COMMON RAVEN MANAGEMENT PLAN
DESERT SUNLIGHT SOLAR FARM PROJECT
BLM CASE FILE NUMBER CACA-48649
RIVERSIDE COUNTY, CALIFORNIA

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List of Acronyms

AC	Alternating Current
ACEC	Area of Critical Environmental Concern
BLM	U.S. Bureau of Land Management
CDCA	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CHU	Critical Habitat Unit
CPUC	California Public Utility Commission
CRMP	Common Raven Management Plan
DB	Designated Biologist
DOI	U.S. Department of the Interior
DPV I	SCE's Devers to Palo Verde I transmission line
DWMA	Desert Wildlife Management Area
ECM	Environmental Compliance Manager
ESA	Endangered Species Act
I-10	Interstate 10
km	Kilometer
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
MVA	Mega-volt ampere
MW	Megawatt
MWD	Metropolitan Water District
O&M	Operations and Maintenance
PV	Photovoltaic
ROW	Right of Way
SBBM	San Bernardino Base and Meridian
SCE	Southern California Edison
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WEAP	Worker Education and Awareness Program
WRI	Wildlife Research Institute

1.0 Introduction

This discussion provides a brief summary of the project description for the Applicant and SCE project components of the Proposed Action. Complete details of project locations and description are found in the *Desert Sunlight Solar Farm Final Environmental Impact Statement* (BLM 2010) and in the Biological Assessment, *Desert Sunlight Solar Farm Project* (Ironwood 2010).

Desert Sunlight has applied to the BLM for an issuance of a right-of-way (ROW) grant that would authorize construction, operation, maintenance, and decommission of a commercial solar power-generating facility and new substation facility on over 7,600 hectares (19,000 acres) of BLM-managed lands. The proposed project is located in Riverside County, California, approximately 6 miles north of the rural community of Desert Center and approximately (10.5 km or 6.5 miles north of the Interstate 10 corridor (Figure 1). Project components generally include construction, operation, and maintenance of the solar farm site, a gen-tie transmission line, and construction, operation and maintenance of the Southern California Edison (SCE) Red Bluff substation and related components (Figure 2). While the Red Bluff substation is included as part of this project description for planning and environmental considerations, it would be constructed, owned, and operated by SCE, not by the Applicant.

The Project area and surrounding vicinity support desert tortoise (*Gopherus agassizii*) and common raven (*Corvus corax*). Ravens are efficient predators of desert tortoise and thrive in areas of human activity. In order to avoid unwanted indirect impacts to the resident desert tortoise population in the Project vicinity, specific measures to control ravens are required with construction of the Project. This Common Raven Management Plan (CRMP) summarizes the raven control measures that will occur at the pre-construction, construction, operations and maintenance (O&M), and decommissioning phases of the Proposed Action.

The purpose of the CRMP is to address direct impacts to desert tortoise by eliminating and minimizing subsidies to the maximum extent practicable. This Project-specific plan will protect juvenile and hatchling desert tortoises in the Project vicinity (within the immediate area of the Chuckwalla Valley) from increased predation by common ravens by eliminating or minimizing raven attractants and subsidies (e.g., surface water, trash and animal and plant waste materials; perching, nesting, and roosting sites) during construction, O&M, and decommissioning of the Project.

The objectives of this CRMP include:

1. Identifying the Project-specific conditions of concern that may attract ravens to the Project site and vicinity.
2. Providing specific management and control measures intended to avoid, minimize, and/or mitigate impacts.
3. Monitoring raven activity to measure the effectiveness of these measures. The monitoring effort is intended to provide qualitative data that can be interpreted by the Project's Environmental Compliance Manager or Designated Biologist to determine if existing Project design features to reduce raven subsidies are effective or if adaptive management is needed to meet these CRMP objectives.

DESERT SUNLIGHT
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Figure 1
Regional Location

