologist to prevent individuals from re-entering the disturbance area (BIO-3, BIO-8, and BIO-9). Installation of the tortoise exclusion fencing around the plant site would preclude tortoises from re-entering or leaving if not found and removed during clearance surveys. During construction and O&M, breaches in the exclusionary fencing may allow tortoises to pass through the barrier and be affected by project-related activities. However, these potential effects would be minimized by the requirement to conduct at least two clearance surveys of the project footprint prior to construction, and to regularly inspect all permanent and temporary tortoise exclusion fencing, and repair damage to all temporary and permanent fencing immediately (BIO-9).

Any tortoises overlooked by the initial clearance surveys may be detected during construction activities by routine site inspections by the Designated Biologist (BIO-2) or incidental observations by construction workers. The Worker Environmental Awareness Program would be administered to all onsite personnel and be repeated annually for all permanent personnel and within 1 week of arrival to any new construction personnel (BIO-6). This training would enhance the effectiveness of onsite personnel detecting tortoises during construction and O&M activities, and either avoiding them or ensuring they are properly relocated.

The posting and enforcement of specified speed limits and inspections underneath parked vehicles (BIO-8) would further reduce the risk to any tortoises that inadvertently venture onto the roadway during construction or O&M activities. To reduce the likelihood of tortoises in construction areas being trapped in pipes, trenches, or other excavations and being injured or killed, all pipes greater than 8 cm (3 in) stored close to the ground and all excavations would be covered, fenced, or backfilled, and inspected by the Designated Biologist (BIO-2 and BIO-8). To reduce the likelihood of tortoises being attracted to construction areas by application of water to control dust, the minimal amount of water needed would be applied to dirt roads and construction areas, and a Biological Monitor would patrol those areas to ensure water does not puddle (BIO-8).

Overall, we expect that death and injury of most subadult and adult tortoises would be avoided during construction and O&M activities through compliance with the conservation measures. However, since tortoise eggs and juveniles are difficult to detect, we anticipate that an unknown

number of eggs and two to three juveniles occurring in the project footprint would be killed or injured due to construction and O&M activities. We do not expect loss of eggs or juveniles in the project footprint would affect the species local population level because early life stages naturally suffer higher mortality rates and are not as important to the long-term conservation of the species as are breeding adults.

Capture, Handling, and Relocation/Translocation

In addition to construction and O&M-related activities, accidental death and injury could result from capturing, handling, and moving tortoises for the purposes of relocating or translocating them out of the project footprint. Accidental death and injury could result from (1) stress or disease transmission associated with handling tortoises, (2) stress associated with moving individuals outside of their established home range, (3) stress associated with artificially increasing the density of tortoises in an area and thereby increasing competition for resources, and (4) disease transmission between translocated and resident tortoises. Capture and handling of translocated and resident tortoises for the purposes of assessing health and monitoring could also result in accidental death or injury from handling to conduct visual health assessments, draw blood for ELISA testing, and secure transmitters.

We anticipate that the applicant would capture and relocate or translocate most subadult and adult desert tortoises from harm's way in the project footprint. Because of the difficulty in detecting juvenile desert tortoises or eggs, the applicant may find and move some but not all juvenile desert tortoises or eggs from the project footprint. Depending on where on the plant, perimeter security fence line, or rerouted drainage channels off the plant site tortoises are found, some individuals would be moved relatively short distances [i.e., less than 500 m (1,640 ft)] but likely still within their home range, and others would be moved farther [i.e., more than 500 m (1,640 ft)], outside of their existing home range.

Capturing, handling, and moving tortoises for the purposes of relocating or translocating them out of the project footprint may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures, or if tortoises void their bladders and are not rehydrated. Averill-Murray (2001) determined tortoises that voided their bladders during handling had lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reused latex gloves, pathogens may be spread among individuals. Walde et al. (2008) found that the differences in reproduction among translocated, resident, and control desert tortoises were "not likely to be statistically significant" in a study of tortoises at Fort Irwin.

Translocated tortoises may suffer a higher potential for mortality following release when they are moved into unfamiliar territory, and are less likely to have established cover sites for protection prior to home range establishment. Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, and flooding (Nussear 2004; Field et al. 2007; Berry 1986; U.S. Army 2009, 2010). The degree to which tortoises

move after translocation depends on whether they are released into typical or atypical habitat; that is, if the recipient area supports habitat similar to that of the source area, tortoises are likely to move less (Nussear 2004). In one study, the majority of dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field et al. 2007). However, Field et al. (2007) and Nussear (2004) showed translocated tortoises appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations.

Following release, we cannot predict the movement patterns that all translocated animals are likely to exhibit. Previous translocation studies have shown that tortoises released in spring, move variable straight-line distances from their release points during the first year. While the mean straight-line distances reported for several studies are close to or less than 2.5 km (1.6 mi), some individuals move much farther (Nussear 2004, Field et al. 2007, Berry et al. 2009, Drake et al. 2009, Boarman et al. 2010). An individual at Fort Irwin was reported to move 23.0 km (14.3 mi) (Boarman et al. 2010). Based on our analysis of available data, we expect the movements of most tortoises translocated more than 500 m (1,640 ft) to fall within 6.5 km (4.0 mi) of their release points. This distance was estimated by examining the upper limits on the 95 percent confidence intervals for available data. Translocated populations can also significantly expand the area they occupy in the first year following translocation [e.g., 10.1 to 17.9 square km (3.9 to 6.9 square mi) at a Nevada site; from 0.5 to 26.7 square km (0.2 to 10.3 square mi) at a Utah site].

Tortoises translocated shorter distances [i.e., less than 500 m (1,640 ft)] are not likely to move as far following release as tortoises moved longer distances. Walde et al. (2008) found that maximum straight-line dispersal distance for male tortoises was approximately 1.5 km (0.9 mi) in the first year following translocation. The degree to which these animals expand the area they use depends on whether the translocated animals are released into typical or atypical habitat; that is, if the translocation area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004).

In a study conducted in Ivanpah Valley, 21.4 percent of 28 translocated tortoises died (Field et al. 2007). Nussear (2004) documented mortality rates of 0, 15, and 21 percent in other areas, though this study found that mortality rates among translocated desert tortoises was not statistically different from that observed in resident populations. Because Nussear (2004) did not compare mortality rates in resident populations to those in control groups, we cannot determine if the translocation caused increased mortality rates in the resident population. Recent work on translocation associated with the expansion of Fort Irwin (U.S. Army 2009 and 2010) compared the mortality rates associated with resident and translocated populations with that of the control populations and indicated translocation did not increase mortality above natural levels (Esque et al. 2010). This and other fieldwork indicate that tortoise mortality is most likely to occur in the first year after release. After the first year, translocated individuals are likely to settle into new home ranges and mortality is likely to decrease.

Desert tortoises from the GSEP site would be moved into areas already supporting resident tortoises, which may result in increased competition for forage, especially during drought years. Increased tortoise densities may lead to increased inter-specific encounters and thereby increase the potential for spread of disease, potentially reducing the health of the overall population. Increased tortoise densities also may lead to increased competition for shelter sites and other limited resources or increased incidence of aggressive interactions between individuals (Saethre et al. 2003). Therefore, recipient sites must be sufficiently large to accommodate and maintain the resident and translocated desert tortoises (Service 2010a). Based on our estimate of the resident population in the recipient sites as discussed in the "Environmental Baseline" section, we calculated the maximum allowable final density[5] at the recipient sites. Based on this calculation, the tortoise population (resident plus translocatees) at the Genesis and Upper McCoy Wash recipient sites should not exceed 95[6] and 46[7] tortoises, respectively, after translocation. Since we estimate that current population at the Genesis and Upper McCoy Wash recipient sites is 10 and 5 tortoises, respectively, we do not anticipate that translocation of up to five subadult and adult tortoise (from the plant site perimeter security fence line or rerouted drainage channels off the plant site) to either recipient site would impact the currently estimated population at either recipient site. However, if the density of resident tortoises at the recipient sites is determined to be higher, then the size of the recipient sites may need to be expanded to ensure tortoise density following translocation does not exceed the maximum allowable density.

Translocation has the potential to increase the prevalence of diseases, such as upper respiratory tract disease, in a resident population. Physiological stresses associated with handling and movement or from density-dependent effects could exacerbate this threat if translocated individuals with subclinical upper respiratory tract disease or other diseases begin to exhibit clinical signs of disease due to the stresses associated with handling and movement. This potential conversion of translocated desert tortoises from a non-contagious to contagious state may increase the potential for infection in the resident population above pre-translocation levels.

Following the Service's translocation guidance (Service 2010a), health assessments would be conducted on all tortoises to be translocated prior to being released. For tortoises that would be translocated less than 500 m (1,640 ft), visual health assessments (without blood draw for ELISA testing) would be conducted. For tortoises that would be moved greater than 500 m (1,640 ft) to the recipient site, visual health assessments and blood draw for ELISA testing would be conducted.

In addition, to minimize the risk associated with potential contact between healthy translocated tortoises and diseased [documented seropositive or clinically ill (showing signs of disease)]

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[5] Defined as 130 percent of the mean density detected in the respective recovery unit (Service 2010b). Mean density in the Eastern Colorado Recovery Unit is estimated to be 5 desert tortoises per square km (13 desert tortoises per square mi) based on line-distance sampling (Service 2009b).

[6] Calculated as 14.6 square km Genesis recipient site multiplied by 6.5 desert tortoises per square km [130 percent multiplied by the mean density of the recovery unit (5 desert tortoises per square km)].

[7] Calculated as 7 square km Upper McCoy Wash recipient site multiplied by 6.5 desert tortoises per square km [130 percent multiplied by the mean density of the recovery unit (5 desert tortoises per square km)].

resident tortoises, the translocation guidance recommends that health assessments be performed on resident tortoises within the translocated tortoises' dispersal area to determine disease prevalence within the population. As discussed above, the extent to which tortoises disperse following translocation appears to be influenced by the distance they are moved from their home range and the availability of resources in the area to which they are moved. Tortoises translocated relatively short distances [up to 500 m (1,640 ft)] have been found to disperse up to 1.5 km (0.9 mi) and we expect the movements of most tortoises translocated more than 500 m (1,640 ft) to fall within 6.5 km (4.0 mi) of their release points. Therefore, for recipient sites that would be receiving tortoises translocated less than 500 m (1,640 ft), Service guidance mandates that visual health assessments (without blood draw for ELISA testing) be conducted on resident tortoises within 1.5 km (0.9 mi) from translocation release points. For recipient sites that would be receiving tortoises translocated over 500 m (1,640 ft), the guidance mandates that visual health assessments with blood draw for ELISA testing be conducted on resident tortoises within 6.5 km (4.0 mi) from translocation release points.

However, for the purposes of the proposed project, we have determined that for recipient sites that would be receiving tortoises translocated over 500 m (1,640 ft), visual health assessments and blood draw for ELISA testing is only necessary for resident tortoises within 1.5 km (0.9 mi) of translocation release points. Our determination is based on the assumption that tortoises translocated greater than 500 m (1,640 ft) are likely to remain closer to their release point in either recipient site due to the presence of better quality habitat than that on the project site. Therefore, tortoises are likely to remain in contact with resident tortoises on the recipient site that previously underwent health assessments as part of the translocation process. As discussed in the "Environmental Baseline" section, the recipient sites will be located within areas of similar or better quality, habitat to that of the project area. Availability of water, forage, and cover sites is anticipated to be higher in the recipient sites due to their proximity to higher value alluvial fans. However, if post-translocation monitoring reveals that tortoises translocated over 500 m (1,640 ft) to either recipient site become diseased, additional resident tortoises within the 6.5 km (4.0 mi) dispersal area would be tested to determine disease prevalence before additional tortoises would be translocated to that recipient site.

We cannot precisely predict how many tortoises would require blood draw since the final number depends on the total number of tortoises translocated and the number of tortoises translocated greater than 500 m (1,640 ft). However, we anticipate a maximum of 20 tortoises may require blood draw (up to five translocated tortoises from the from the plant site, security fence line, or rerouted drainage channels off the plant site, up to ten resident tortoises from the Genesis recipient site, and up to five resident tortoises from the Upper McCoy Wash recipient site).

We cannot reasonably predict the increase in disease prevalence within the resident population that may occur due to translocation. However, the following mitigating circumstances are likely to reduce the magnitude of this threat: (1) the applicant would use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals; (2) desert tortoises in the project footprint are currently part of a continuous

population with the resident populations of the recipient site and are likely to share similar pathogens and immunities; (3) some of the translocated desert tortoises would be moved a relatively short distance, which is likely to reduce post-translocation stress associated with long-distance movements; (4) density-dependent stresses are unlikely to occur; (5) any animal that has clinical signs of disease or tests ELISA-positive would not be translocated; and (6) monitoring of translocated individuals would be implemented to determine the prevalence of disease transmission.

Because ELISA testing can result in false-positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the potential exists for removal of healthy individuals from the translocated population due to concern over disease. These individuals would not be released into the wild and would no longer contribute to the environmental baseline for the action area. Because the applicant would coordinate with the Service and perform follow-up testing of ELISA-positive individuals, the potential for removing false-positive individuals from the translocated population is low. Consequently, we conclude that few, if any, desert tortoises would be incorrectly removed from the population due to false positive results. Similarly, some of the animals that test positive may have survived past disease infections and are healthy. Though our understanding of disease ecology is not complete and removal of these individuals from the wild population could eliminate individuals with superior fitness and genetic adaptations for surviving disease from the gene pool, the low numbers of tortoises involved likely would not be large enough to affect population genetics in the wild.

Following the Service's translocation guidance (Service 2010a), translocated tortoises should be monitored for at least 5 years. Therefore, the tortoises translocated from the plant site, security fence line, or rerouted drainage channels off the plant site that would require blood draw for the purposes of translocation also would carry transmitters and be regularly monitored and handled annually for health assessments and blood draw for ELISA testing. Some potential exists that handling of desert tortoises for the purposes of conducting health assessments and monitoring may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids.

In conclusion, we do not anticipate that relocating tortoises out of harm's way, but less than 500 m (1,640 ft) from the point of capture, would result in death or injury because these individuals would be moved a relatively short distance and they would remain near or within their home range. Since relocated tortoises typically remain within their home range, we do not anticipate additional significant social or competitive impacts to resident tortoises in the area. Following release of tortoises translocated outside of their home range, a small number may die due to predation, exposure, disease, or competition. We anticipate most of this mortality is likely to occur in the first year after release, during the period that translocated animals are attempting to establish new home ranges. In addition, we anticipate that a small number of resident tortoises at the recipient site may die from natural causes due to predation, exposure, disease, or competition. However, we cannot determine if mortality rates in the resident or translocated populations would be above natural mortality levels for the recipient site. In addition, the potential impacts of capturing, handling, and moving tortoises for the purposes of relocation or

translocation would be minimized by the requirement for experienced biologists to handle all tortoises following Service-approved guidelines and relocate individuals out of harm's way or translocate individuals to the recipient site as will be outlined in the Relocation/Translocation Plan (BIO-9 and BIO-10). Lastly, as will be outlined in the final Relocation/Translocation Plan, translocated tortoises would be monitored, findings reported to the Service, and adaptive management strategies implemented, as needed.

Habitat Loss

To offset permanent losses of tortoise habitat, the applicant would provide compensatory mitigation at a 1:1 ratio for impacts to approximately 708 ha (1,750 ac), and at a 5:1 ratio for impacts to approximately 10 ha (24 ac) of critical habitat. Quality of acquired habitat would be equivalent or better than that of the project footprint and benefit tortoise habitat connectivity and habitat linkages between tortoise critical habitat, known populations of tortoises, and/or other preserve lands in the Colorado Desert Recovery Unit in the BLM's NECO bioregional planning unit (BIO-12). These conservation lands would be conserved and managed in perpetuity for tortoises. Using available data on landownership and willing sellers, the Service has determined that a sufficient amount of privately owned desert tortoise habitat exists within the Colorado Desert Recovery Unit that would be available for acquisition. We are also aware of private lands that have been identified by private organizations as available for potential acquisition to offset impacts to desert tortoise habitat in the Eastern Colorado Desert Recovery Unit.

Native shrubs and annual plants used by tortoises for sheltering and feeding adjacent to the project footprint also may be adversely affected by introduced or previously naturalized invasive nonnative plants (also referred to as weeds) that respond positively to ground-disturbing activities. Project equipment may transport invasive nonnative plants into the project area where they may become established. Additionally, the potential introduction of noxious weeds may lead to increased wildfire risk (Brooks et al. 2003). However, potential degradation of habitat due to spread of invasive nonnative plants would be avoided and minimized by measures outlined in the Weed Management Plan designed to prevent the introduction of any new weeds and the spread of existing weeds as a result of project construction and O&M (BIO-14).

Indirect Effects

Human activities may provide food in the form of trash and litter or water that attracts tortoise predators such as the common raven. Ravens capitalize on human encroachment and expand into areas where they were previously absent or in low abundance. Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. The nearby Blythe airport and other urban areas provide food, water features, and roosting/nesting substrates (buildings, signs, lamps, and utility poles) that otherwise would be unavailable. Small mammal, fox, coyote, rabbit, lizard, snake, and tortoise road kill along I-10 and other roads provide additional attractants and subsidies for opportunistic predators/scavengers. Road-killed wildlife would increase with

project construction and O&M traffic, further exacerbating the raven/predator attractions and increasing tortoise predation levels.

Facility infrastructure, such as power poles, fence lines, buildings, and other structures on the project site, may provide perching, roosting, and nesting opportunities for ravens. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of tortoises in rural residential areas. Though feral dogs may range several miles into the desert and have been found digging up and killing tortoises (Service 1994a, Evans 2001), we are not aware of any reports of feral dogs in the project area.

To minimize the generation of food and water subsidies due to construction and O&M-related activities, all trash materials would be disposed of in self-closing containers and removed daily to prevent the attraction of tortoise predators to the project footprint, road-killed animals would be immediately removed from the project footprint, and the minimal amount of water needed would be applied to dirt roads and construction areas to avoid standing water, with a Biological Monitor patrolling those areas to ensure water does not puddle (BIO-8). Also, increases in raven abundance in the project area would be minimized by measures outlined in the Raven Monitoring, Management, and Control Plan (Raven Plan) which include a program to monitor raven presence in the project vicinity, would determine if raven numbers are increasing, and would implement raven control as needed based on monitoring (BIO-13).

In addition, desert tortoise behavior may be impacted by increased noise levels and the presence of full-time facility lighting during construction and operation of the facility over a 30-year period. While we do not have data demonstrating the effect of increased noise levels and the presence of artificial lighting to desert tortoise behavior, several measures proposed to minimize these potential impacts on other sensitive species (BIO-8) would also benefit tortoises.

Given that the proposed construction of the plant site would result in the loss of a 718 ha (1,774 ac) block of habitat, the project may also impact tortoises by disrupting movement of individuals to habitat north and south of the project site. For gene flow to occur reliably across the range, populations of tortoises need to be connected by occupied areas of habitat that contain sustainable numbers of tortoises. Desert tortoise distribution and population genetic studies provide evidence that individual tortoises breed with their neighbors, those tortoises breed with their neighbors on the other side, and so on. Removal of 718 ha (1,774 ac) of tortoise habitat from the area between I-10 and the Palen/McCoy Mountains Wilderness may further limit movement of tortoises, though habitat would remain west and east of the project boundaries to provide for continued connectivity after construction of the proposed project.

Desert Tortoise Critical Habitat

Approximately 10 ha (24 ac) of the 413,022 ha (1,020,600 ac), or less than 0.002 percent, of designated critical habitat in the Chuckwalla Critical Habitat Unit would be permanently and temporarily impacted by the construction of linear facilities off the plant site. The conservation measures proposed as part of the project, including the measure to offset habitat impacts with the acquisition of equivalent or better quality tortoise habitat in the Chuckwalla Critical Habitat Unit, would help maintain the role and function of critical habitat by avoiding and offsetting adverse effects to the primary constituent elements of critical habitat. In addition, the small impact of the proposed project to critical habitat would not affect population connectivity across the project area because habitat would remain west and east of the project boundaries to provide for connectivity after construction of the proposed project. In addition, as discussed in BIO-12, the REAT agencies would have approval authority over the parcels acquired through the NFWF account or by other means. Therefore, the BLM and Service would ensure that the small impacts to critical habitat would be offset through the purchase of suitable habitat within Chuckwalla Critical Habitat Unit to be consistent with BIO-12 and the conservation measures included as part of the proposed project description. As such, the proposed project would maintain the habitat base for supporting viable desert tortoise populations in critical habitat and prevent erosion of the environmental baseline on BLM lands in the highest value habitat areas that provide the primary focus for recovery efforts.

Effect on Recovery

Per section 2(b), the primary purposes of the Act are to provide a means whereby the ecosystems upon which listed species depend may be conserved, and to provide a program for the recovery of listed species. Per section 2(c), Congress established a policy requiring all Federal agencies to use their authorities in seeking to recover listed species in furtherance of the purposes of the Act. Consistent with these purposes and Congressional policy, sections 3(5), 4(f), 7(a)(1), and the implementing regulations (50 *CFR* §402.02) to section 7(a)(2), and related preamble at 51 FR 19926 through 51 FR 19957, generally require Federal agencies to further the survival and recovery of listed species in the use of their authorities. Pursuant to these mandates, our analysis below assesses (1) whether the proposed action adequately offsets its adverse effects to the environmental baseline to the desert tortoise, and (2) the extent to which the proposed action would cause "significant impairment of recovery efforts" or adversely affect the "species' chances for survival to the point that recovery is not attainable" (51 FR 19934).

The applicant would implement numerous measures to avoid, minimize, reduce, and offset the adverse effects to the relatively few tortoises in the project footprint. Overall, we expect that five or fewer subadult and adult and three or fewer juvenile desert tortoises would be captured, injured, or killed during construction of the solar facility, and that a relatively small but unquantifiable number of eggs may be moved or destroyed during construction. Few tortoises would be killed or injured during O&M of the facility. We expect that most subadult and adult tortoises encountered during work activities would be either moved short distances out of harm's way or translocated. Because the BLM and applicant would implement a variety of measures to

reduce stress to these animals, we do not anticipate that injury or mortality would result from the handling and relocation of these animals.

We do not anticipate that loss of habitat in the project footprint would substantially reduce the ability of the tortoise to survive and recover in the wild because the recovery plan (Service 1994a) and final rule for designation of critical habitat for the species (Service 1994b) primarily focuses long-term conservation priorities in higher value habitat areas. The proposed acquisition of 708 ha (1,750 ac) of tortoise habitat, including 48 ha (120 ac) in the Chuckwalla Critical Habitat Unit, would benefit tortoise habitat connectivity and habitat linkages between tortoise critical habitat, known populations of tortoises, and/or or other preserve lands in the Colorado Desert Recovery Unit in the BLM's NECO bioregional planning unit.

Based on the results of studies discussed above, most of the subadult and adult tortoises moved from the project footprint likely would continue to survive and reproduce at the location to which they are moved (i.e., in adjacent habitat or the recipient site). Consequently, we anticipate that the proposed project would not appreciably diminish the reproductive capacity of the species, particularly in light of the relatively few tortoises that would be affected.

The overall distribution of the desert tortoise would be minimally reduced due to long-term disturbance associated with the proposed action because the proposed project would result in loss of a small percentage of the habitat in the Eastern Colorado Desert Recovery Unit [which includes the 413,022-ha (1,020,600-ac) Chuckwalla Critical Habitat Unit, a majority of the approximately 404,686-ha (1,000,000-ac) Joshua Tree National Park, and additional lands]. This percentage does not constitute a substantial portion of the recovery unit. Given the location of the proposed project in an area near the edge of the tortoise's range, we do not anticipate that the amount of habitat to be lost because of the proposed project would reduce the distribution of the tortoise to an appreciable degree.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, private, or certain tribal actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any future State, local, private, or certain tribal actions that are reasonably certain to occur in the action area.

CONCLUSION

After reviewing the current status, environmental baseline for the action area, effects of the proposed action, and cumulative effects of the desert tortoise, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise or destroy or adversely modify designated critical habitat. We base this decision on the following:

1. The applicant will implement numerous measures to ensure that most tortoises are moved out of the project footprint and injury and death of tortoises is minimized (i.e., clearance surveys, exclusion fencing, relocation, translocation, and qualified tortoise biologists).

2. The applicant will implement measures to reduce the potential for increased predation by common ravens, both in the vicinity of the project footprint and regionally, and to reduce the spread of invasive nonnative plants in the project area.

3. Current information from permanent study plots and line distance sampling does not document a statistical trend in adult tortoise densities in the Eastern Colorado Desert Recovery Unit. Nonetheless, given the small number of tortoises potentially affected by the proposed project, we have no information to indicate that development of the proposed project would appreciably reduce the tortoise population levels in this recovery unit.

4. Few, if any, tortoises are likely to be injured and killed as a result of relocation or translocation.

5. Though the proposed project would reduce the amount of available tortoise habitat and thereby result in a loss of habitat connectivity, sufficient habitat would remain to the west and east of the proposed project to provide connectivity of tortoises in the long term. Relocation of some tortoises into habitat adjacent to the project area, and translocation of some tortoises to a recipient site will increase tortoise numbers in those areas. Successful translocation would minimize these effects by allowing those tortoises to remain in the population and contribute towards recovery of the species.

6. Compensation requirements through the BLM, CDFG, and CEC will result in an increase in the quantity and quality of habitat managed for the conservation of the tortoise.

7. With implementation of the conservation measures, the impacts of the proposed project are expected to be effectively minimized and offset, and are not likely to diminish appreciably the conservation role and function of designated critical habitat for desert tortoise in the project area or the species' ranges.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to,

and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below for desert tortoises are non-discretionary and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to the applicant/permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant/permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT AND EXTENT OF TAKE

We anticipate that the number of desert tortoises that may be taken would be low due to the small number of individuals estimated to occur within the project footprint and the anticipated effectiveness of conservation measures described as part of the proposed action. However, quantifying the precise number of individuals that may be incidentally taken is not possible because this species is cryptically colored to avoid predation, and spends the majority of its life inhabiting burrows to avoid environmental extremes or predation, making the observation or detection of death or injury difficult. In addition, population numbers fluctuate in response to weather patterns and other biotic and abiotic factors, and population levels and the distribution of individual animals have changed since the species surveys were completed and are anticipated to continue changing over the 30-year life of the project. The number of tortoise eggs and juveniles is even more difficult to quantify because of small size, in addition to the other reasons discussed above. As a result, finding dead or injured individuals within the project area is difficult as individuals may be crushed or buried underground in burrows that were not found or inspected, and otherwise hard to recognize/detect for the reasons discussed above. Because eggs and juveniles are almost never found during clearance surveys, we assume virtually all these early life forms will be killed or injured by construction and O&M activities within the project footprint.

While we cannot provide the precise number of desert tortoises that may be taken, we have estimated the number of subadult and adult tortoises (tortoises with a midline carapace length greater than 160 mm) in the project footprint based on the best available information, and based on this estimate have established take thresholds that, if exceeded, will trigger reinitiation of consultation.

Take of desert tortoises is anticipated and exempted as follows:

- The disturbance of up to 718 ha (1,774 ac) of habitat from construction and O&M-related activities may result in accidental death or injury of tortoise eggs, juveniles, subadults or adults from crushing, trampling, or burial. If the project impacts more than this acreage of tortoise habitat, the take threshold will be exceeded.

- As discussed in the "Environmental Baseline" section above, we estimate that up to five subadult and adult tortoises and up to three juvenile, and a relatively small but unquantifiable number of eggs could occur in the project footprint. While we cannot quantify the precise numbers of tortoises that may be killed or injured as a result of construction or O&M activities for the reasons discussed above, we anticipate the number of subadult and adult tortoises that may be killed or injured will be small because no tortoises were found during surveys, which indicates an apparently small population in the project footprint, and because most tortoises will be found during pre-project clearance surveys. Therefore, using our best professional judgment and in light of best available information, we anticipate that construction of the proposed project will result in the incidental take of two individuals, and that O&M activities will result in incidental take of two individuals per year. However, based on the difficulty of detecting individual tortoises, we anticipate each report of incidental taking could represent the actual death or injury of two tortoises. As a result, we anticipate no more than one tortoise per year may be reported dead or injured from construction and no more than one tortoise per year may be reported dead or injured from O&M activities. Thus, if more than one tortoise per year is found injured or dead during construction activities, and more than one tortoise per year is found injured or dead during O&M activities, the take threshold will be exceeded.

- Take, in the form of capture or collection, of up to five subadult and adult tortoises, up to three juveniles, and a relatively small but unquantifiable number of eggs for the purposes of relocation or translocation from within the project construction and O&M disturbance area. However, because the capture or collection, relocation/translocation, and release will be conducted by a Service-approved Biologist, we do not expect these activities to result in direct injury or death of any relocated/translocated tortoises. Therefore, we do not want to limit the ability of the Service-approved Biologist to avoid and minimize the direct injury or death of tortoises by relocating/translocating tortoises found during preconstruction clearance surveys. Thus, all take in the form of trapping, capture, or collection for the purposes of relocation is exempted for any eggs, juveniles, or subadult or adult tortoises found during clearance surveys, monitoring activities, or other incidental observations, subject to the reasonable and prudent measures and terms and conditions below. If any tortoises are directly injured or killed during relocation or translocation, the take threshold will be exceeded.

- Take, in the form of capture or collection, of up to five subadult and adult tortoises for the purposes of monitoring transmittered tortoises. Although transmittered tortoises may

be captured multiple times over the course of the post-translocation monitoring effort, we do not anticipate injury or mortality of these individuals due to post-translocation monitoring. However, if any tortoises are directly injured or killed during monitoring activities, the take threshold will be exceeded.

- Take, in the form of capture or collection, of up to 20 subadult and adult tortoises (up to five from the project footprint, up to ten from the Genesis recipient site, and up to five from the Upper McCoy Wash recipient site) for the purposes of blood draw for ELISA testing to assess disease prevalence. Although such an invasive procedure presents some likelihood that individuals could be injured or killed, we do not anticipate that blood draw will result in the death or injury of any individuals because blood draw will be conducted by Service-approved Biologists, following Service-approved methods. If any tortoises are directly injured or killed as a result of blood draw, the take threshold will be exceeded.

IMPACT OF THE INCIDENTAL TAKING OF THE SPECIES

In the accompanying biological opinion, the Service determined that these levels of anticipated take are not likely to result in jeopardy or adversely affect the recovery of the tortoise.

REASONABLE AND PRUDENT MEASURES

The BLM and applicant are implementing conservation measures for this project as part of the proposed action to minimize the taking of desert tortoises. The Service's evaluation in the biological opinion includes consideration of the conservation measures developed by the BLM and applicant to reduce the adverse effects of the proposed project on this species. Any subsequent changes in the conservation measures proposed by BLM or applicant or in the conditions under which these activities currently occur may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 *Code of Federal Regulations* § 402.16. These reasonable and prudent measures are intended to supplement the protective measures that were proposed by BLM and applicant as part of the proposed action, and are necessary and appropriate to minimize the impact of the taking on desert tortoises.

- The BLM and applicant shall monitor and report the level of incidental take of desert tortoises to the CFWO throughout the life of the project and report on the effectiveness of the project minimization measures to reduce the impact of incidental take of tortoises.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the BLM and applicant, and all agents/contractors, must comply with the following terms and conditions, which implement the

reasonable and prudent measures described above, and are intended to minimize the impact of the incidental taking. These terms and conditions are non-discretionary.

The following term and condition implements the reasonable and prudent measure above.

1. The applicant shall prepare and provide to the Service and BLM an annual report by December 31 of each year of the project. The annual report shall document but not be limited to, the following:

    - Compliance with project-specifications and conservation measures outlined in this biological opinion, including BIO-1 thru BIO-14, and BIO-29 outlined in the CEC's Commission Decision on the GSEP project (CEC 2010b), as they relate specifically to desert tortoises.

    - Any activities determined by the Designated Biologist or Biological Monitors to be out of compliance with project-specifications and conservation measures outlined in this biological opinion and the corrective measures implemented to bring the project back into compliance.

    - The total amount and location of desert tortoise habitat disturbed by construction and O&M activities during the reporting year.

    - The number and location of desert tortoises killed or injured during project construction or O&M activities during the reporting year and a description of the circumstances leading to the death or injury of individuals of the species.

    - Activities conducted under the Desert Tortoise Relocation/Translocation Plan (BIO-10) during the reporting year, including but not limited to, the number and location of desert tortoise eggs, juveniles, subadults, or adults located during project activities and relocated or translocated during preconstruction, construction, and/or O&M activities during the reporting year and a detailed description of the relocation/ translocation activities, and a detailed description of monitoring activities conducted at the recipient and control sites during the reporting year.

      If more than five adult desert tortoises, or any eggs, juveniles or subadults are found within the project footprint, the Designated Biologist shall immediately report the observation to the CFWO, prior to any relocation/translocation activities. The CFWO will review the information to determine its consistency with the effects analysis above and if relocation/translocation of additional desert tortoises would benefit their survival and be consistent with our assumptions in the biological opinion, and if reinitiation of consultation is warranted.

- Activities conducted under the Raven Management Plan (BIO-13) during the reporting year, including but not limited to, the results of raven nest monitoring and removal of raven nests and offending ravens.

- Activities conducted under the Weed Management Plan (BIO-14), including but not limited to, invasive plant species control activities conducted during construction or O&M activities in the project disturbance area during the reporting year and the status of control activities conducted the previous year.

Disposition of Sick, Injured, or Dead Specimens

The CFWO is to be notified immediately at (760) 431-9440 if any desert tortoises are found sick, injured, or dead in the action area. Immediate notification means verbal (if possible) and written notice within 1 workday, and must include the date, time, and location of the carcass, and any other pertinent information. Care must be taken in handling sick or injured individuals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.

The CFWO should also be notified immediately at (760) 431-9440 if any endangered or threatened species not addressed in this biological opinion is found dead or injured in the project footprint during the life of the project. The same reporting requirements also shall pertain to any healthy individual(s) of any threatened or endangered species found in the action area and handled to remove the animal to a more secure location.

Reporting Requirements

Please refer to the "Terms and Conditions" section above for details on reporting procedures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the BLM work with the applicant and Service to determine if the transmittered desert tortoises associated with the translocated populations can be used to answer additional research questions related to translocation or desert tortoise biology.

2. We recommend that the BLM amend the California Desert Conservation Area Plan to prohibit additional renewable energy development (e.g., solar energy facilities, wind development) within the unused portion of the 3,804-ha (9,400-ac) ROW granted for

construction and O&M of the GSEP project, particularly within the proposed Genesis recipient site. We offer this recommendation because this area is likely to be used as a recipient site for translocated desert tortoises from the GSEP project. Additionally, we are aware of one other ROW application filed with the BLM for development of large-scale solar facilities directly west of the GSEP project. Given this proposed project, the potential exists that desert tortoise habitat adjacent to the GSEP may be disturbed and fragmented to the extent that desert tortoises and other wildlife populations in the area may be severely compromised.

3. We recommend that the BLM amend the California Desert Conservation Area Plan to prohibit additional renewable energy development (e.g., solar energy facilities, wind development) within the upper bajadas (mapped as "dissected fans" on the NECO Map 3-4, Landforms) in the mountains of northeastern Riverside County. We offer this recommendation because this action would protect the higher quality tortoise habitat in this area.

REINITIATION NOTICE

This concludes formal consultation on the proposed project for the desert tortoise. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions regarding this document, please contact Tannika Engelhard at the Carlsbad Fish and Wildlife Office at (760) 431-9440, extension 202.

Attachments:
Figure 1. Genesis Solar Energy Project Location
Figure 2. Genesis Solar Energy Project Site Plan

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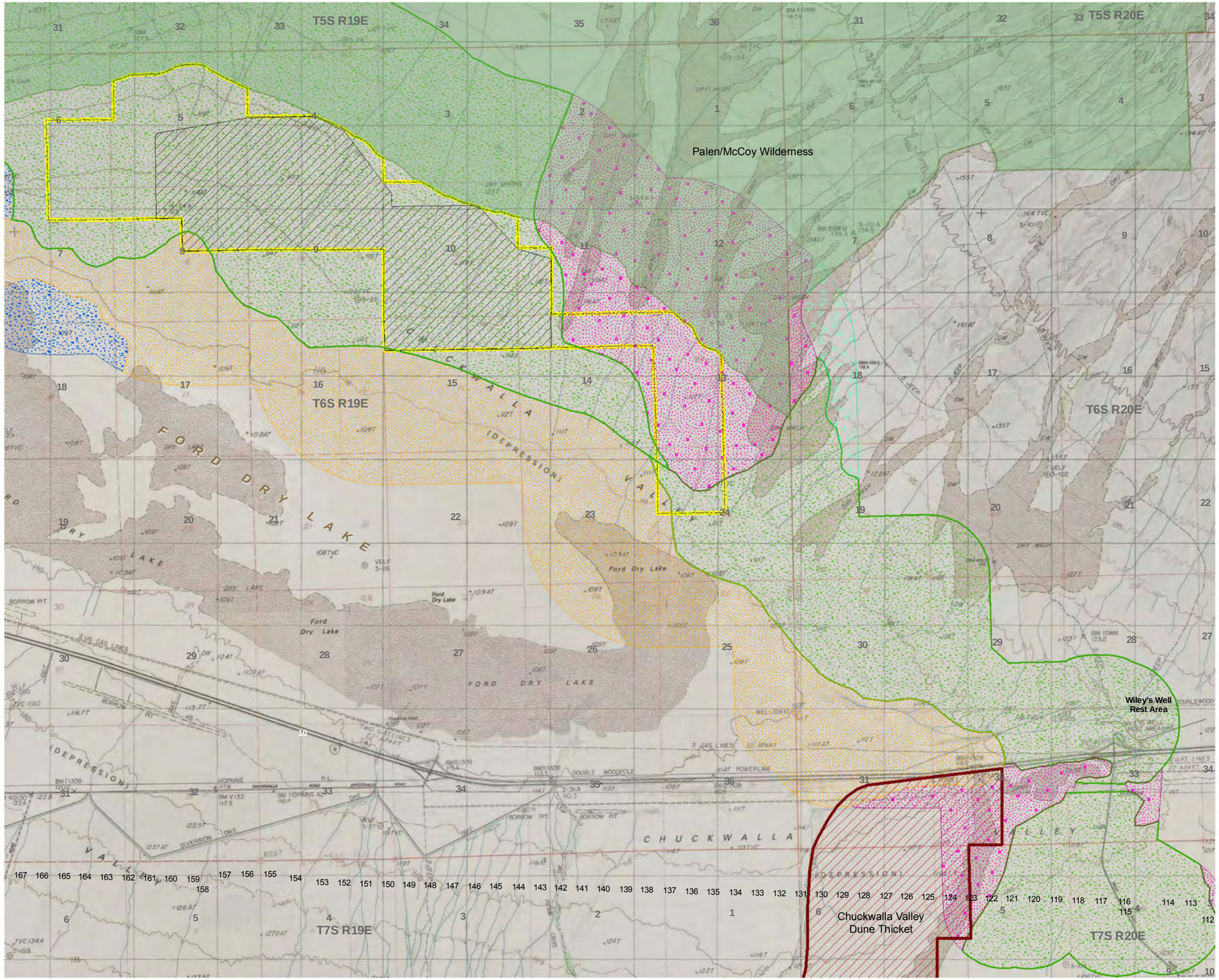
Genesis Solar, LLC

GENESIS SOLAR ENERGY PROJECT
RIVERSIDE COUNTY,
CALIFORNIA



Blythe Energy Project Transmission Line
Blythe Energy Project Transmission Line Structure
Transmission Interconnect
Transmission Interconnect on Existing Poles
Gas Line
Access Road
New Distribution Line/Redundant Communication Line
Redundant Communication Line in Existing ROW
Project Requested ROW
Plant Site
Chenopod Scrub
Sonoran Creosote Bush Scrub
Dry Desert Wash Woodland
Playa and Sand Drifts over Playa
Stabilized and Partly-Stabilized Sand Dune
Area of Critical Environmental Concern
BLM Wilderness
County Assessor Parcel
Township/Range
Section

0 0.5 1 1.5 2
Miles

Notes:
(a) UTM Zone 11, NAD 1983 Projection.
(b) Source data: ESRI, TTEC, USDA, Riverside County, A. Karl & Assoc.

UTILITIES WITHIN LINEAR CORRIDOR

TETRA TECH EC, INC

Last Saved: Monday, August 9, 2010 Analyst: S. Marrs
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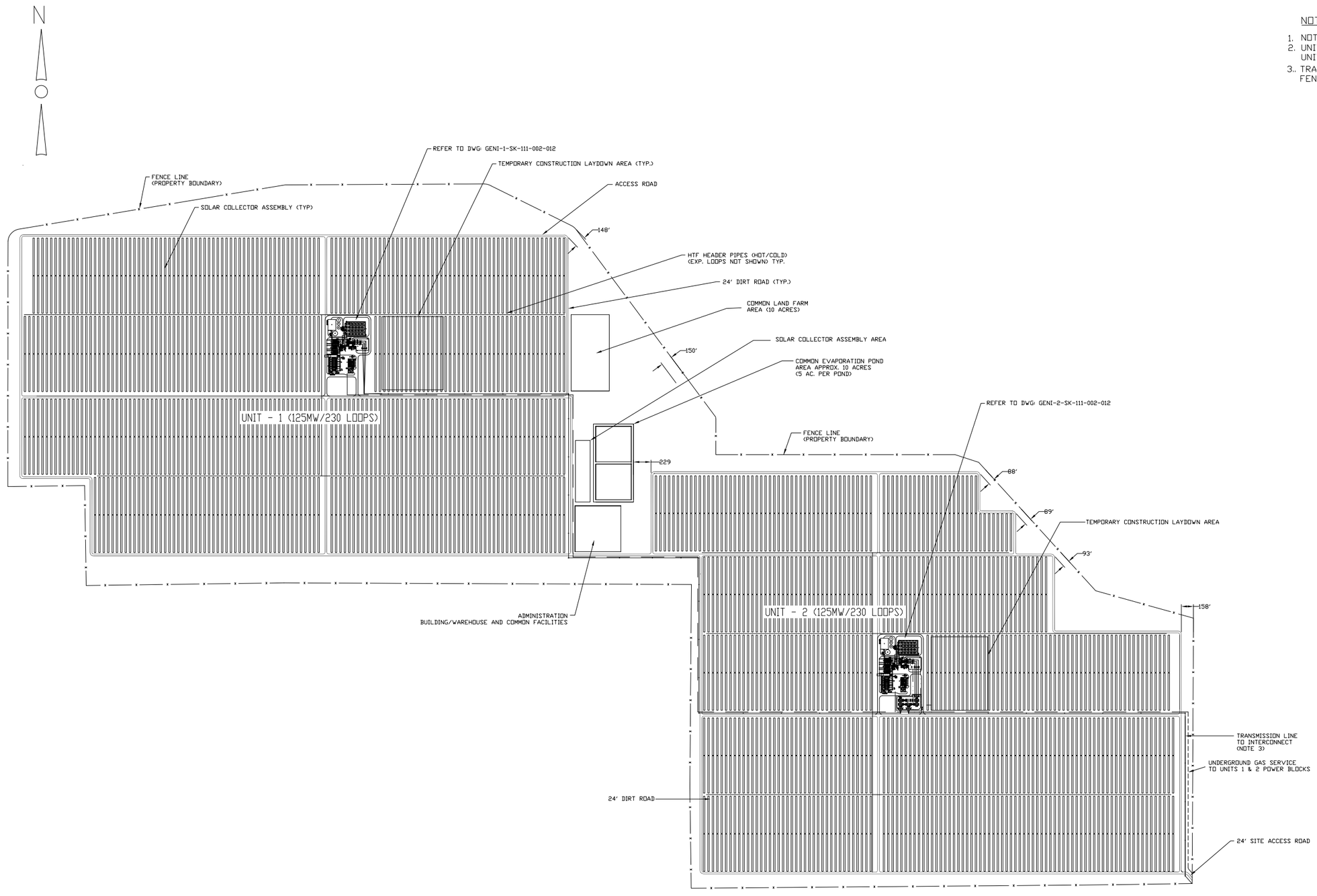
NOTES:

1. NOT FOR CONSTRUCTION.
2. UNIT 1 CALLOUTS ALSO APPLY TO UNIT 2 WHERE SIMILAR.
3. TRANSMISSION LINE EASEMENT WITHIN FENCELINE IS 100 FEET.



REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH SPEC	PROJECT ENGINEER MANAGER	PROJECT MANAGER
B	07 06 10	ISSUED FOR REVIEW	RWG	BA	RWG	DR	JF	JK
A	06 09 10	ISSUED FOR REVIEW	SC	JF	PL	JF	JF	JK

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE J. FOSTER 06/09/2010

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL

DRAWN BY: S. CHERRY
CHECKED BY: J. FOSTER
LEAD DESIGNER: P. LOUEN
ENGINEER/TECH SPECIALIST: J. FOSTER
PROJECT ENGINEERING MANAGER:
PROJECT MANAGER: J. KIMURA

PROFESSIONAL ENGINEER'S SEAL

Zero Harm — Leadership, No Incidents, Safe Behavior

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: _____ STATE: _____
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WorleyParsons resources & energy

CLIENT/PROJECT TITLE

GENESIS SOLAR, LLC
GENESIS SOLAR ENERGY PROJECT
PARABOLIC THROUGH CSP

GENERAL ARRANGEMENT
OVERALL SITE PLAN - DRY COOLED
FORD DRY LAKE, CA

SCALE 1" = 600'
DRAWING SIZE ARCH D (36" x 24")
WORLEYPARSONS DWG. NO. GENI-0-SK-111-002-008
REV B

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APPENDIX C

BIOLOGICAL RESOURCE MONITORING AND MANAGEMENT PLANS

Appendix C.1 Weed Management Plan
Appendix C.2 Revegetation Plan
Appendix C.3 Couch's Spadefoot Toad Protection and Mitigation Plan
Appendix C.4 Desert Tortoise Translocation Plan
Appendix C.5 Burrowing Owl Relocation and Mitigation Plan
Appendix C.6 Nesting Bird Monitoring and Management Plan
Appendix C.7 Golden Eagle Monitoring and Management Plan
Appendix C.8 Common Raven Monitoring, Management, and Control Plan
Appendix C.9 Avian Protection Plan
Appendix C.10 Decommissioning and Closure Plan

APPENDIX D

SURVEY PROTOCOL

Appendix D.1	USFWS Clearance Survey Protocol for the Desert Tortoise – Mojave Population
Appendix D.2	Nest Monitoring Plots: Methods for Locating Nests and Monitoring Success
Appendix D.3	Burrowing Owl Survey Protocol and Mitigation Guidelines
Appendix D.4	Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations

CHAPTER 6. CLEARANCE SURVEY PROTOCOL FOR THE DESERT TORTOISE - MOJAVE POPULATION

6.1. Objectives

- Locate as many desert tortoises as possible within the project site.
- Remove all desert tortoises encountered from the project site.
- Safely excavate, collect, and rebury desert tortoise eggs.

6.2. Applicability of Clearance Surveys

For projects located in occupied desert tortoise habitat, especially those projects with a permanent or linear disturbance (e.g., pipelines, roads, transmission lines), a clearance survey may be required as part of the Terms and Conditions of a biological opinion or incidental take permit. This survey is intended to reduce the likelihood that desert tortoises are killed or injured as a result of the proposed action. Clearance survey methods may include temporarily penning desert tortoises within the area surrounding its burrow, relocating desert tortoises from the impact area, or translocating desert tortoises to a designated area outside its home range in accordance with a USFWS-approved translocation plan (Section 7.10).

6.3. Methodology

- Clearance surveys require 100 percent coverage of the project area, with a focus on locating all desert tortoises above and below ground within the project area. This survey would be conducted immediately prior to surface disturbance at each site within the project area or following construction of a desert tortoise-proof fence or similar barrier encompassing the project area to ensure that tortoises cannot enter the project area.
- Clearance surveys at the project site must consist of at least 2 consecutive surveys of the site. Surveys shall involve walking transects less than or equal to 15-feet (5-meter) wide under typical conditions. In areas of dense vegetation or when conditions limit the ability of the surveyor's to locate desert tortoises, transects should be reduced in width accordingly. Clearance surveys should be conducted when desert tortoises are most active (April through May or September through October). If desert tortoises are found during the second pass, the USFWS and appropriate State wildlife agency may require a third survey. If any desert tortoises need to be translocated follow the USFWS-approved translocation plan for that project.
- After the desert tortoise exclusion fence has been installed, the fencing should be checked several times a day to ensure a tortoise has not been trapped within the fence and may be exposed to lethal temperatures. Desert tortoises often pace along new fences attempting to gain access to the other side or return to areas from which they were removed.
- All methods used for handling desert tortoises during the clearance surveys must be in accordance with this Manual. Anyone that handles desert tortoises during clearance activities must have the appropriate authorizations from USFWS and the State.
- During the clearance surveys, desert tortoises in burrows may be removed through tapping (Section 6.4) or careful excavation. Multiple visits may be necessary if desert tortoises are inaccessible in deep caves or burrows.

- During all handling procedures, desert tortoises shall be treated in a manner to ensure that they do not overheat or exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises shall be kept shaded at all times until it is safe to release them. Ambient air temperature shall be measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. All clearance activities (capture, transport, release, etc.) shall occur when ambient temperatures are below 95 degrees F (35 degrees C) and not anticipated to rise above 95 degrees F (35 degrees C) before handling and processing desert tortoises are completed. Refer to section 7.4 for handling desert tortoises during hot temperatures.
- If a desert tortoise is encountered aboveground and outside the temperature limits refer to Section 7.4 or 7.5.
- The area cleared and number of desert tortoises found within that area must be reported to the local USFWS and the appropriate State wildlife agency. The report should be made in writing, either by mail or email. Notification should be received within one week.
- If a desert tortoise is encountered after clearance surveys have been completed, process the tortoise according to the methods described above.

6.4. Extracting Desert Tortoises from Burrows

Before touching a desert tortoise or using any instrument that comes into contact with a desert tortoise, implement procedures described in Section 7.6. Examine the burrow for other occupants (e.g., snakes, spiders, scorpions, wasps, Gila monsters, etc.). Firmly pound the soil at the side of the "apron" or soil mound at the entrance of the burrow 5 to 6 times with an open hand then listen for desert tortoise movement; wait 30 seconds and repeat several times if needed. Avoid disturbing or pounding the center of the apron or entrance of the burrow where desert tortoises typically dig nests and lay their eggs. If the desert tortoise is visible deep in its burrow, the observer can gently tap the carapace 3 to 4 times with a stick (Medica et al. 1986). The observer should then remove the stick and move away from the burrow entrance. If tapping is successful, the desert tortoise will emerge, usually to the burrow entrance. If desert tortoise movements are not heard within a few minutes, discontinue tapping.

If the desert tortoise is within arm's reach, firmly grasp the gular, plastron, or posterior edge of the carapace and gently pull the tortoise towards the burrow entrance. If the desert tortoise resists to the point where moderate pulling effort is unsuccessful, stop pulling while maintaining a grip on the tortoise; resume when the tortoise relaxes. **Never use a hook or other instrument to remove a desert tortoise from a burrow or otherwise compromise the integrity of a burrow if the desert tortoise will remain in the project area.**

If the area is to be cleared of all desert tortoises, excavate the burrow as described in Section 6.5. If the tortoise is in a deep caliche cave which cannot be excavated without potentially harming the desert tortoise, record the location and contact the USFWS for instruction.

6.5. Excavating Burrows

According to most agency documents, desert tortoise burrows are excavated only if they occur within a proposed disturbance area. If excavating a burrow to relocate a desert tortoise, and an artificial burrow is required, it should be constructed before beginning the excavation (Section 6.7.). Biological opinions and permits typically require that such areas be flagged and that project activities be confined to those areas. As an alternative to excavation in certain circumstances, the immediate area surrounding a burrow occupied by a desert tortoise may be temporarily penned, if authorized by the USFWS and the appropriate State wildlife agency (Section 6.9.).

When required, take measurements of the burrow before excavating it. Before excavation, feel for desert tortoise eggs by gently probing the soil in front of the burrow opening (i.e., the mound) with a blunt instrument (e.g., knitting needle) or similar instrument, and along the floor of the burrow as you excavate the burrow. The purpose of probing is to locate areas of excavated soil which are less compacted and may indicate a nest. Eggs have been found up to 6 feet (1.9 meters) in front of burrow openings and up to 6 feet (1.9 meters) within the entrance of a burrow; they may also occur in the mound at the burrow opening. To avoid crushing eggs, do not scrape the shovel across the bottom of the burrow, but continue to probe the area with your fingers as you proceed. Removal of the top 10 inches (25 centimeters) of soil (or until a hard layer of soil is encountered) will typically ensure that you find any desert tortoise eggs. Be particularly careful from late April to mid-October when eggs are most likely present. If found, follow the USFWS's egg handling protocol (Section 6.6.).

Excavators should wear leather or cloth gloves during burrow excavation to avoid being bitten or stung by venomous animals. Use blunt-nosed shovels or garden trowels. The preferred method involves two individuals, each with a shovel, to excavate a burrow. Place a shovel in the burrow entrance, or garden trowel for small burrows, and slice away the ceiling with the second shovel or trowel. Remove the soil with the first shovel or trowel as excavation proceeds and repeat. Excavate the burrow slowly and carefully and stop often to see if a desert tortoise is within reach. Do not collapse the burrow ahead of the shovel or trowel inside the burrow. You should feel the shovel contact the other shovel with each stroke to avoid striking a desert tortoise. It may take several minutes or several hours to excavate a desert tortoise burrow, depending on its length and other characteristics.

Always excavate the burrow to its absolute end(s), and then excavate an additional foot-or-so (0.3 meter) of harder soil beyond the suspected end to ensure that a desert tortoise is not behind a dirt plug or mound. Search all side tunnels within the burrow for desert tortoises, especially in kit fox dens. If a desert tortoise is found, do not assume that it is alone. After removing the first desert tortoise encountered, return to the burrow and continue to excavate it looking for additional desert tortoises. After excavating the burrow, leave it collapsed so that no desert tortoise may reuse it easily.

When excavating a burrow, stop digging when a desert tortoise is encountered. If during the desert tortoise less-active period (i.e., during July - August, and November - February; in Arizona the less-active period may begin in late May or June), relocate the desert tortoise to an artificial burrow. If it is during the most-active period (i.e., when desert tortoises are most likely

above ground; March - June, and September - October), place the desert tortoise in the shade of a shrub, or depending on conditions, in an artificial burrow (Section 6.7.).

6.6. Nest and Egg Handling Protocol

Desert tortoises may lay eggs during the months of May through July and usually hatch July through October. Some eggs may not hatch, or hatchlings may not emerge until the following spring. Because desert tortoise eggs are also protected by the ESA, the Authorized Biologist shall search for nests and encouraged to search prior to clearance surveys. Desert tortoise eggs shall be moved to artificial nests either in the wild or at a USFWS-approved facility. If you encounter unemerged hatchlings, contact the USFWS and appropriate State wildlife agency for instructions. Authorized Biologists must receive special training in the procedures outlined below. If you discover a nest and have not been trained, the nest shall be carefully covered with soil so as not to move the eggs then contact the USFWS and appropriate State wildlife agency for instructions.

Any nest that is found shall be carefully excavated by hand at a time of day when the air temperature 6 inches (15 centimeters) above the ground is approximately equal to the soil temperature at egg level. Immediately upon finding a nest, discontinue using large tools. The Authorized Biologist shall excavate the nest using his or her hands. Disposable rubber or latex gloves must be worn when marking and handling eggs. Before disturbance of nest contents, each egg shall be gently marked with a small dot on the top using a felt-tipped pen to establish the egg's orientation in the nest. In handling nest contents, eggs must be maintained in this orientation at all times. Because egg shells become extremely fragile in the last few weeks before hatching, special care shall be taken with eggs found from August to mid-October. Because the egg is very fragile, it may break during handling; this will be lethal to the developing tortoise inside. Broken eggs shall be buried nearby and left in the field, or the contents preserved and made available for research projects. Report broken eggs to the USFWS and appropriate State wildlife agency as required for tortoise mortalities.

The Authorized Biologist shall measure and record the depth of the nest below the soil surface, the cardinal location of the nest in relation to any adjacent shrub (i.e., north, south, east, or west side of the shrub), the species of shrub and its approximate foliage volume, and the soil type. Place approximately 1 inch (2.5 centimeters) of soil from the nest area in a bucket and carefully transfer the eggs to the bucket, maintaining egg orientation. Gently cover the eggs with soil that is free of cobbles and pebbles, to a depth equivalent to that of the original nest.

If good desert tortoise habitat is available in the general area, the eggs shall be relocated between 150 to 1,000 feet (45.7 to 305 meters) from outer boundary of the project site, unless directed differently by USFWS. Eggs and tortoises shall only be placed on lands administered by a Federal agency or on lands when a written authorization to bury the eggs or relocate the tortoises has been obtained. A nest shall be prepared with the same depth, orientation, location in relation to a specific shrub species, and in the same soil type as the original nest. The eggs shall be transferred to the new nest, maintaining their original orientation. The eggs shall be replaced so that they touch one another. Gently cover with soil from which cobbles and pebbles have been removed so that all the air spaces around the eggs are filled. Relocated nests in the wild shall be monitored by an Authorized Biologist. The monitoring program shall be developed in

consultation with the USFWS and appropriate State wildlife agency. Care must be taken to remove any scent of tortoise eggs or human activity at the nest site to minimize nest predation.

If a suitable site for a nest is not available in the wild, the eggs shall be prepared for incubation in a suitable holding facility. A small amount of soil shall be placed in a bucket and the eggs transferred to the bucket using the technique specified above, making sure that the eggs are touching one another. The bucket shall be carefully filled to the depth of the original nest, but leave the top of the soil layer 3 inches (7.6 centimeters) below the rim of the bucket so that future hatchlings cannot escape. The bucket shall be buried in soil in a safe location at a holding facility approved by the USFWS and appropriate State wildlife agency.

The Authorized Biologist shall record in detail all the procedures used in moving eggs. Personnel caring for incubating eggs at a facility shall maintain a record of where the eggs were found, method of incubation, length of time and conditions under which the eggs were incubated, observations of eggs during the incubation period, information about hatchling health and behavior, and disposition of the hatchlings.

6.7. Constructing Artificial Burrows

Constructing an artificial burrow will take from 30 minutes to several hours, depending on the substrate. An artificial burrow is intended to provide replacement shelter and protection to a desert tortoise when removed from its natural burrow. The USFWS requires experience and training in burrow construction prior to being authorized to construct an artificial burrow. The information provided below including Figures 6.1 and 6.2 is a general description of the methods for constructing artificial burrows taken from Tortoise Group's adoption and care pamphlet (www.tortoisegroup.org).

Create an artificial burrow that is the same orientation and size as the burrow from which the desert tortoise was taken. The burrow for a juvenile desert tortoise should be 3 to 4 feet (0.9 to 1.2 meters) long and an adult tortoise burrow should be 5 to 6 feet (1.5 to 1.8 meters) long. Burrow construction involves digging a three-sided shelf upon which plywood will be placed to serve as the roof of the burrow. A channel is dug below the level of the shelf which approximates the width of the tortoise and functions as the actual burrow (Figure 6.1).

Determine the width and length to dig the shelf, place the plywood on the ground. Use corner stakes and twine to delineate the perimeter. Dig the burrow in a downward slant of 15 to 20 degrees below the horizontal line of the ground (Figure 6.2). Place the plywood onto the shelf. Fit the plywood snugly and then remove it. Next, dig the channel and loosen the soil along the floor of the channel to a depth of 6 inches (15.2 centimeters) to allow a tortoise to dig its way out should the plywood sag and possibly trap or pin it in the burrow. Replace the plywood and shovel dirt on top. Place rocks along the eave of the burrow roof, above the opening (Figure 6.2). Mound the dirt so that rain water will not puddle on top of the finished burrow.

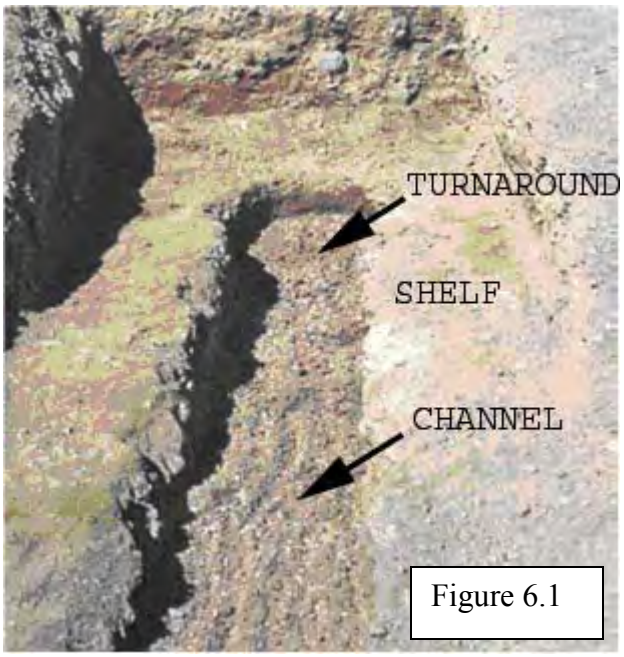

Figure 6.1

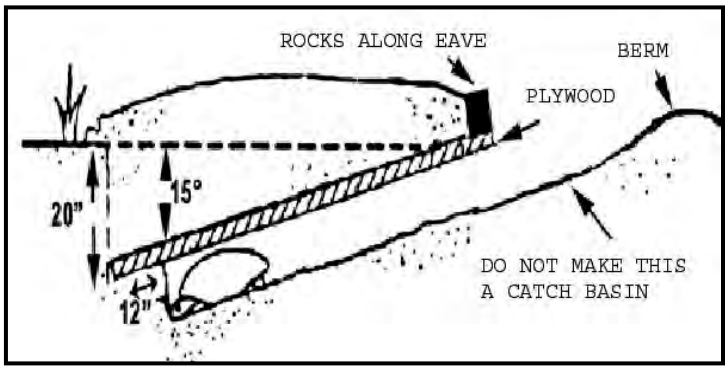

Figure 6.2

We recommend that you cover the opening of the artificial burrow with rocks or wood for 2 or 3 days to ensure that the tortoise remains within the burrow and out of harm's way, or that it resumes hibernation or aestivation. Alternatively, the tortoise and its burrow may be temporarily penned (Section 6.9). Providing an artificial burrow is particularly important if most of the burrows have been lost to disturbance and a desert tortoise would be unable to find an existing burrow in a reasonable amount of time. After several days, when project activities have ceased in the area (i.e., as on a pipeline or transmission line), or when you are reasonably sure that the tortoise is safely hibernating or aestivating, **it is absolutely essential that you remove the rocks from the opening of the blocked burrow or remove the pens around the tortoise and its burrow.**

6.8. Mapping and Finding Blocked Burrows

If you block a desert tortoise inside a burrow or temporarily pen the tortoise and its burrow according to instructions from the USFWS, you must return to that burrow and unblock it or remove the enclosure as soon as possible. Tortoises shall not be blocked in burrows during extreme high temperatures and construction activity shall be carefully monitored in the area around the blocked or penned tortoise. Accurately map the burrow with GPS so that you can find it again. Additionally, we recommend that you mark the area as a backup in case of GPS failure. For example, mark burrows with lath or ribbon placed a minimum of 100 feet (30.5 meters) from burrow. The marker should provide a cryptic message sufficient to locate the burrow (e.g., B23-2100FTS, to indicate that Burrow #23 on Reach 2 is 100 feet (30.5 meters) south of the lath (LaRue 1993)). The area must be discretely marked to avoid attracting people or ravens to the burrow.

6.9. Temporarily Confining Desert Tortoises

Desert tortoises found in the project area sheltering in a burrow during a period of reduced activity (e.g., winter), may be temporarily penned according to instructions from the USFWS. Tortoises shall not be penned in burrows during extreme high temperatures and construction activity shall be carefully monitored in the area around the penned tortoise. The methodology for penning desert tortoises (U.S. Department of Defense 2005) is adapted from a methodology developed by Gilbert Goodlett (EnviroPlus Consulting, Ridgecrest, California). Generally,

desert tortoises should not be penned in areas of moderate or heavy public use. Penning shall be accomplished by installing a circular fence, approximately 20 feet (6 meters) in diameter to enclose the tortoise/burrow. The pen should be constructed with durable materials (i.e., 16 gauge or heavier) suitable to resist desert environments. Fence material should consist of ½-inch hardware cloth or 1-inch horizontal by 2-inch (2.5 by 5.0 centimeters) vertical, galvanized welded wire. Pen material should be 24 inches (50 centimeters) in width. Steel T-posts or rebar (2 to 3 feet or 0.6 to 0.9 meter) should be placed every 5 to 6 feet (1.5 to 1.8 meters) to support the pen material. The pen material should extend 18 inches (45.7 centimeters) aboveground. The bottom of the enclosure shall be buried 6 to 12 inches (15 to 30 centimeters) or bent inward (towards the burrow), soil mounded along the base, and implement other measures to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An Authorized Biologist or Desert Tortoise Monitor shall check the pen at least daily and ensure that the desert tortoise is in the burrow or pen, the desert tortoise is okay, and the pen is intact. All instances of penning or issues associated with penning shall be reported to the USFWS within 3 days.

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NEST-MONITORING PLOTS: METHODS FOR LOCATING NESTS AND MONITORING SUCCESS

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Abstract.—Attention to long-term declines in populations of Neotropical migratory birds has generated increased interest in how to monitor and manage them. Measurement of nesting success provides information on trends in recruitment, and measurement of vegetation associated with nests may identify habitat influences on breeding productivity. Examination of nests also allows collection of life history data (e.g., clutch size, numbers of broods, numbers of nesting attempts, nesting success), which provide important insight into vulnerability of species to decimation or perturbations. Comparisons of nesting success and habitat use across the geographic range of a species can determine local habitat effects on population recruitment and historical constraints on habitat use and species distributions. In this paper, standardized methods and cues are described that aid in locating and monitoring nests to allow comparisons across studies in space and time.

MÉTODOS PARA LOCALIZAR NIDOS Y MONITOREAR EL ÉXITO DE ESTOS

Sinopsis.—El decrecimiento progresivo de las poblaciones de aves que migran al neotrópico ha generado gran interés en cómo monitorear y manejar a éstos. El medir el éxito de anidamiento provee información en relación a las tendencias en el reclutamiento poblacional y las medidas de la vegetación asociada a nidos puede ser importante en identificar aspectos de ésta que influyan en la productividad. El examen de nidos también permite recopilar datos sobre ciclos de vida (ej. tamaño de la camada, número de camadas por año, número de intentos de anidamiento, y éxito de anidamiento) el cual provee información importate en referencia a la vulnerabilidad de la especie a perturbaciones. La comparación del éxito de anidamiento de una especie en diferentes habitats a lo largo de extensiones geográficas puede determinar el efecto de habitats locales en el reclutamiento poblacional y restricciones históricas en el uso de habitat y la distribución de la especie. En este trabajo, se describen métodos estandarizados y pistas que pueden ayudar a localizar y monitorear nidos de tal manera que se puedan hacer comparaciones entre estudios y lapsos de espacio y/o tiempo.

Habitat features that influence breeding productivity of birds are poorly known (Martin 1992). Measurement of nesting success and associated vegetation allows identification of such habitat features and also provides greater insight into evolution of habitat requirements and species coexistence than traditional metrics such as presence or abundance (Martin 1986, 1988a, 1992). Data on nest sites and mortality also improve understanding of ecological and evolutionary influences on life history traits

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(Lack 1968; Martin 1988b, 1993a, b; Martin and Li 1992), which can give insight into the abundance and vulnerability of species to population decimation (Martin 1993a, Pimm et al. 1988). Knowledge of life history traits taken together with data on breeding productivity can also provide information on demographic trends and warn of population problems before declines in density actually occur (Martin 1992, 1993a; Pienkowski 1991; Temple and Wiens 1989). Many life history traits, however, are unknown or poorly known for many species in North America; breeding biology studies are poorly represented among species and geographic locations (Martin 1992, 1993a; Ricklefs 1969). The paucity of studies exists in part from a misconception that nests are too difficult to find. Yet, cues and techniques for finding nests can be learned, as we describe here, thereby providing the vital information needed to curb long-term population declines of many species (see Robbins et al. 1989).

Nest record programs, where volunteers turn in records of nest attempts, have been in existence for years in both the United Kingdom (Ballie 1990) and United States (Bart 1977). These programs obtain data for broad geographic regions from volunteers who often locate nests incidental to other activities. Sample sizes for many geographic regions and habitat types are minimal and consistency in monitoring nests once they are found is poor. Thus, these programs suffer from several potential biases and require careful interpretation (Ballie 1990). In contrast, studies that focus on nest monitoring on long-term plots can provide data on breeding productivity for entire collections of species to allow comparisons within and among species in space and time (e.g., Martin 1992, 1993a; Martin and Li 1992; Sherry and Holmes 1992). Moreover, broad-scale deterioration of environmental conditions from habitat degradation or global warming can be detected if such studies are distributed across local microclimatic gradients and broad geographic regions (Martin 1992, Temple and Wiens 1989). Additionally, if vegetation is measured, habitat features that influence nesting success can be compared across the geographic ranges of species to provide insight into habitat requirements and distribution of species (see James et al. 1984, Knopf et al. 1990). Effective comparisons among species and locations, however, depend on standardization of sampling protocols.

In this paper we describe aids and standardized techniques for locating and monitoring success of nests. These methods are provided to standardize data collection to allow comparisons across investigators and in the hope of increasing both sample sizes and numbers of studies of breeding biology.

NEST LOCATION

Nest finding is labor intensive (DeSante and Geupel 1987), but most observers can improve their ability to locate nests in a matter of days with training and practice. The behavioral observations and clues described below work effectively for a variety of species. Our experience includes only a small subset of species and habitats available in North America,

however, and is largely restricted to wooded (scrub and forest) habitats. Other methods may be more effective in other habitats. For example, cable-dragging (Higgins et al. 1969) and rope-dragging (Labisky 1957) may be more effective methods for many grassland species. The patience and alertness of observers and their familiarity with the habitat and behavior of species are the most important influences on effectively locating nests.

We have successfully used these techniques to train individuals who even lack experience at bird identification. For example, a crew of four assistants initiated a study in Arkansas in 1991 where nesting behaviors of species were unstudied; this crew was provided only the general nest-finding guidelines given below. The crew included one experienced nest-finder, one person experienced at identifying birds and two people without experience at either. These workers found over 300 nests of open-nesting birds (Table 1). A crew of seven assistants that included two experienced nest-finders found more than 800 open-cup and cavity nests on Arizona sites in the same year (Table 1). In general, about 20 nests are needed for an adequate estimate of nesting success (Hensler and Nichols 1981), and such sample sizes were obtained for most species (Table 1). Moreover, species with small sample sizes can be compiled across years.

We recommend that two study plots be established for each person searching for nests and he or she should work on these two plots for the entire nesting season. Nest-searching should be alternated between plots between days. This schedule allows consistent monitoring and allows the person to become familiar with the plot and identify "hot spots." In general, eight plots, each 40 ha in size, should be established in forest habitat to find adequate numbers of nests for most species coexisting in any given forest, but smaller plots can be established if studying habitats with higher densities. This design fits in the national Breeding Biology Research and monitoring Database (BBIRD) administered by Martin.

Nest finding should begin early, as soon as territories are established. Non-migratory species generally are more variable than migrants and may initiate breeding considerably earlier in some years (e.g., Geupel and DeSante 1990). Visits prior to nesting are recommended to ensure early nests are not missed in 'unusual' years. Once general chronology of nest initiation is known (after the first year), a general description of this chronology helps assistants to know species on which to focus early in the season.

Nest location during nest construction.—Nests located during construction provide the best estimates of nest success. Permanent residents and many ground-nesting species often begin the earliest. Only the female constructs the nest and incubates for most small terrestrial bird species in North America (Kendeigh 1952, Silver et al. 1985). Exceptions include woodpeckers (Picidae), vireos (Vireonidae), and wrens (Troglodytidae). Thus, the most effective way of finding nests is by locating and following females, although males may provide some cues (see later), and some nests in the shrub layer can be found by random search. Ground nests

TABLE 1. List of species and numbers of nests found in a single field season in Arkansas and Arizona using teams of four and seven field assistants, respectively.

Arkansas		
Yellow-billed Cuckoo	*Coccyzus americanus*	13
Acadian Flycatcher	*Empidonax virescens*	51
Wood Thrush	*Hylocichla mustelina*	40
Red-eyed Vireo	*Vireo olivaceus*	51
Black-and-white Warbler	*Mniotilta varia*	19
Ovenbird	*Seiurus aurocapillus*	14
Worm-eating Warbler	*Helmitheros vermivorus*	16
Hooded Warbler	*Wilsonia citrina*	67
Indigo Bunting	*Passerina cyanea*	30
Arizona		
Acorn Woodpecker	*Melanerpes formicivorus*	8
Red-naped Sapsucker	*Sphyrapicus varius*	30
Williamson's Sapsucker	*Sphyrapicus thyroideus*	32
Hairy Woodpecker	*Dendrocopus villosus*	10
Downy Woodpecker	*Dendrocopos pubescens*	8
Northern Flicker	*Colaptes auratus*	26
Cordilleran Flycatcher	*Empidonax difficilis*	36
Mountain Chickadee	*Parus gambeli*	45
Pygmy Nuthatch	*Sitta pygmaea*	24
Red-breasted Nuthatch	*Sitta canadensis*	26
White-breasted Nuthatch	*Sitta carolinensis*	14
Brown Creeper	*Certhia familiaris*	22
House Wren	*Troglodytes aedon*	83
Hermit Thrush	*Catharus guttatus*	74
American Robin	*Turdus migratorius*	24
Ruby-crowned Kinglet	*Regulus calendula*	14
Warbling Vireo	*Vireo gilvus*	58
Orange-crowned Warbler	*Vermivora celata*	71
Virginia's Warbler	*Vermivora virginiae*	34
Yellow-rumped Warbler	*Dendroica coronata*	45
MacGillivray's Warbler	*Oporornis tolmiei*	9
Red-faced Warbler	*Cardellina rubrifrons*	21
Western Tanager	*Piranga ludoviciana*	39
Black-headed Grosbeak	*Pheucticus melanocephalus*	7
Green-tailed Towhee	*Pipilo chlorurus*	24
Dark-eyed Junco	*Junco hyemalis*	46

in forests are usually the most difficult to find and ground-nesting species are poorly studied (Martin 1992, 1993a). Yet, this group is thought to be particularly area-sensitive and good indicators of habitat disturbance (Martin 1993a, Whitcomb et al. 1981). Thus, special efforts should be made at locating and monitoring ground-nesting species.

Females tend to be extremely furtive during nest building. Mated females may be recognized by copulation events during latter stages of building or by observing that they move about the territory unharassed by the male. Any non-mated bird, especially an intruding male, is normally attacked immediately. Any female observed should be checked with

binoculars, especially after long flights across the territory, to determine whether nesting material is being carried. Nest material may not be obvious. For example, species such as Yellow-rumped Warblers (*Dendroica coronata*) and Wrentits (*Chamaea fasciata*) collect spider webbing, which is only observable as a small white spot after careful examination of the bill (Martin and Geupel, pers. obs.). Similarly, many birds carry fine materials for lining nests, and these materials are not obvious upon casual inspection.

Sitting near sources of nesting material (i.e., failed nests, thistles) or open areas with a good view of the territory can help detection of nest-building females. Different paths across plots should be used on each visit to increase the probability of randomly encountering females near undiscovered nests. Follow a bird carrying nesting material from a distance to avoid disturbance. Do not interrupt a long flight. If the bird disappears, begin to scan for potential nest sites. Be patient and wait for another visit, being careful not to interfere with her behavior. If the female disappeared near the nest, she will spend time in the area. Remain aware, however, that she may also move out of the back side of the patch to a different patch that contains the nest.

Some birds tolerate nearby observers and behave normally, but most are very wary of observers. If the observer is too close to the nest, the bird often will sit on a perch and eventually drop the nesting material if the observer does not move away. The observer should move quickly and quietly in the opposite direction from which the bird came. Obtain a new hiding position at least 15 m away and watch the female take nesting material several times and leave without it. Stay alert to the possibility that the female may enter one patch and then surreptitiously move among patches only to return the same way to give the appearance of nesting in the first patch. Some species such as MacGillivray's Warblers (*Oporornis tolmiei*), Hooded Warblers (*Wilsonia citrina*) and Sage Sparrows (*Amphispiza belli*) will walk on the ground for several meters to approach the nest secretly. Species that nest off the ground can often be detected as they move through a thick patch of vegetation by watching the vegetation move. Verify the nest status and location a few hours later, being careful to make sure the female is not present. Later visitation is recommended because usually the female has become aware of observers during their nest-finding activities.

Nest location during egg-laying.—The most difficult stage for finding nests is during egg-laying because the female may visit the nest only when she lays an egg and most songbirds lay one egg per day. In cold climates, the female will sometimes sit on the nest during egg-laying when weather is particularly harsh. Also, nest visitation becomes more frequent with increases in numbers of eggs laid (Kendeigh 1952, Zerba and Morton 1983). One means of finding nests during egg-laying is by carefully observing female and male behavior. When either parent gets near the nest, it will look at the nest. If an egg-laying female detects a predator in the area, such as an observer following her, she will sometimes check

the nest by looking down at it repeatedly. A good cue is a female staying in an area without actively feeding.

Finally, copulatory behavior can be used to detect nests during both nest-building and egg-laying. Copulation often occurs in the same tree above a nest, on the same branch, or in the next tree. Carefully examine the area immediately adjacent to any copulatory activity observed.

Nest location during incubation.—When females suddenly "vanish" and males increase the frequency of singing, females have probably initiated incubation. An increase in female foraging speed also indicates the onset of incubation. Females forage at slower speeds prior to incubation (during pre-construction, nest construction, and egg-laying) than during incubation and nestling stages. Females that are moving obviously fast (e.g., rapid hops, quick short flights, rapid wing flicks) should be carefully followed because they will return to the nest soon; on average, female passerines stay off the nest for 6–10 min and on for 20–30 min at a time across species (e.g., Nice 1937, Southern 1958, Zerba and Morton 1983).

Detection of incubating females can be accomplished in two ways. First, females can be encountered by constantly moving through the study plot, but constant alertness is imperative. Sometimes, sitting down in a spot for 20–30 min is useful because incubating females will leave the nest in that period. Second, females can be detected by call notes. Females of many taxa (e.g., Silviidae, Parulinae, Emberizinae) chip or call when they are off the nest. The female begins chipping just prior to leaving the nest or as soon as she is off it. Some taxa such as emberizid finches and icterines give a unique nest departure call when leaving the nest (McDonald and Greenberg 1991). If a vocalizing female is detected and then lost during the course of following her, immediately return to the point of original detection because it is often near the nest and the female can often be relocated before getting back on the nest.

Males can also be of some help. First, males often will respond to females when they leave the nest and either quietly guard the nest (e.g., Gray Catbird, *Dumetella carolinensis*; Slack 1976), or the female. Detection of a quiet male may indicate presence of a foraging female or a nest somewhere near him. Second, males will feed incubating females for a great array of species, particularly cavity-nesting birds, but for many open-nesting birds as well (Lyon and Montgomerie 1987, Silver et al. 1985, Martin and Geupel, unpubl. data). Any birds (male or female) observed should be checked for material in their bills because they potentially could be building nests, feeding females or feeding young. Finally, males of some species (e.g., Chestnut-sided Warbler, *Dendroica pensylvanica*) use favorite singing perches that are in direct view of the nest (Martin, pers. obs.). The nest can be located by following his line of sight.

Females are fairly tolerant of people following while they forage. The female is more cautious as she returns to the nest. A relatively long flight after foraging is probably a return to the nest and is often along the same route. Quickly running in her direction for about 25 m may often allow

resighting because the disturbance will keep her from returning to the nest. If she is near the nest, but cautious about approaching, she will display nervous displacement behavior. This "nest dance" involves bouncing back and forth between a few trees or substrates, and in some cases also includes very rapid foraging. Eventually, she will start to move down toward the nest and then suddenly fly back up. This behavior will be repeated several times in the course of a few minutes. If the observer is too close to the nest, the bird will continue to bounce back and forth between substrates and will sometimes fly off for a short time, only to return within a few minutes. The observer should back off and watch her with binoculars and she will then return to the nest. If the work is being conducted in cold conditions, do not keep her off the nest for more than 15 min because the eggs can chill to lethal levels. If the female has been followed for more than 30 min and has not disappeared or exhibited displacement behavior, then she probably does not have a nest. Of course this "30-min rule" does not apply to species where both sexes incubate.

If a female disappears into a tree or shrub, memorize the area where the female disappeared and choose potential nesting sites before approaching. Moving quietly, begin tapping potential nest shrubs in this area with a stick. Listen for the flush of the female off the nest. Watch for the female or the "nest dance." Note that spotting the female will confirm that the nest is nearby. If the nest is not found and the female is not observed leaving, then there is no confirmation that a nest is in the area. Because the nest is in a fixed location, the site can be revisited for careful searches in the future.

In many species, nest site preference seems to be an evolutionarily conservative trait (Martin 1988a, 1992, 1993c). Many birds prefer to nest in or under certain plant species or patch types that differ among bird species (Geupel 1993, Martin 1993c, Martin and Roper 1988). Familiarity with nest substrate and patch preferences can help in finding nests. Describe and visit nest locations from previous years to aid new observers in finding nests.

Nest location during the nestling stage.—Finding nests during the nestling period is easiest because both males and females commonly bring food to the nestlings and remove fecal sacs. Males are normally the easiest to follow because they are generally less cautious than females in approaching nests. Nests can usually be found from a greater distance using binoculars because of the constant activity of the parents.

Knowledge of the nesting cycle allows an observer to anticipate when to start looking for a new nest. Most species will renest following a nesting failure, although the number of nesting attempts or renesting intensity varies within and among species (Geupel and Desante 1990, Martin and Li 1992). Reconstruction begins almost always at a new site within 10 d and the new nest is likely to be farther away from the previous nest the earlier in the nesting cycle that failure occurred (citations in Martin 1992). Multi-brooded species may begin another nest in as little as 8 d

after fledging a prior nest. Sometimes the female will begin nesting while the male is still tending the fledglings of the previous brood (Burley 1980, Smith and Roff 1980).

Nest finding can be a difficult and frustrating task; patience is the most important asset. An observer should set a goal of trying to find at least one nest every day. More than one nest will be found on many days, but if at least one nest can be found each day the numbers of nests obtained over the season will accumulate and frustration will be minimized.

NEST MONITORING

Each nest found should be checked every 3–4 d to determine if it is still active (with eggs or young) or has failed. Except just after egg-laying and near hatching and fledging events, it is not necessary to check the nest contents. Instead, check the nest from a distance; if an adult is on the nest, do not flush it. Careful and highly conscientious attention to checking nests is critical for data quality because the number of days that nests are observed with eggs or young is used to calculate daily mortality rates, the most effective measure of nest success (Hensler and Nichols 1981; Mayfield 1961, 1975). Moreover, nesting outcome is difficult to determine with increasing length of time between nest checks and variation at this stage can bias estimates of nest success. The fledging date should be identified as the date of the last visit on which nestlings were observed in the nest. Do not extrapolate past the last date that young were observed except when the average nesting cycle duration is used to determine the fledging date from the known initiation date. Otherwise, an upward bias on Mayfield estimates occurs. Prior to the field season, a sheet of information that summarizes the general clutch size, length of the incubation period, and length of the nestling period for every species that occurs on the study sites should be prepared. This information aids anticipation of hatching and fledging events.

Flagging or other visible markers can increase risk of predation (Picozzi 1975) and, hence, should be used with caution. When possible, memorize the area and write a description of how to find the nest using compass bearings and distance estimates (paces) from obvious landmarks or flagging placed greater than 10 m from the nest. Another solution is to grid permanently all study plots with numbered stakes at 25 or 50 m intervals depending on the density of the vegetation; 25 m intervals are usually best (see Ralph et al. 1993 for information on establishing permanently marked plots). Nest location can be described from these permanent markers.

Nest cards are used to record data about the nest site and nest activity. The Cornell Laboratory of Ornithology (159 Sapsucker Woods Rd., Ithaca, New York 14850) maintains a national nest card database and, thus, their card or some similar variant should be used. All observations of nests should be recorded on the nest card, including visits when no activity was noted. Noting lack of adult activity is particularly critical for canopy or cavity-nests where nest contents cannot be checked. All this

information is needed for calculating nesting success (see also Bart and Robson 1982). Recorded information should include date, time, presence of adults and activity of adults (e.g., incubating, feeding young, flushed from nest). Also, any time the nest is approached close enough to see the contents, they should be noted on the nest cards (number of eggs, or number and age of nestlings). Age of the nestlings helps determination of nest fate in some cases by providing information on length of time that nests were active. Also, data should be summarized by success at each nesting stage (egg-laying, incubation and nestling) and, thus, accurate records of these stages are needed. When possible, data should include date of first egg, clutch completion date, hatching date, day of banding (if banded) and fledging date. Careful and detailed observations should be recorded if a nest predation event is observed in action. If the nest appears inactive based on observations from a distance, it should be approached to verify mortality. In the case of canopy nests, mirrors attached to telescoping poles (we use window-washing poles) can be used to check nest contents of nests up to 10 m off ground. If the nest appears depredated (eggs or young removed) then check the nest structure and immediate area around and under the nest for evidence of predation. Look for holes in the bottom of the nest cup. Any evidence (e.g., shell fragments, hole in nest, nest torn up) should be fastidiously noted on the card. When the young fledge, they commonly perch on the side of the nest thereby flattening the nest and they leave fecal droppings in the nest or on the edge or ground and such should be noted as possible evidence of successful fledging. When a nest is thought to have fledged, however, observers should try to verify by watching for fledglings or parents feeding fledglings or by hearing parents giving alarm or distress calls or young begging. This activity usually occurs near the nest site because fledglings often do not move very far in the first couple of days. Some species such as Rufous-sided Towhees (*Pipilo erythrophthalmus*), however, may move as far as 100 m in less than a few hours. Care must be exercised in classifying nest fate because some species or individuals may carry food up to 24 h or longer after predation of their nest. This behavior may be exacerbated by unrelated fledgings from neighboring territories. Descriptive confirmatory evidence of fledging should be noted on the nest cards.

PRECAUTIONS FOR MINIMIZING HUMAN-INDUCED MORTALITY

Locating and monitoring nests have the potential to reduce nest success (Gotmark 1992) but with proper precautions such biases can be eliminated or minimized (Martin and Roper 1988, Nichols et al. 1984, Willis 1973). Some investigators use camouflage netting over their heads or attached to camouflaged hats to reduce disturbance to birds. Initial location of the nest normally creates the most distress to adult birds and disturbance to the nest site because subsequent visits are brief. Some evidence suggests that predation rates are higher on the first or early visits than subsequent visits (Bart 1977, Nolan 1978, but see Bart and Robson 1982), perhaps caused by the disturbance during locating the nest. Therefore the following

guidelines are suggested when attempting to locate nests. (1) Distress calls by adults should be minimized and never allowed to continue for over 5 min. (2) Do not approach a nest when any potential nest predator, particularly a visually-oriented predator (e.g., corvid) is present. (3) Minimize disturbance to the area around the nest. (4) Do not get close to nests during nest building; birds will abandon if disturbed prior to egg-laying, particularly during the early part of a season.

To lower the probability of predation or brood parasitism during checks, we recommend the following precautions. (1) Check the nest from as great a distance as possible. Use binoculars to see the female or contents of the nest or get on logs and look from above into the nest when possible to minimize proximity and disturbance near the nest. (2) Disturb the birds and area as little as possible. Move to nests in different paths on subsequent visits and use a path that is quick, quiet and that minimizes disturbance to the vegetation; paths in the vegetation from broken stems or smashed grass/forbs can cue possible predators. Never leave a dead end trail to the nest. Do not return on the same path but continue walking in a different direction away from the nest. If avian predators are common, check other bushes without nests. Always assume a predator is watching. (3) Be quick and accurate during nest checks and nestling banding. If the nest must be approached, minimize the amount of time spent near the nest examining the contents because the more time spent at nest the more scent that is left for olfactory predators. (4) Minimize the number of observers visiting the nest (no photographers). (5) Use a pen or stick to check nests to prevent human scent from being left on or near a nest.

VEGETATION MEASUREMENT

As soon as a nesting attempt terminates (successful or unsuccessful), complete the nest card and then measure the vegetation associated with the nest. Be careful at the beginning of the season (May to early June), as an empty nest may not have had eggs laid yet; some species or individuals will delay as long as 8 d between completing nests and laying eggs. Do not bother nests at this stage, unless it is certain a nesting attempt was made and failed.

Vegetation should be measured for the nest substrate and surrounding patch. Vegetation in the patch surrounding the nest can provide information on microhabitat choices. Species that choose the same plant species as a nest substrate may choose different microhabitat types (Martin 1993c, unpubl. data). Moreover, vegetation in the habitat patch surrounding a nest may exert a strong influence on probability of mortality. For example, numbers of potential nest sites (stems of the same size and plant species as used for the nest) in the patch surrounding the nest may affect predation risk (Martin 1988c, 1992, 1993c; Martin and Roper 1988). Hence, determination of habitat patch preferences is important for developing land management guidelines and testing habitat selection theories. Comparisons of nest patch characteristics to unused patches or to patches used across the range of species may provide important insight into habitat

preferences (e.g., see James et al. 1984; Knopf et al. 1990; Martin 1988c, 1992, 1993c; Martin and Roper 1988). Standardized vegetation sampling methods should be used to allow comparisons among locations and investigators. Details of the vegetation sampling protocols used by the national BBIRD program are available from Martin upon request.

In conclusion, nest-monitoring plots can provide valuable data on the habitat influences on nesting productivity and possible causes underlying population trends. Constant-effort mist-netting schemes can provide an index of annual productivity (Ballie et al. 1986, DeSante and Geupel 1987) and also some information on adult and juvenile survivorship. These methods, however, do not necessarily provide information on the types of habitat conditions that facilitate increased nesting productivity. Nest-monitoring is more labor-intensive but provides direct information on both productivity and habitat conditions that facilitate maintenance of viable populations, thereby providing direct land management information. Moreover, nest-monitoring is the only way to ascertain the rate and consequences of cowbird parasitism. Finally, nest-monitoring provides badly needed data on life history traits of species, which allows identification of bottlenecks in the demography of species and, also, when taken together with nesting success may provide important insight into vulnerability of populations to disturbance (see Martin 1993a).

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BURROWING OWL SURVEY PROTOCOL AND MITIGATION GUIDELINES

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INTRODUCTION

The California Burrowing Owl Consortium developed the following Survey Protocol and Mitigation Guidelines to meet the need for uniform standards when surveying burrowing owl *(Speotyto cunicularia)* populations and evaluating impacts from development projects. The California Burrowing Owl Consortium is a group of biologists in the San Francisco Bay area who are interested in burrowing owl conservation. The following survey protocol and mitigation guidelines were prepared by the Consortium's Mitigation Committee. These procedures offer a decision-making process aimed at preserving burrowing owls in place with adequate habitat.

California's burrowing owl population is clearly in peril and if declines continue unchecked the species may qualify for listing. Because of the intense pressure for development of open, flat grasslands in California, resource managers frequently face conflicts between owls and development projects. Owls can be affected by disturbance and habitat loss, even though there may be no direct impacts to the birds themselves or their burrows. There is often inadequate information about the presence of owls on a project site until ground disturbance is imminent. When this occurs there is usually insufficient time to evaluate impacts to owls and their habitat. The absence of standardized field survey methods impairs adequate and consistent impact assessment during regulatory review processes, which in turn reduces the possibility of effective mitigation.

These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or the resources that support them. The process begins with a four-step survey protocol to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Each project and situation is different and these procedures may not be applicable in some circumstances. Finally, these are not strict rules or requirements that must be applied in all situations. They are guidelines to consider when evaluating burrowing owls and their habitat, and they suggest options for burrowing owl conservation when land use decisions are made.

Section 1 describes the four phase Burrowing Owl Survey Protocol. Section 2 contains the Mitigation Guidelines. Section 3 contains a discussion of various laws and regulations that protect burrowing owls and a list of references cited in the text.

We have submitted these documents to the California Department of Fish and Game (CDFG) for review and comment. These are untested procedures and we ask for your comments on improving their usefulness.

SECTION 1 BURROWING OWL SURVEY PROTOCOL

PHASE I: HABITAT ASSESSMENT

The first step in the survey process is to assess the presence of burrowing owl habitat on the project site including a 150-meter (approx. 500 ft.) buffer zone around the project boundary (Thomsen 1971, Martin 1973).

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat: both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by an observation of at least one burrowing owl, or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

The Phase II burrow survey is required if burrowing owl habitat occurs on the site. If burrowing owl habitat is not present on the project site and buffer zone, the Phase II burrow survey is not necessary. A written report of the habitat assessment should be prepared (Phase IV), stating the reason(s) why the area is not burrowing owl habitat.

PHASE II: BURROW SURVEY

1. A survey for-burrows and owls should be conducted by walking through suitable habitat over the entire project site and in areas within 150 meters (approx 500 ft.) of the project impact zone. This 150-meter buffer zone is included to account for adjacent burrows and foraging habitat outside the project area and impacts from factors such as noise and vibration due to heavy equipment which could impact resources outside the project area.

2. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.), and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more surveyors conduct concurrent surveys. Surveyors should maintain a minimum distance of 50 meters (approx. 160 ft.) from any owls or occupied burrows. It is important to minimize disturbance near occupied burrows during all seasons.

3. If burrows or burrowing owls are recorded on the site, a map should be prepared of the burrow concentration areas. A breeding season survey and census (Phase III) of burrowing owls is the next step required.

4. Prepare a report (Phase IV) of the burrow survey stating whether or not burrows are present.

5. A preconstruction survey may be required by project-specific mitigations no more than 30 days prior to ground disturbing activity.

PHASE III: BURROWING OWL SURVEYS, CENSUS AND MAPPING

If the project site contains burrows that could be used by burrowing owls, then survey efforts should be directed towards determining owl presence on the site. Surveys in the breeding season are required to describe if, when, and how the site is used by burrowing owls. If no owls are observed using the site during the breeding season, a winter survey is required.

Survey Methodology

A complete burrowing owl survey consists of four site visits. During the initial site visit examine burrows for owl sign and map the locations of occupied burrows. Subsequent observations should be conducted from as many fixed points as necessary to provide visual coverage of the site using spotting scopes or binoculars. It is important to minimize disturbance near occupied burrows during all seasons. Site visits must be repeated on four separate days. Conduct these visits from two hours before sunset to one hour after or from one hour before to two hours after sunrise. Surveys should be conducted during weather that is conducive to observing owls outside their burrows. Avoid surveys during heavy rain, high winds (> 20 mph), or dense fog.

Nesting Season Survey. The burrowing owl nesting season begins as early as February 1 and continues through August 31 (Thomsen 1971, Zam 1974). The timing of nesting activities may vary with latitude and climatic conditions. If possible, the nesting season survey should be conducted during the peak of the breeding season, between April 15 and July 15. Count and map all burrowing owl sightings, occupied burrows, and burrows with owl sign. Record numbers of pairs and juveniles, and behavior such as courtship and copulation. Map the approximate territory boundaries and foraging areas if known.

Survey for Winter Residents (non-breeding owls). Winter surveys should be conducted between December 1 and January 31, during the period when wintering owls are most likely to be present. Count and map all owl sightings, occupied burrows, and burrows with owl sign.

Surveys Outside the Winter and Nesting Seasons. Positive results, (i.e., owl sightings)- outside of the above survey periods would be adequate to determine presence of owls on site. However, results of these surveys may be inadequate for mitigation planning because the numbers of owls and their pattern of distribution may change during winter and nesting seasons. Negative results during surveys outside the above periods are not conclusive proof that owls do not use the site.

Preconstruction Survey. A preconstruction survey may be required by project-specific mitigations and should be conducted no more than 30 days prior to ground disturbing activity.

PHASE IV: RESOURCE SUMMARY, WRITTEN REPORT

A report should be prepared for CDFG that gives the results of each Phase of the survey protocol, as outlined below.

Phase I: Habitat Assessment

1. Date and time of visit(s) including weather and visibility conditions; methods of survey.

2. Site description including the following information: location, size, topography, vegetation communities, and animals observed during visit(s).

3. An assessment of habitat suitability for burrowing owls and explanation.

4. A map of the site.

Phase II: Burrow Survey

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. A more detailed site description should be made during this phase of the survey protocol including a partial plant list of primary vegetation, location of nearest freshwater (on or within one mile of site), animals observed during transects.

3. Results of survey transects including a map showing the location of concentrations of burrow(s) (natural or artificial) and owl(s), if present.

Phase III: Burrowing Owl Surveys, Census and Mapping

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. Report and map the location of all burrowing owls and owl sign. Burrows occupied by owl(s) should be mapped indicating the number of owls at each burrow. Tracks, feathers, pellets, or other items (prey remains, animal scat) at burrows should also be reported.

3. Behavior of owls during the surveys should be carefully recorded (from a distance) and reported. Describe and map areas used by owls during the surveys. Although not required, all behavior is valuable to document including feeding, resting, courtship, alarm, territorial, parental, or juvenile behavior.

4. Both winter and nesting season surveys should be summarized. If possible include information regarding productivity of pairs, seasonal pattern of use, and include a map of the colony showing territorial boundaries and home ranges.

5. The historical presence of burrowing owls on site should be documented, as well as the source of such information (local bird club, Audubon society, other biologists, etc.).

Burrowing: Owl Survey Protocol

April 1993

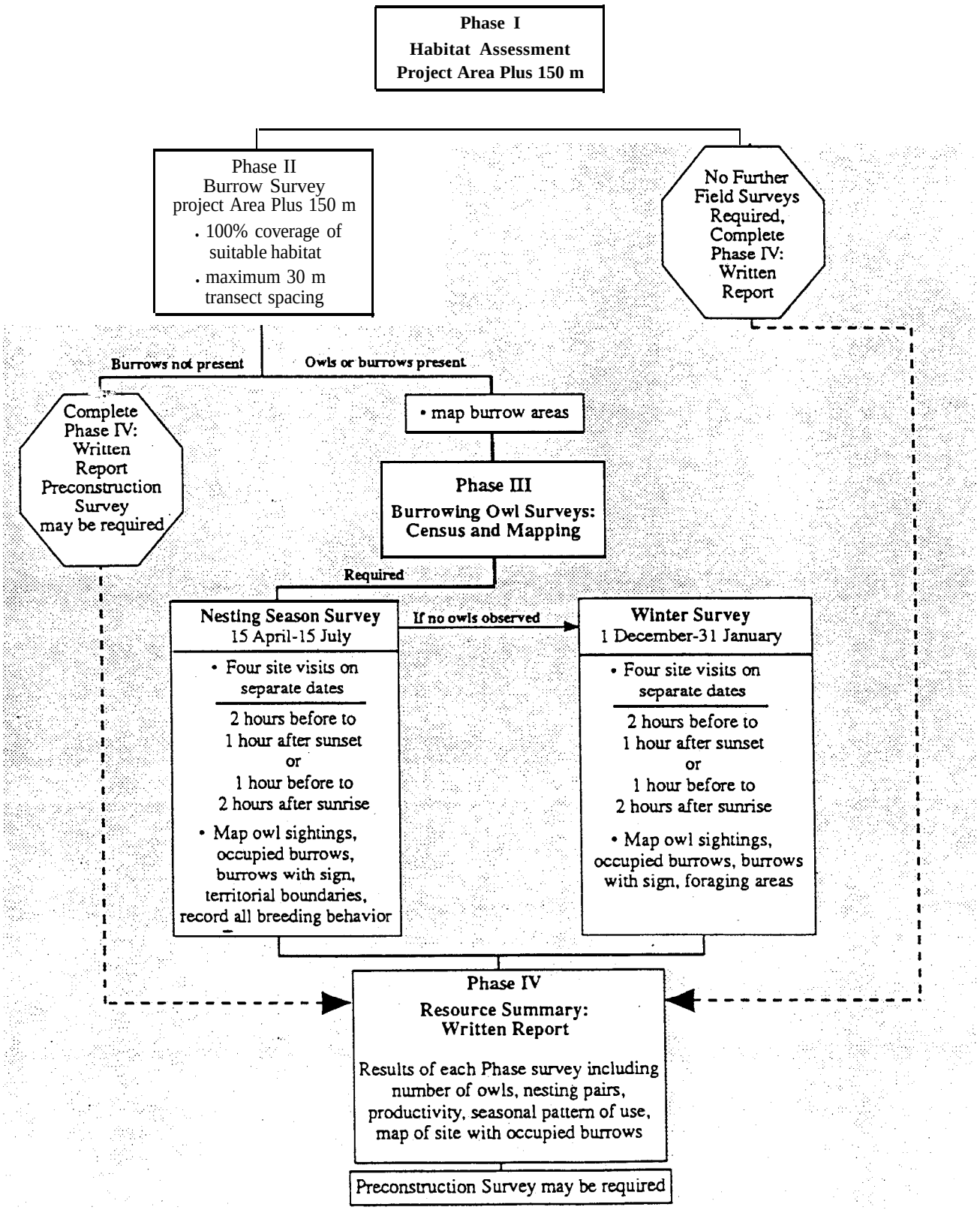

Figure 1.

SECTION 2 BURROWING OWL MITIGATION GUIDELINES

The objective of these mitigation guidelines is to minimize impacts to burrowing owls and the resources that support viable owl populations. These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or their resources. The process begins with a four-step survey protocol (see *Burrowing Owl Survey Protocol)* to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures described below are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Mitigation actions should be carried out prior to the burrowing owl breeding season, generally from February 1 through August 31 (Thomsen 1971, Zarn 1974). The timing of nesting activity may vary with latitude and climatic conditions. Project sites and buffer zones with suitable habitat should be resurveyed to ensure no burrowing owls have occupied them in the interim period between the initial surveys and ground disturbing activity. Repeat surveys should be conducted not more than 30 days prior to initial ground disturbing activity.

DEFINITION OF IMPACTS

1. Disturbance or harassment within 50 meters (approx. 160 ft.) of occupied burrows.

2. Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to burrowing owls.

3. Degradation of foraging habitat adjacent to occupied burrows.

GENERAL CONSIDERATIONS

1. Occupied burrows should not be disturbed during the nesting season, from February 1 through August 31, unless the Department of Fish and Game verifies that the birds have not begun egg-laying and incubation or that the juveniles from those burrows are foraging independently and capable of independent survival at an earlier date.

2. A minimum of 6.5 acres of foraging habitat, calculated on a 100-m (approx. 300 ft.) foraging radius around the natal burrow, should be maintained per pair (or unpaired resident single bird) contiguous with burrows occupied within the last three years (Rich 1984, Feeney 1992). Ideally, foraging habitat should be retained in a long-term conservation easement.

3. When destruction of occupied burrows is unavoidable, burrows should be enhanced (enlarged or cleared of debris) or created (by installing artificial burrows) in a ratio of 1:1 in adjacent suitable habitat that is contiguous with the foraging habitat of the affected owls.

4. If owls must be moved away from the disturbance area, passive relocation (see below) is preferable to trapping. A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows.

5. The mitigation committee recommends monitoring the success of mitigation programs as required in Assembly Bill 3180. A monitoring plan should include mitigation success criteria and an annual report should be submitted to the California Department of Fish and Game.

AVOIDANCE

Avoid Occupied Burrows

No disturbance should occur within 50 m (approx. 160 ft.) of occupied burrows during the non-breeding Season of September 1 through January 31 or within 75 m (approx. 250 ft.) during the breeding Season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird (Figure 2).

MITIGATION FOR UNAVOIDABLE IMPACTS

On-site Mitigation

On-site passive relocation should be implemented if the above avoidance requirements cannot be met. Passive relocation is defined as encouraging owls to move from occupied burrows to alternate natural or artificial burrows that are beyond 50 m from the impact zone and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated owls (Figure 3). Relocation of owls should only be implemented during the non-breeding season. On-site habitat should be preserved in a conservation easement and managed to promote burrowing owl use of the site.

Owls should be excluded from burrows in the immediate impact zone and within a 50 m (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances: One-way doors should be left in place 48 hours to insure owls have left the burrow before excavation. One alternate natural or artificial burrow should be provided for each burrow that will be excavated in the project impact zone. The project area should be monitored daily for one week to confirm owl use of alternate burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe or burlap bags should be inserted into the tunnels

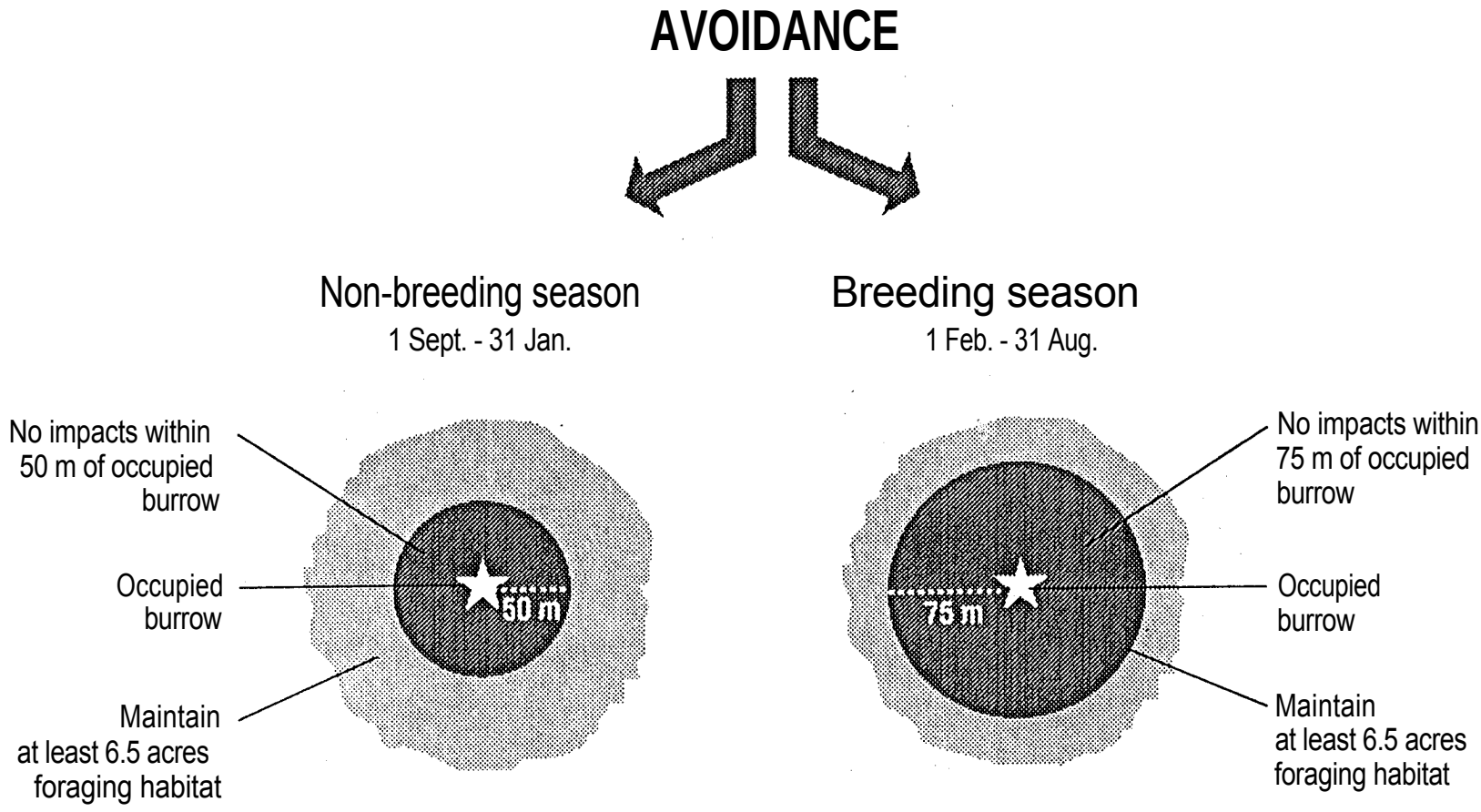

Figure 2. Burrowing owl mitigation guidelines.

ON-SITE MITIGATION
IF AVOIDANCE NOT MET

(More than 6.5 acres suitable habitat available)

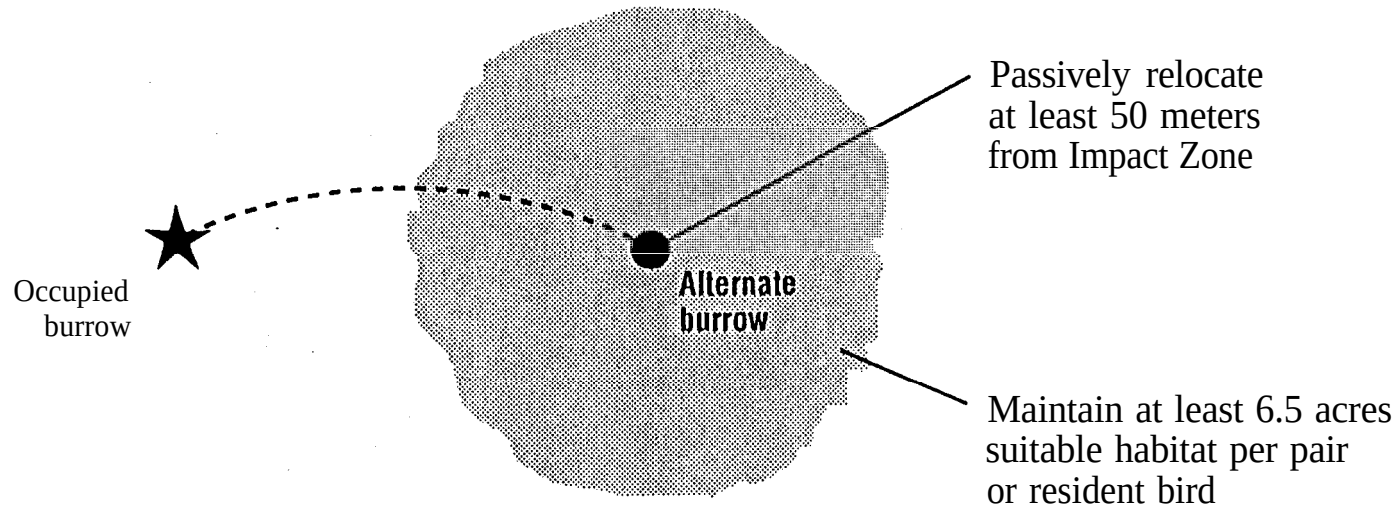

Figure 3. Burrowing owl mitigation guidelines.

during excavation to maintain an escape route for any animals inside the burrow.

Off-site Mitigation

If the project will reduce suitable habitat on-site below the threshold level of 6.5 acres per relocated pair or single bird, the habitat should be replaced off-site. Off-site habitat must be suitable burrowing owl habitat, as defined in the *Burrowing Owl Survey Protocol*, and the site approved by CDFG. Land should be purchased and/or placed in a conservation easement in perpetuity and managed to maintain suitable habitat. Off-site mitigation should use one of the following ratios:

1. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair or single bird.

2. Replacement of occupied habitat with habitat contiguous to currently occupied habitat: 2 times 6.5 (13.0) acres per pair or single bird.

3. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair or single bird.

SECTION 3 LEGAL STATUS

The burrowing owl is a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter, any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3503, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. Implementation of the take provisions requires that project-related disturbance at active nesting territories be reduced or eliminated during critical phases of the nesting cycle (March 1 - August 15, annually). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) or the loss of habitat upon which the birds depend is considered "taking" and is potentially punishable by fines and/or imprisonment. Such taking would also violate federal law protecting migratory birds (e.g., MBTA).

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001(c), 21083. Guidelines 15380, 15064, 15065). Avoidance or mitigation must be presented to reduce impacts to less than significant levels.

CEQA AND SUBDIVISION MAP ACT

CEQA Guidelines Section 15065 directs that a mandatory finding of significance is required for projects that have the potential to substantially degrade or reduce the habitat of, or restrict the range of a threatened or endangered species. CEQA requires agencies to implement feasible mitigation measures or feasible alternatives identified in EIR's for projects which will otherwise cause significant adverse impacts (Sections 21002, 21081, 21083; Guidelines, sections 15002, subd. (a)(3), 15021, subd. (a)(2), 15091, subd. (a).).

To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action." (Guidelines, Section 15.370).

Section 66474 (e) of the Subdivision Map Act states "a legislative body of a city or county shall deny approval of a tentative map or parcel map for which a tentative map was not required, if

it makes any of the following findings:... (e) that the design of the subdivision or the proposed improvements are likely to cause substantial environmental damage or substantially and avoidably injure fish and wildlife or their habitat". In recent court cases, the court upheld that Section 66474(e) provides for environmental impact review separate from and independent of the requirements of CEQA (Topanga Assn. for a Scenic Community v. County of Los Angeles, 263 Cal. Rptr. 214 (1989).). The finding in Section 66174 is in addition to the requirements for the preparation of an EIR or Negative Declaration.

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Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations

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Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations

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I. Purpose

This document identifies the minimum inventory and monitoring effort recommended for determining and evaluating potential Golden Eagle (*Aquila chrysaetos canadensis*) use of habitat including nest sites, roosts, and territories, as well as the rationale for identifying and evaluating foraging locations during breeding and non-breeding periods. It also outlines the minimum monitoring techniques to ascertain occupancy and reproductive success at territories. These field efforts are the mutual responsibility of agencies authorizing activities and their permittees (i.e. action agency; see Glossary). They are essential components for avoiding and minimizing disturbance and other kinds of take, including lethal take, and are a necessary component of short and long-term site specific monitoring and management of local Golden Eagles and regional Golden Eagle populations. The data gathered will provide information on the baseline circumstances for evaluation of permit applications and foundation for permit conditions, as well as assist planners so they may conduct informed impact analyses and mitigation during the National Environmental Policy Act (NEPA) process. Data collected via this effort will also help:

1. Determine the fate and reproductive trends of regional nesting populations via collating information from observed territories;
2. Document and list historical and unsurveyed habitat for future analysis to assist in determining local and regional population trajectories;
3. Provide information to document whether local Golden Eagle conservation efforts are meeting goals for improvements in the status of the species; and
4. Provide a foundation for evaluation of whether and which activities or conditions may be affecting Golden Eagles.

II. Background

Golden Eagles are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (Eagle Act), both of which prohibit take. Take means *pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest,* or *disturb*. When the Bald Eagle (*Haliaeetus leucocephalus*) was delisted under the Endangered Species Act (ESA), and in order to improve management of both species of eagles under the Eagle Act, the U.S. Fish and Wildlife Service (Service) undertook a series of management actions, including:

- **Codifying a regulatory definition of "disturb"** under the Eagle Act (see 72 FR 31132, June 5, 2007). *Disturb* means to agitate or bother a Bald Eagle or a Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest

abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

- **Proposing permit regulations** to (1) Create a new permit type to authorize take of Bald Eagles and Golden Eagles that is associated with, but not the purpose of, the activity; and (2) Create a second new permit type to authorize purposeful take of eagle nests that pose a threat to human or eagle safety (subsequently broadened to accommodate additional circumstances). The regulations were finalized on September 11, 2009 (74 FR 43686).

Summary of the new regulations.

Permits issued under 50 CFR § 22.26 authorize take of Bald Eagles and Golden Eagles, where the take is associated with, but not the purpose of the activity, and cannot practicably be avoided. Most take authorized under this section will be in the form of disturbance; however, permits may authorize lethal take that results from, but is not the purpose of, an otherwise lawful activity. Purposeful take will not be authorized under § 22.26.

The second new permit regulation, at 50 CFR 22.27, establishes permits for removing eagle nests where (1) necessary to alleviate a safety hazard to people or eagles, (2) necessary to ensure public health and safety, (3) the nest prevents the use of a pre-existing human-engineered structure, or (4) the activity, or mitigation for the activity, will provide a net benefit to eagles. Only inactive nests during the non-breeding season may be taken, except in the case of safety emergencies.

Regulations under § 22.27 authorize removal and/or relocation of active and inactive eagle nests in cases where genuine safety concerns for people, eagles, or both, necessitate the take. Examples include: (1) a nest tree that appears likely to topple onto a residence; (2) at airports to avoid collisions between eagles and aircraft; and (3) to relocate a nest built within a reservoir that will be flooded.

Both regulations are provided for by the Eagle Act which gives the Secretary of the Interior the authority to permit the limited take of Bald Eagles and Golden Eagles "for the protection of... other interests in any particular locality." Additionally, both new regulations:

- Are applicable to Golden Eagles as well as Bald Eagles.
- Authorize take only where it is compatible with the preservation of the eagle. For purposes of these regulations, "compatible with the preservation of the Bald Eagle and the Golden Eagle" means consistent with the goal of stable or increase of breeding populations.
- Authorize take only where it cannot practicably be avoided.

- Include provisions for programmatic take. Programmatic take (take that is recurring and not in a specific, identifiable timeframe and/or location) will be authorized only where it is unavoidable despite implementation of comprehensive measures developed in cooperation with the Service to reduce the take below current levels.

Additional needs for Golden Eagle information and evaluation.

As part of an adaptive management approach to the permits and eagle management, the Service will assess, at least every five years, overall population trends along with annual report data from permittees and other information to assess how likely future activities are to result in the loss of one or more eagles, a decrease in productivity of Golden Eagles, and/or the permanent loss of a nest site, territory, or important foraging area. Therefore, implementation of the new permit regulations will entail requirements for cumulative effects analyses and identifying the impacts of an activity. We include them here to provide the context and framework for the protocols and recommendations in this document.

Cumulative effect considerations.

Whether the take is compatible with eagle preservation includes consideration of the cumulative effects of other permitted take and additional factors affecting eagle populations. Cumulative effects are defined as: *"the incremental environmental impact or effect of the proposed action, together with impacts of past, present, and reasonably foreseeable future actions"* (50 CFR 22.3). Numerous relatively minor disruptions to eagle behaviors from multiple activities, even if spatially or temporally distributed, may lead to disturbance that would not have resulted from fewer or more carefully sited activities. The accumulation of multiple land development projects or siting of multiple infrastructures that may be hazardous to eagles can cumulatively reduce the availability of alternative sites suitable for breeding, feeding, or sheltering, resulting in a greater than additive risk of take to eagles.

To ensure that impacts are not concentrated in particular localities to the detriment of locally-important eagle populations, cumulative effects need to be considered at the population management level—*Service Regions* for Bald Eagles and *Bird Conservation Regions* for Golden Eagles—and, especially for project-specific analyses, at local area population levels (the population within the average natal dispersal distance of the nest or nests under consideration). Eagle take that is concentrated in particular areas can lead to effects on the larger management population because 1) disproportionate take in local populations where breeding pairs are 'high' producers may reduce the overall productivity of the larger population; and 2) when portions of the management population become isolated from each other the productivity of the overall management population may decrease.

Identifying the Impacts of the Activity

The applicant for an Eagle Act permit (who can be a project proponent or the agency preparing the NEPA), has four subtasks to determine the likely effects of a project or activity on eagles:

a. Collection and synthesis of biological data. The applicant is responsible for providing up-to-date biological information about eagles that breed, feed, shelter, and/or migrate in the vicinity of the activity that may potentially be affected by the proposed activity. Biological information can include locations and distribution of nests, delineation of territories, prey base, general composition and relative abundance, and productivity data.

b. Identifying activities that are likely to result in take. As part of the permit application, the applicant must include a complete description of the actions that: (1) are likely to result in eagle take, and (2) for which the applicant or landowner has some form of control. For most applications, the activity will be specific and well-defined (e.g., home construction; water use development) or land use activity (e.g., forestry). For larger-scale permits, each applicant will need to determine the extent of impacts to include in the permit authorization and, if necessary, which ones to exclude.

c. Avoidance and minimization measures. An application for a § 22.26 permit must document the measures to which the applicant will commit to avoid and minimize the impacts to eagles to the maximum degree practicable.

d. Quantifying the anticipated take. The take authorized under a permit will depend on a variety of factors, including: (1) the number of eagles that breed, feed, shelter, and or migrate within the activity area, (2) the degree to which the eagles depend on that area for breeding, feeding, or sheltering, or migration, and thus are more likely to be present and affected, (3) the potential of that type of activity in general to take eagles, (4) the scale of the activity, and (5) the measures the applicant will undertake to avoid and minimize the take.

Federal agencies have additional responsibilities to Golden Eagles under Executive Order 13186 (66 FR 3853, January 17, 2001), which reinstated the responsibilities of Federal Agencies to comply with the Migratory Bird Treaty Act of 1918. The Executive Order establishes a process for Federal Agencies to conserve migratory birds by avoiding or minimizing unintentional take and taking actions that benefit species to the extent practicable. Agencies are expected to take reasonable steps that may include restoring and enhancing habitat. Environmental analyses of Federal actions required by NEPA or other environmental review processes must evaluate the effects of actions and Federal agency plans on migratory birds, including Golden Eagles.

Golden Eagle populations are believed to be declining throughout their range in the contiguous United States (Harlow and Bloom 1989, Kochert and Steenhof 2002, Kochert et al. 2002, Good et al. 2007, Farmer et al. 2008, Smith et al. 2008, 74 FR 46836-46879). The Service has modeled current data (USFWS 2009, Appendix C), employing Moffat's equilibrium (Hunt 1998) and Millsap and Allen's (2006) analysis of anthropogenic demographic removal, and estimated that the floating (non-breeding and surplus) component of the Golden Eagle population in some areas may be limited at this time. Data from the Western EcoSystems Technology Inc. surveys from 2006 through 2009 suggest a decline since 2006 in the total Golden Eagle population within the area covered by the surveys (Neilson et al. 2010, USFWS 2009, Appendix C). Significant Golden Eagle breeding failures have been reported in some areas of the southwestern United States (WRI 2009), and declines in counts of migrating Golden Eagles have been reported in most areas in the western United States (Farmer et al. 2008, Smith et al. 2008), although it is unclear if the latter is linked to a decrease in the number of eagles.

III. Management Need

Prior to initiating inventory and monitoring efforts, land management agencies and/or proponents of land use activities should first assess all existing recent and historical data available on eagles, including their nests, reproductive activity and chronologies, natal dispersal, pertinent data from VHF and satellite telemetry, winter roosts, migration corridors, and foraging habitats contained by and 4 - 10 + miles of areas slated for development or authorizations for increased human activity. This background search of available information may yield few data, but is necessary to alert project proponents and regulatory staff about data gaps, and existing knowledge of Golden Eagles for that area. Inventory, monitoring, and research activities may then be identified and funded to fill in site specific information gaps to avoid take of Golden Eagles. Specific recommendations for the number of years needed for baseline data and measures to avoid take should be developed in coordination with the Service, and, to reduce redundancy between management and permitting requirements, consistent with permit requirements outlined in the Draft Implementation Guidelines for the new rules (expected fall 2010).

Projects in Golden Eagle breeding home ranges on federal, state, and private land possibly will have direct, indirect, and cumulative effects associated with or exacerbated by, factors such as: recreation disturbance, electrocution, urbanization, illegal shooting, invasive species altering prey densities, lead poisoning, other contaminants, climate change, and prolonged drought which affects predator and prey abundance and distribution. In many cases, existing data may not be adequate for NEPA, planning, or permitting purposes. Therefore, inventory and subsequent monitoring of Golden Eagles and components of their habitats are important to 1) develop a baseline prior to project planning and prior to project development in Golden

Eagle habitat, 2) analyze impacts to the species, 3) continue to evaluate and report on the effects of the action and mitigation on Golden Eagles, 4) essential to adaptive management approaches, and 5) provide information that may be required for permits.

Project design, type, and siting of project footprint and infrastructure are critical to avoid disturbance and take of Golden Eagles. In the Final Environmental Assessment on the rule and in the draft Implementation Guidance, the Service recommended that when planning locations of infrastructure and project boundaries, action agencies and project proponents consider life-history components such as productivity, age-class survival, dispersal, migration, winter-concentration behavior, and foraging behavior during breeding and non-breeding seasons to avoid lethal take. The Service recommends use of the best available or gathered information applicable to the location of the project or plan, but also encourages efforts to conduct further research. For permitting purposes however, and to determine the likelihood and magnitude of take, as well as effectiveness of mitigation, monitoring will need to yield productivity information.

Note: This document does not address site specific observations for transitory or wintering eagles; these protocols will be forthcoming. Although the life history for transitory and wintering eagles is not discussed at length here, that does not imply a lack importance for site-specific observations from the Service's perspective. The document provides general recommendations for factors to consider outside nesting, until more specific protocols are developed.

IV. Basic Golden Eagle Ecology

This account is not intended as a compendium of Golden Eagle natural history, biology, ethology, or ecology; please refer to Watson (1997), Palmer (1988) and Kochert et al. (2002) for more detailed information.

Where they exist, Golden Eagles are an upper-trophic aerial predator, and eat small to mid-sized reptiles, birds, and mammals up to the size of mule deer fawns and coyote pups (Bloom and Hawks 1982). They also are known to scavenge and utilize carrion (Kochert et al. 2002).

Golden Eagles nest in high densities in open and semi-open habitat, but also may nest at lower densities in coniferous habitat when open space is available, (e. g. fire breaks, clear-cuts, burned areas, pasture-land, etc.). They can be found from the tundra, through grasslands, woodland-brushlands, and forested habitat, south to arid deserts, including Death Valley, California (Kochert et al. 2002). Historically, Golden Eagles bred in the Plains and Great Lake states. Golden Eagles currently breed in and near much of the available open habitat in North America west of the 100th Meridian, as well as in eastern United States in the northern Appalachian Mountains (Palmer 1988, Kochert et al. 2002). The Lee and Spofford (1990) review

of the literature for the eastern portion of the United States suggested historical nesting Golden Eagles south of New York in the Appalachians was unlikely. Nesting of introduced Golden Eagles has been reported in Tennessee and northwestern Georgia (Kochert et al. 2002), but we do not know if those territories are still extant.

A nesting territory for the purpose of this monitoring protocol is an area that contains, or historically contained, one or more nests within the home range of a mated pair. It is a confined locality where nests are found, usually in successive years, and where no more than one pair is known to have bred at one time (Steenhof and Newton 2007).

Golden Eagles avoid nesting near urban habitat and do not generally nest in densely forested habitat. Individuals will occasionally nest near semi-urban areas where housing density is low and in farmland habitat; however Golden Eagles have been noted to be sensitive to some forms of anthropogenic presence (Palmer 1988). Steidl et al. (1993) found when observers were camped 400 meters from nests of Golden Eagles, adults spent less time near their nests, fed their juveniles less frequently, and fed themselves and their juveniles up to 67% less food than when observers were camped 800 meters from nests. In studies of Golden Eagle populations in the southwest (New Mexico and Texas) and the Front Range of the Rocky Mountains (New Mexico, Colorado and Wyoming), Boeker and Ray (1971) reported that human disturbance accounted for at least 85% of all known nest losses. Breeding adults are sometimes flushed from the nest by recreational climbers and researchers, sometimes resulting in the loss of the eggs or juveniles due to nest abandonment, exposure of juveniles or eggs to the elements, collapse of the nest, eggs being knocked from the nest by startled adults, or juveniles fledging prematurely. However, Golden Eagles rarely flushed from the nest during close approaches by fixed-wing aircraft and helicopters during various surveys in Montana, Idaho, and Alaska (Kochert et al. 2002).

Golden Eagles nest on cliffs, in the upper one third of deciduous and coniferous trees, or on artificial structures (windmills, electricity transmission towers, artificial nesting platforms, etc.; Phillips and Beske 1990, Kochert et al. 2002). Golden Eagles build nests on cliffs or in the largest trees of forested stands that often afford an unobstructed view of the surrounding habitat (Beecham 1970, Menkens and Anderson 1987). Usually, sticks and soft material are added to existing nests, or new nests are constructed to create a strong, flat or bowl shaped platform for nesting (Palmer 1988, Watson 1997, Kochert et al. 2002). Sometimes Golden Eagle will decorate multiple nests in a single year; continuing to do so until they lay eggs in the selected nest. The completed nest structure(s) can vary from large and multi-layered; or a small augmentation of sticks in caves with little material other than extant detritus (Ellis et al. 2009). Most Golden Eagle territories have up to 6 nests, but they have been found to contain up to 14 nests (Palmer 1988, Watson 1997, Kochert et al. 2002).

Onset of courtship and nesting chronology

Courtship for Golden Eagles involves stick-carrying, display flights, and vocalization (Ellis 1979, Kochert et al. 2002). Golden Eagles partake in undulating flight, however undulating flight has been observed year-round and is thought to be associated more with aggression and territory defense than with courtship (Newton 1979, Harmata 1982, Collopy and Edwards 1989, Watson 1997).

Nesting chronologies vary however there are some generalities. In California and in Texas, courtship at territories start in mid to late December (Palmer 1988, Hunt et al. 1997, D. Bittner pers. com); in Texas eggs have been detected as early as November (Olberholser and Kincaid 1974, *in lit.*). In Utah, courtship can commence in January. In northern tier states at upper latitudes and higher elevation sites, egg laying can occur as early as February and March, before late winter snows and storms have abated (Palmer 1988).

Golden Eagles lay 1 to 4 eggs, with 4 egg clutches rare. Most nests have 2 eggs. The laying interval between eggs ranges between 3 to 5 days. Incubation commences as soon as the first egg is laid, and hatching is asynchronous and can begin as early as late January in southern California (Dixon 1937, Hickman 1968), mid April to late May in southwest Idaho (Kochert et al. 2002) and late March–early May in central and northern Alaska (McIntyre 1995, Young et al. 1995; Fig. 3). In Texas, eggs have been noted from November to June (Oberholser and Kincaid 1974, in lit.). In the northeast United States, eggs have been laid in March/April (Palmer 1988). For more detail, please refer to Kochert et al. (2002, Appendix 2).

Migration and Wintering

Golden Eagles will migrate from the Canadian provinces and northern tier and northeastern states to areas that are milder in the winter and/or may have less snow cover. Wintering Golden Eagles have been noted in all states in the continental U.S. (Wheeler 2003, 2007). Some segments of the population can be found near their nest sites throughout the year. See Kochert et al. (2002) for detailed listing of winter range.

Roosts or gathering behavior

Golden Eagles are not known to roost communally as is common with wintering Bald Eagles in some areas of the United States, but will gather together if local food sources are abundant. A caveat to this is that Golden Eagles have perched with bald eagles where there have been large concentrations of waterfowl or carrion (Palmer 1988).

V. Golden Eagle Responses to Disturbance

Golden Eagles,visibly display behavior that signifies disturbance when they are stressed by anthropogenic activities; whether it is a lone hiker walking 1000 meters or more from a nest, or extended construction or recreation activities 2000 – 5000 meters from a territory. These postures, movements and behaviors can be overt. However with Golden Eagles, disturbance behaviors are often subtle and require an experienced observer. Olendorff (1971), Fyfe and Olendorff (1976), and Olsen and Olsen (1978) identified considerations when human interactions may disturb nesting activities, and how to ascertain critical distances to avoid agitating nesting, roosting, and foraging raptors. Factors affecting critical distances included:

1. Mannerisms of intruder,
2. Size of intruder,
3. Stage of breeding cycle, and
4. Topography and exposure of intruder in relation to bird.

Golden eagle behavior varies among individuals and can be affected by previous experiences. However, some behavioral generalities relative to direct and indirect disturbance include the following:

1. Agitation behavior (displacement, avoidance, and defense),
2. Increased vigilance at nest sites,
3. Change in forage and feeding behavior, and/or
4. Nest site abandonment.

Of the preceding behaviors, nest-site abandonment constitutes take under the Eagle Act, as it is specifically cited in the definition of 'disturb'. The other behaviors, when considered cumulatively, may be evidence that activities are interfering with normal breeding behavior and are likely to lead to take. Human intrusions near Golden Eagle nest sites have resulted in the abandonment of the nest; high nestling mortality due to overheating, chilling or desiccation when young are left unattended; premature fledging; and ejection of eggs or young from the nest (Boeker and Ray 1971, Suter and Joness 1981).

VI. Overall Objectives of the Golden Eagle Survey Protocol

This survey protocol is intended to standardize procedures to inventory and monitor Golden Eagles within the direct and indirect impact areas of planned or ongoing projects where disturbance or lethal take from otherwise permitted human activities is possible. This protocol will identify eagle use areas and identify and minimize potential observer-related disturbance to Golden Eagles by surveys when conducted by qualified and experienced raptor biologists.

Additionally, data collected using this protocol may be used for, at a minimum, 1), sampling other geographic areas where suitable habitat may be present; 2) short and long-term analysis of Golden Eagle occupancy and productivity at known nest sites, and historical locations where observation to determine occupancy maybe necessary; 3) identification and evaluation of potential disturbance factors. This protocol will standardize data collection for potential local and regional analysis of long-term occupancy, productivity and eagle use trends. It was developed as minimum standards, and as such may require additional area-specific detail if used for research purposes.

Objectives of inventory and monitoring

The first objective of these surveys is to provide methods to identify areas occupied by Golden Eagles and select factors their behavior ecology. Additional objectives of these surveys include the following.

1. Record and report occupancy and productivity of local Golden Eagle territories.
2. Document and list historical and unsurveyed habitat for future analysis to assist in determining local and regional population trajectories.
3. Determine nesting chronologies.
4. Provide information to document whether local Golden Eagle conservation efforts meet permit conditions or goals for improvements in the status of Golden Eagles.
5. Provide a foundation to evaluate whether and which activities or conditions may be affecting Golden Eagles.
6. Document foraging behavior, diet and habitat use within breeding and non-breeding home ranges.

VII. Inventory Techniques

CAUTION

Golden Eagles are one of several cliff and tree dwelling species sensitive to human disturbance. Monitoring eagles in a manner that 'disturbs' them, and causes them to be 'agitated or bothered' can cause nesting failure, and permanent site abandonment, constituting take under the Eagle Act.

These monitoring protocols should facilitate observer caution and identify techniques that will minimize potential for take of Golden Eagles. For additional information regarding preventing observer disturbance while surveying raptors, please refer to Fyfe and Olendorff (1976).

Inventory

Inventories for Golden Eagles should occur if nesting, roosting, and foraging habitat are contained within the project boundary and exist within 10 miles of the project boundary. Local and regional Golden Eagle habitat variability will dictate the distance from the project boundary where surveys will occur; distances will be greater in xeric or other habitats where local prey may not be abundant. The Service will be basing its site-specific evaluations and final determinations on local conditions, not national averages.

Nesting habitat

This account is not intended as a compendium of Golden Eagle habitat available and used in North America; please refer to Palmer (1988) and Kochert et al. (2002) for more detailed information.

Golden Eagles use a wide variety of habitat throughout North America. Small xeric mountain ranges in the Mohave and Great Basin deserts, forested habitat in the Pacific coastal, southern desert, Great Basin, Rocky, Sierra, and Cascade Mountain ranges are also key nesting areas. Local and regional variation of nesting habitat should be considered prior to surveys; however should include cliff, desert scrub, juniper woodland, and forested habitat. For example, in the northern Great Basin, Golden Eagles nest on cliff and in scrub-forest habitat; surveys of both types of substrates are urged prior to projects that have a potential to affect eagles. Identification criteria for nesting habitat at the local scale should take place in coordination with the Service, State, or Tribal wildlife agencies, and raptor experts.

VII.a. Procedures for aerial and ground inventory and monitoring surveys

Golden Eagles generally show strong fidelity to the nesting area annually. Occupancy determination is the most important goal of nest searches. Considerable suitable habitat exists in western North America that has never been adequately surveyed. Inventory surveys should examine habitat where Golden Eagles are not currently known to exist but habitat may be present, as well as previously inventoried areas to detect new activity. Monitoring surveys examine all historical and extant territories where Golden Eagles have been detected either previously or in the current survey.

A nesting territory or inventoried habitat should be designated as unoccupied by Golden Eagles ONLY after at least 2 complete aerial surveys in a single breeding season. In circumstances where ground observation occurs, at least 2 ground observation periods lasting at least 4 hours or more are necessary to designate an inventoried habitat or territory is unoccupied as long as all potential nest sites and alternate nests are visible and monitored. These observation periods should be at least 30 days apart for inventory, and at least 30 days apart for monitoring

of known territories. Intervals between observations at occupied nesting territories may need to be flexible and should be based on the behavior of the adults observed, the age of any young observed, and the data to be collected (see below, Section IX). Dates of starting and continuing inventory and monitoring surveys should be sensitive to local nesting (i.e. laying, incubating, and brooding) chronologies, and would be conducted during weather conditions favorable for aerial survey and/or monitoring from medium to long range distances (+ 300 – 700 meters).

The first inventory and monitoring surveys should be conducted during courtship when the adults are mobile and conspicuous. When survey of historical territories is conducted, observers should focus their search on known alternative nests, and also carefully examine the habitat for additional nests which may have been overlooked or recently constructed. A 'decorated' nest will be sufficient evidence to indicate the probable location of a nesting attempt. If a decorated nest or pair of birds is located, the search can then be expanded to inventory likely habitat adjacent to the discovered territory to see if additional golden eagle territories can be observed.

Note: Identification of alternate nests will be required by the Service for determination of relative value of individual nests to a territory in cases of applications for permits to take 'inactive' nests, and when determining whether abandonment of a particular nest is likely to result in abandonment of a territory. The Service has determined that territory loss or permanent abandonment of a territory is a greater impact to populations than temporary abandonment of a nest.

Weather: Avoid searching potential and known nesting locations during periods of heavy rain, snow, high winds, or severe cold weather. Golden Eagles should not be induced to flush at any time during the survey period. Flushing when the adults are incubating or have small young can be particularly hazardous for successful nesting, and could constitute lethal disturbance take. High temperatures also may cause problems for successful viewing over long distances due to heat waves. Further, observer related incidences of causing flight of adults that are shading young to prevent overheating during high temperatures may cause mortality of the young. Observation for Golden Eagles during inclement weather is impractical, uncomfortable, and unsafe for Golden Eagles and observers. Weather will be recorded by the observer.

Time of day: Aerial surveys should be conducted at the beginning of the day if winds permit. Likewise, ground surveys should be initiated, where possible, in morning hours when the air is still to avoid heat waves. Prime observation periods are around dawn, or shortly thereafter. In some cases the angle of the sun in relation to the cliff can be a more important issue, and some cliffs are better observed in

afternoon light, however observations of adult behavior that are used to determine nesting chronologies may be conducted during most of the day. Observers should be aware of the angle of the sun in relation to the observation post and the nest. Some sites are plagued by afternoon winds, heat waves, or dust storms; local observation conditions should be taken into account prior to establishing viewing periods. Time of day will be recorded by the observer.

Time of year: Breeding surveys for Golden Eagles are latitude and elevation dependent; however, their nesting season ranges in the contiguous United States from 01 January to 31 August (Kochert et al. 2002). Nesting failures and seasonal variations should be considered as potential anomalies to 'normal' behavior and nesting chronologies. Dates to be used as a cut-off period for observation and reporting of nesting failures or non-nesting status will vary per region. The dates listed below are to be used as general guides, and should not be used as final nest site failure survey determination dates. Location-specific determination dates should be developed in coordination with the Service, State, or Tribal wildlife agencies, and raptor experts.

Duration of stay at observation points: Ground observers will survey from observation points for a minimum of 4 hours, unless observations yield Golden Eagle presence, or Golden Eagle behavior indicate eggs or young, or observation suggests the observer is disturbing the birds. Slowly walking and observing all potential nesting substrate can be used to completely inventory potential habitat. Observation periods may last longer as longer observation periods may be necessary to accurately determine nesting chronologies. Duration of stay at known or suspected territories during helicopter reconnaissance, or during ground observation periods will be recorded by the observer.

VII.b Aerial surveys

Helicopters are an accepted and efficient means to monitor large areas of habitat to inventory potential habitat and monitor known territories only if accomplished by competent and experienced observers. They can be the primary survey method, or can be combined with follow-up ground monitoring. Disturbance to eagles is minimal only WHEN accepted aerial practices and techniques are followed. NOTE: Ground surveys can be used when their use is more efficient, or when other circumstances (e.g. bighorn sheep lambing areas) require this method.

Coordination between state and federal agencies is an important aspect of aerial surveys to develop acceptable search criteria to be used for identifying likely suitable nesting habitat and

locating nests, as well as to be become acquainted with potential hazards and air space restrictions. Survey pilots should be aware of potential ground hazards within the habitat to be examined, including marked and unmarked transmission and wires. Other hazards to surveyors include rock-fall or tree fall from above the helicopter, raptors or other birds colliding with the helicopter, and collision with other aircraft. Although pilots are often the first to note a flying raptor during surveys, some accidents involving wildlife researchers have been attributed to the pilots focusing on the survey, rather than giving their complete attention to flying the helicopter.

Helicopters used for surveying Golden Eagle habitat should be light utility, small to medium sized (such as the MD-500/520, Eurocopter 145, Bell Jet-Ranger 206, or UH-72). The aircraft should be capable of vertical mobility in warm temperatures and at higher elevations. Inventories for raptors can be conducted with the main observer door(s) removed (which may provide more lateral and horizontal visibility), or with the doors closed. The decision regarding observer doors should remain a personal choice, with the safety of pilots and observers as the primary determinant.

Cliffs should be approached from the front, rather than flying over from behind, or suddenly appearing quickly around corners or buttresses. Inventories should be flown at slow speeds, ca. 30 – 40 knots. However, detection of nests may require slower speeds, e.g. 20 knots, while between nest speeds can be higher (+ 60 knots). All potentially suitable nesting habitats (as identified in coordination with the Service) should be surveyed; multiple passes at several elevation bands may be necessary to provide complete coverage when surveying potential nesting habitat on large cliff complexes, escarpments, or headwalls. Hovering for up to 30 seconds no closer than a horizontal distance of 20 meters from the cliff wall or observed nests may be necessary to discern nest type, document the site with a digital photograph of the nest, and if possible, allow for the observer to read patagial tags, count young, and age young in the nest (Hoechlin 1976). Confirmation of nest occupancy may be confirmed during later flights at a greater horizontal distance.

Re-nesting is rare, but Golden Eagles may fail at their first nest attempt, and move to, or create, an alternate nest site. Multiple visits to known or potential nesting habitat may be necessary to provide complete observation and coverage of habitat.

To inventory for the purpose of documenting presence/absence of Golden Eagles in potential habitat, at least 2 aerial observation flights of habitat are necessary. These flights will be spaced no closer than 30 days apart. Additional inventory work in the territory is not necessary after nests have been located where Golden Eagles are found incubating, or where eggs or young and number of eggs or young are noted. At this point, the observation effort should

switch to monitoring of the known territory. The nest location should be documented (see territory/nest naming convention, pp. 20.

Inventory and monitoring flights will be based on local knowledge of known nesting chronologies for that latitude and elevation, and should be timed to be the most efficient to reduce the number of visits to the nest site. Flights may occur preferentially during a) late courtship, b) egg-laying though hatch, and/or c) when the young are between 20 and 51 days old. Productivity surveys are best scheduled when the young are 51 days old or more, but prior to fledging. Aerial visits at known nests may be augmented or replaced by ground observation (see below).

Other raptors or special status species may be observed during the flight, and should be recorded/reported. Coordination with state and federal agencies will be necessary when state or federally listed Threatened, Endangered or special status (species of concern, sensitive, etc.) species are present in the flight survey area (i.e. big-horn sheep, peregrine falcons, etc.). Bighorn sheep share the same type of cliff complexes Golden Eagles use for nesting, and are hyper-sensitive to helicopters (Weyhausen 1980, Bleich et al. 1990). Specifically for bighorn sheep lambing areas, helicopter reconnaissance and surveys for Golden Eagles are not possible as these flights will induce unpermitted take during the lambing season; all helicopter survey work for Golden Eagles should be avoided in known lambing areas. Ground observation will be necessary for inventory of cliff complexes and monitoring of potential and known Golden Eagle territories in bighorn sheep lambing areas.

Most Golden Eagle respond to fixed wing aircraft and helicopters by remaining on their nests, and continuing to incubate or roost (DuBois 1984, McIntyre 1995). Perched birds may flush. During aerial surveys, deference to flying eagles should be given at all times. Flights at nest sites should be terminated and the helicopter should bank away and move to the next location if Golden Eagles appear to be disturbed; i.e. behavior that indicates the birds are agitated by the presence of the helicopter. In short, observers should obtain their data, and leave as soon as possible.

Any disturbance behavior observed should be noted so that consecutive aerial surveys would be sensitive to Golden Eagles at that location. Aerial reconnaissance to inventory/survey for potential habitat and additional visits at known nests may be augmented/replaced by ground observation from a safe distance (see below). Ground observation may be the recommended alternative to additional survey flights due to convenience or necessitated by other sensitive wildlife species. Follow-up ground observation from a safe distance may also be the recommended alternative for additional nest site monitoring.

Observers in helicopters have specific duties. At least two observers may be best for aerial surveys; one the lead observer, the other(s) supplement survey effort. One observer is assigned to record data on a recorder (unless the verbal interchange can be recorded on the helicopters internal communication system), and the other briefly records data on hard-copy and with digital photographs. Aerial observation routes should be recorded, downloaded, and reported using Global Positioning System track routes or applicable software programs. Observation locations and time-on-site should be recorded on applicable maps to ascertain coverage of cliff systems and other potentially suitable habitat.

Summary:

- Qualified observer(s) (as defined in section VIII).
- No closer than 10-20 meters from cliff; no farther than 200 meters from cliff (safety dependent).
- Close approach and extended hovering is allowed when there are no birds on the nest to allow observers to count eggs, dead young, or confirm nest failure.
- Multiple passes or 'bands' (back and forth at different elevations above ground level) of observation across cliff habitat may be necessary to achieve complete coverage of a large cliff complex.
- Occupied territories and current and alternative nest sites will be documented; nests containing fresh branches should also be delineated.
- After a nest with eggs, young, or an incubating adult has been located, there is no need to search for other nests within the territory.
- Minimal hovering time at a known or potential nest should be less than 30 seconds.
- At least 2 surveys of previously unsurveyed habitat will be spaced at least 30 days apart.

VII.c. Ground Surveys

Ground surveys of potential habitat

Ground surveys for Golden Eagles in potential habitat may be achieved without aerial support, or may be used to augment extant aerial surveys. Ground surveys to detect Golden Eagle nests and the selected nest at known territories are effective in habitat where observation points are established to observe areas on cliffs, utility towers, or in trees suspected to be nesting habitat. As with aerial surveys, identification criteria for nesting habitat should take place in coordination with the Service, State or Tribal wildlife agencies, and raptor specialists.

Observation posts (OPs) are established during initial reconnaissance of potential or known nest cliffs, and are established in locations that are far enough from the potential nest site to

effectively observe the behavior of the adults (if present) without disturbing nesting behavior. Well-placed OPs provide unobstructed viewing of the potential nest location or of the area to be surveyed; including a broad panorama of the surrounding habitat. Multiple OPs or walking surveys may be necessary to observe potential nest sites. OPs located in front of, and below the potential nest cliff or tree are best. Placing OPs below the potential nest cliff reduces stress if an incubating adult may be present. The distance from an OP to the potential nest site may range from 300 – 1600 meters (latter represents extreme circumstances) from the cliff base to the observer, and generally no greater than 700 meters.

Golden Eagles may use alternative nests. Detection of previously unknown alternate nests and observation of all known alternative nests will become important if Golden Eagles fail in their initial nesting attempt, or are not observed at the probable nest location.

Ground monitoring; known territories

Monitoring to document nesting success at known territories may occur solely via ground observations. Observation of known territories should use the methodology described for ground monitoring of potential habitat (see section VIIc). Dates of all visits to the nesting territory will be recorded; date of confirmation of nesting failure will be key data for site specific and regional analysis.

Nesting outcomes

Fledging success will be determined via the observation of young that are at least 51 days of age, or are known to have fledged from the observed nest. If there is whitewash (Golden Eagle defecation) and a well worn nest, young were previously observed in the nest to be > 4 weeks old during a previous visit, and the young would have been > 51 days old at the time of the visit, and no dead young are found after a thorough ground search, the nesting attempt can be deemed successful.

Nesting failure occurs when a nest where eggs were laid or where incubation behavior was observed fails to have any young reach 51 days of age. If necessary, nesting failure will be confirmed by using a spotting scope to view the nest to determine if dead young are observed. Nesting failures may also be determined if observations of the nest prior to the projected fledge date yields no young or fledglings where eggs or young were previously observed. In these instances observation periods should last 4 hours (consecutively), or are confirmed by aerial survey. If dead young are observed in the nest (i.e. all young are dead), monitoring efforts may cease. Nest failures may also be confirmed by an approach (walk-in) to the nest no more than 4 weeks after fledging was scheduled to occur. Observers will look for dead chicks at the base of the nest cliff or tree, where access is reasonable and safe.

Observers must document the criteria they use to conclude that success or failure occurred.

Summary

- Observation posts for monitoring known territories will be no closer than 300 meters for extended observations, and generally no further than 700 meters, where terrain allows. Maximum OP distance would be 1600 meters.
- To inventory and determine occupancy of cliff systems, there will be *at least* 2 observation periods per season. To determine fledging success, additional observations may (or may not) be necessary.
    - Observation periods will last at least 4 hours for known nest sites, or until territory occupancy can be confirmed.
    - Observation periods will last for at least 4 hours per 1.6 km of cliff system, based from the center point of that cliff complex.
    - Observation periods will be at least 30 days apart for monitoring efforts.
- To collect monitoring data at a known nest territory, there will be at least 2 observation periods per season.
    - Observation periods from ground observation points will last at least 4 hours for known nest sites or until nesting chronology can be confirmed per visit. Observation periods will be at least 30 days apart.

VIII. Observer qualifications

Surveyor experience affects the results of protocol-driven raptor surveys. All observers should have the equivalent of 2 seasons of intensive experience conducting survey and monitoring of Golden Eagle and/or cliff dwelling raptors. That experience may include banding, intensive behavioral monitoring, or protocol-driven survey work. Experience should be detailed and confirmed with references, and provided to action and regulatory agencies. All surveyors should be well-versed with raptor research study design and Golden Eagle behavior and sign, including nests, perches, mutes, feathers, prey remains, flight patterns, disturbance behavior, vocalizations, age determination, etc. **Aerial surveys will be conducted by raptor specialists who have at least 3 field seasons experience in helicopter-borne raptor surveys around cliff ecosystems.**

In lieu of limited or no Golden Eagle experience, ground surveyors should attend at least a 2-day Golden Eagle training session convened with classroom and field components; trainers will be designated by the USFWS/USGS. Inexperienced or limited experience surveyors will be mentored by Golden Eagle specialists for at least 1-2 field seasons, depending on their experience level, and should assist with the preparation of at least 3 surveys and reports over at least 3 years. A Golden Eagle specialist is defined as a biologist or ecologist with 5 or more years of Golden Eagle or cliff dwelling raptor research/survey experience, possession of

state/federal permit allowing capture, handling, and/or translocation of Golden Eagles and/or cliff dwelling raptors; and/or relevant research on raptors published in the peer reviewed literature.

IX. Documentation and accepted notation of territory/nest site and area surveyed

Data for each territory/nest site(s) and area visited will be reported annually to the applicable regional office of the USFWS Division of Migratory Bird Management for collation into a national database.

Minimum data collected at known Golden Eagle territories

Observation of potential sites and known nest territories will produce data helpful to determine territory occupancy, productivity, and fate of the nesting attempt. Each observation and all site specific data collected should include at least;

a) Date of observation,
b) Time of observation(s),
c) Weather during observation,
d) Duration of observation,
e) Name of observer(s),
f) Location of observation,
g) Description of observation.

Data collected during inventory and monitoring will include (at least) the following:

- Territory status [Unknown; Vacant; Occupied-1 eagle; Occupied-2 eagles- laying or non-laying; Breeding successful (chick observed to be at least +51 days-fledging), Breeding unsuccessful (failed-nesting attempt failed after eggs were laid)].
- Nest location (decimal degree lat/long or UTM).
- Nest elevation.
- Age class of Golden Eagles observed.
- Document nesting chronology;
    - Date clutch complete (estimated). Describe incubation behavior observed to derive this date, and/or use backdating from known nestling age);
    - Hatch date (estimated from age of nestlings);
    - Fledge date (known or estimated; see nesting outcomes, pp. 18);
    - Date nesting failure first observed and/or confirmed;
    - Number of young at each visit and at >51 days of age;
    - Digital photographs; a) landscape view of area inventoried, b) landscape view of territory, and c) nest(s); and
    - Substrate upon which the nest is placed (tree species, cliff, or structure).

Additional data that can be collected include (but are not limited to):

- Presence or absence of bands (USGS and VID), patagial tags (number and color), or telemetry unit;
- Forage location (if known);
- Prey items noted (if discerned);
- Height of nest on cliff or in tree, and description of technique used to estimate height;
- Species of tree, type of rock, or type of structure used to support the nest;
- Overall cliff or tree height, and description of technique used to estimate height;
- Nest aspect; and
- Other nesting raptors present nearby.

Each area surveyed under the requirements of this protocol, including surveyed habitat, occupied nesting territory, historical territory, and suspected/alternative nests will be recorded in a standardized manner to allow local, regional, and national data analysis.

Recommended Golden Eagle Territory/site naming convention:

XX^1-XXX^2-XXXXX/XX^3-XXX^4-XX^5 Territory name

XX^1 = State (two letter alpha)

XXX^2 = County (three letter alpha)

XX^3= USGS Quad [five numeric/two letter alpha] (when the territory straddles adjacent quad maps, the quad in which the first nest was found will be used to describe the territory; XX^5 is used to document the locations of alternate nests within a territory)

XXX^4=Assigned Territory number within USGS quad (three numeric)

XX^5=Assigned Nest number within territory in instances of alternate nests (two numeric)

Site name=traditional site name, or if new, use local naming convention (e.g. Upper fork Amundsen Creek, Fort Peck flatland, Farmer Jane's back 40)

Example CA-KER-38512/DG-03-02 Abbot Creek

X. Additional considerations

This interim document primarily contains methods for inventorying and monitoring at nest sites, but the prohibitions against take and the new regulations apply at nest sites and foraging areas, as well as during migration and other non-breeding times. The Service will develop or adopt recommendations for surveys applicable to non-nesting in other documents.

Suitable foraging habitat

Golden Eagles forage close to and far from their nests, i.e. < 6 km from the center of their territories, but have been observed to move 9 km from the center of their territories in favorable habitat (McGrady et al. 2002). These distances may be further in xeric habitat.

Suitable wintering habitat

During winter, Golden Eagles are found throughout the contiguous United States. Inventories for wintering Golden Eagles will encompass all habitat where Golden Eagles have been known to nest, roost, and forage. Refer to Wheeler (2003, 2007) for maps elucidating suitable wintering range.

Winter surveys

Survey information gathered during the non-breeding period is needed to identify foraging areas and determine numerical estimates of use by Golden Eagles. Presence of Golden Eagles during winter surveys does not necessarily mean that breeding individuals are present; however follow-up surveys during the breeding season are necessary to denote occupancy at suspected or known territories.

Migration surveys

The location of migration routes or areas in relation to a proposal that are likely to take Golden Eagles through injury or mortality may have critical implications. Therefore, evaluations should assess whether migratory or transient Golden Eagles are likely to be present during the construction and the life of the project. Other factors to consider include numbers of Golden Eagles moving through the project area, movement patterns (including a three-dimensional spatial analysis), time of day, and seasonal patterns. In the case of wind development, surveys will need to identify the locations of migration routes and movements during migration in relation to proposed turbines and rotor-swept area.

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XIII Glossary

Action agency – an agency or entity authorizing an action or plan, or providing funding for actions and plans.

Active nest (from the regulations**)** — a Golden Eagle nest characterized by the presence of any adult, egg, or dependent young at the nest in the past 10 consecutive days immediately prior to, and including, at present. Applies only to applications for permits to take eagle nests.

Breeding home ranges - the spatial extent or outside boundary of the movement of individuals from Golden Eagle pairs during the course of everyday activities during the breeding season.

Inactive nest (from the regulations**) —** a Golden Eagle nest that is not currently being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days immediately prior to, and including, at present. An inactive nest may become active again and remains protected under the Eagle Act.

Inventory –systematic observations of the numbers, locations, and distribution of Golden Eagles and eagle resources such as suitable habitat and prey in an area.

Local area population — the population within the average natal dispersal distance of the nest or nests under consideration (43 miles for bald eagles, 140 miles for golden eagles). Effects to the local area population are one consideration in the evaluation of the direct, indirect, and cumulative effects of take, and the mitigation for such take, under eagle take permits.

Migration corridors - the routes or areas where eagles may concentrate during migration. Golden Eagles begin migrating across a broad front, but tend to concentrate along leading lines (geographical features such mountain ridges) as they move between geographic locations. Golden Eagles are observed in largest numbers along north-south oriented mountain ranges where they soar on mountain updrafts. The species typically avoids lengthy water-crossings. In North America, migrating Golden Eagles concentrate along the Appalachian Mountains in the East and Rocky Mountains in the West.

Management agency - see Action Agency.

Monitoring - inventories over intervals of time (repeated observations), using comparable methods so that changes can be identified. Monitoring includes analysis of inventory data or measurements to evaluate change within or to defined metrics. Monitoring also includes repeated observations of a known nesting territory.

Occupied Nest – a nest used for breeding in the current year by a pair. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years' mutes (whitewash) suggest site occupancy. Additionally, for the purposes of these guidelines, all breeding sites

within a breeding territory are deemed occupied while raptors are demonstrating pair bonding activities and developing an affinity to a given area. If this culminates in an individual nest being selected for use by a breeding pair, then the other nests in the nesting territory will no longer be considered occupied for the current breeding season. A nest site remains occupied throughout the periods of initial courtship and pair-bonding, egg laying, incubation, brooding, fledging, and post-fledging dependency of the young.

Unoccupied Nests - those nests not selected by raptors for use in the current nesting season. Nests would also be considered unoccupied for the non-breeding period of the year. The exact point in time when a nest becomes unoccupied should be determined by a qualified wildlife biologist based upon observations and that the breeding season has advanced such that nesting is not expected. Inactivity at a nest site or territory does not necessarily indicate permanent abandonment.

Productivity — the mean number of individuals fledged per occupied nest annually.

Survey –is used when referring to inventory and monitoring combined.

APPENDIX E

DATA FORMS

Appendix E.1	USFWS Desert Tortoise Clearance Survey Reporting Data Sheet
Appendix E.2	Pre-construction Survey Form
Appendix E.3	Biological Monitor Daily Report Form
Appendix E.4	Construction Wildlife Incident Form

USFWS 2010 DESERT TORTOISE CLEARANCE SURVEY REPORTING DATA SHEET

Date of survey: _____ Survey biologist(s): _____ BO#: FWS-ERIV-08B0060-1 OF0878
(day, month, year) (name, email, and phone number)

Project Name:_____Site description:_____
(general location, size)

County:_____ Quad:_____ Zone: _____ Location:_____ Clearance #: _____
(UTM coordinates, lat-long, and/or TRS; datum) (Is this transect part of the 1st, 2nd, etc. clearance of project area?)

Live Tortoises

Detection number	Date	GPS location Easting	Northing	MCL (mm)	Existing tag # and color, if present	Transmitter #	Animal visually healthy (Y/N)	Disposition (<5km or >5km move)	If <5km move, Release site location Easting	Northing	If >5km move, blood sample #
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

2010 Field Season

GENESIS SOLAR ENERGY PROJECT
PRECONSTRUCTION BIOLOGICAL SURVEY FORM

Date (mmddyy) _____ Start Time _____ End Time _____
Weather Conditions _____ Start Temp _____ End Temp _____
Surveyors _____

Description of Area Surveyed (site # or include GPS coordinates)
_____

Habitat Description
_____

Desert Tortoise Sign Observed: ___(Y) ___ (N) (if yes , attach Tortoise Data Sheet)
Burrowing Owl Sign Observed: ___ (Y) ___ (N)
Mojave Fringe-Toed Lizard Observed ___ (Y) ___ (N)

Species Observed (attached additional sheet if necessary)

Plants	Animals

Site Information:

Overall habitat quality (circle one) Excellent Good Fair Poor
Current Land Use:
Surrounding Land Use:
Visible disturbance:
Threats:
Comments:

Photographs:

Subject	Location

Genesis Solar Energy Project

Biological Monitor (BM) Daily Report Date ____ /____ /_____

Monitor: _____
Weather Conditions : _____
High Temp.: _____Low Temp.:_____

Start Time: _____ Stop Time: _____
Attachments:_____
Photographs: _____

Sites Monitored

Circle One: **Plant Site** **Access Road** **Gas Line** **Transmission Line** **Other (explain)**

Activity Log: Note activities monitored and timing of each activity.

Monitor Checklist

General	Yes	No	N/A	Comments Attach Supplemental Report if needed
Workspace limits verified and properly marked?				
All activities within approved workspace limits?				
Only approved access roads utilized for ingress and egress?				
Access road signs in place?				
Trash and debris contained and disposed of in proper manner?				
Topsoil segregated properly?				
Topsoil segregation barriers maintained?				
All crew on site displaying hard-hat decals from WEAP training?				
Speed limit observed by all project personnel?				

Biological Issues	Yes	No	N/A	Comments Attach Supplemental Report if needed
Work area cleared by BM prior to construction activity beginning?				
Any desert tortoise or other T&E species encountered? If so, note species in comments and attach wildlife incident data form.				
Tortoise exclusionary fence and/or ramps intact?				
Any nesting birds observed? Note species (if known) and location.				
Common Ravens Present? If yes, note number and activity.				
All ESAs and other bio-related exclusion areas marked and avoided?				

Additional Notes: _____

Construction Wildlife Incident Form

***** All Fields Must Be Filled Out. Do Not Leave Any Field Blank. *****

INCIDENT DETAILS

Date: _____Observer:_____

Type of Incident (circle one): Injury / Fatality / Nest

Cause of Death: _____

Condition (circle one): Intact Carcass / Dismembered Carcass / Feathers Only

Photo No. _____

Carcass Condition Details, Behavior of Injured Animal, or Nest Details:

_____

_____

_____

LOCATION

DATUM: _____

UTM E: _____ UTM N: _____

Location Details (microhabitat, etc.):

_____

_____

_____

_____

IDENTIFICATION

Bird / Bat / Unknown / Other (circle one)

Species (if unknown, write 'unknown'):_____

Sex (circle one): Male / Female / Unknown

Age (circle one): Adult / Juvenile / Unknown

Is Animal Tagged? (circle one): Yes / No

Identification Remarks: _____

_____

_____

_____

ENVIRONMENTAL CONDITIONS

Weather (circle one): Clear / Fog / Cloudy / Rain

Approx. Temperature (circle one) °F / °C: _____

Wind (circle one): Calm / Gusty / Storm / Violent Storm

Habitat (circle all that apply):

Bare Ground / Creosote Bush Scrub / Sand Dune or Sand Sheet /

Playa / Ephemeral Wash / Desert Pavement

NOTIFICATION

Actions Taken (e.g., left in place, taken to rehab): _____

_____

_____