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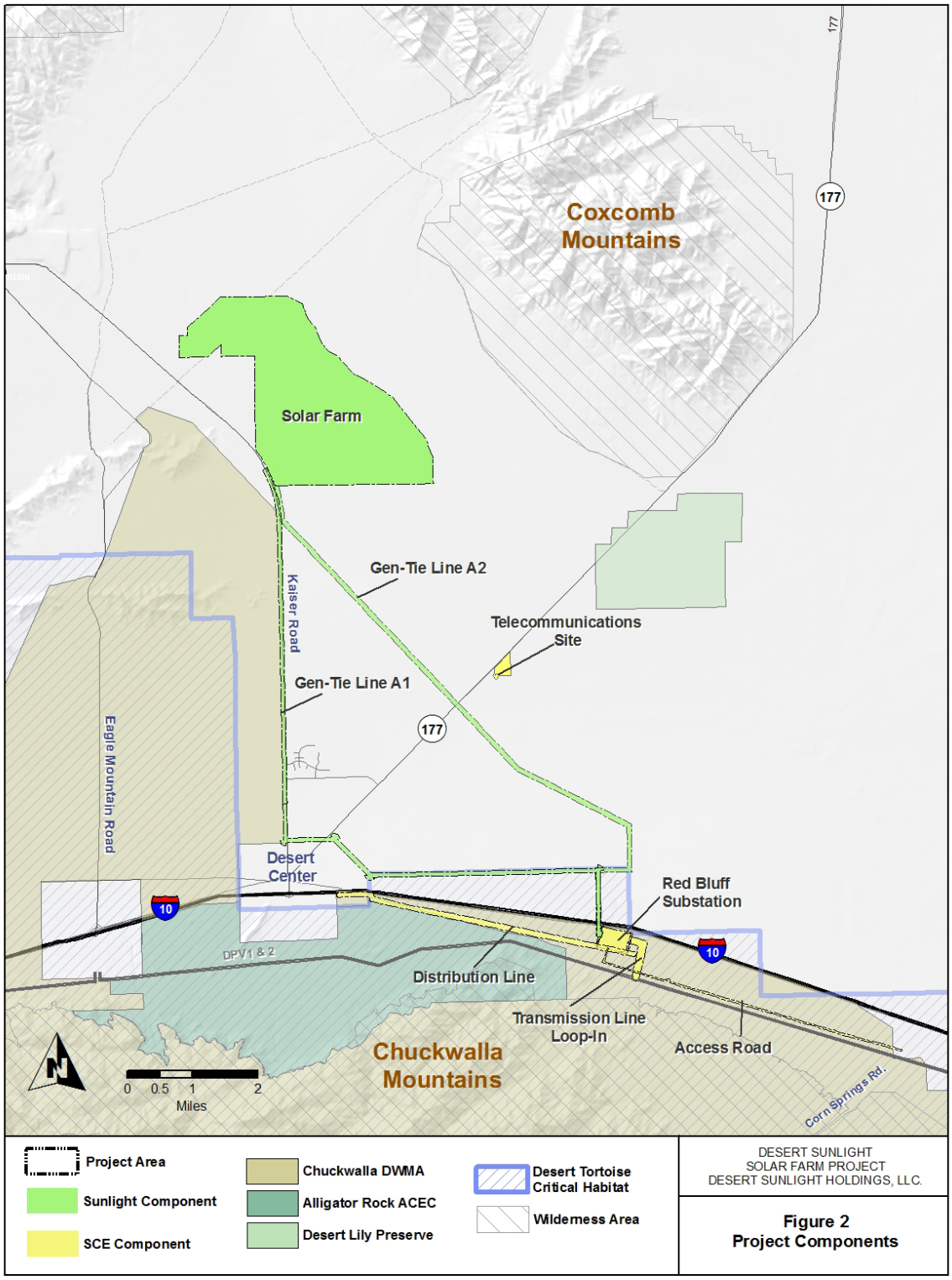

Coxcomb Mountains
Solar Farm
Gen-Tie Line A2
Telecommunications Site
Kaiser Road
Gen-Tie Line A1
Eagle Mountain Road
Desert Center
Red Bluff Substation
DPV1 & 2
Distribution Line
Transmission Line Loop-In
Access Road
Chuckwalla Mountains
Corn Springs Rd.
177
10
0 0.5 1 2
Miles
Project Area
Sunlight Component
SCE Component
Chuckwalla DWMA
Alligator Rock ACEC
Desert Lily Preserve
Desert Tortoise Critical Habitat
Wilderness Area
DESERT SUNLIGHT
SOLAR FARM PROJECT
DESERT SUNLIGHT HOLDINGS, LLC.
Figure 2
Project Components
Prepared by Ironwood Consulting, Inc. - Dec 16, 2010

2.0 Common Raven Biology

The common raven is resourceful and adaptable. It has a world-wide range that covers almost the entirety of North America, Europe, Siberia and Eastern Asia. Food sources vary greatly and the raven eats everything from grains to young livestock (Larsen 1970). The common raven population has soared over the last half-century with an estimated population increase in the Mojave and Colorado Deserts ranges from 700 to 1,500 percent (Boarman 1993; USFWS 2008a). The most widely accepted cause of this population growth is from human infrastructure expanding into the desert and a dependency on easy food sources found at landfills, illegal dump sites, and agricultural land (Boarman 1993).

The common raven in California has a unique genetic clade (ancestral grouping) that separates it from the other common ravens of North America and the world (USGS 2000). Although there are no superficial differences in appearance between the two populations, the California clade is actually a closer relative to the Chihuahuan Raven. In contrast, the Holarctic clade, the more common northern hemisphere raven, is more related to the Pied Crow (USGS 2000), which is not present in the Project region. The ranges of the two raven clades overlap but they do not interbreed. This indicates that the California clade is endemic (USGS 2000) to the state, although not to the desert regions, and requires careful management versus an exotic invader, which in most cases could be eradicated where it is becoming a problem to native wildlife.

The raven overpopulation at the edges of human settlements has resulted in ravens learning to identify food sources in desert areas, which they historically avoided, including preying on juvenile desert tortoises. Studies of the desert tortoise population indicate that uneven age classes exist within desert tortoise populations and very little recruitment (young entering the population) is occurring (USFWS 2008). Common ravens are known to prey on juvenile desert tortoises and an increase in the raven populations has had a negative effect on the number of young tortoises recruited into the population. The predation of juvenile tortoises by ravens led to creation of a plan to reduce raven predation, which was included and analyzed in the *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a). The purpose of this document is to outline measures that would reduce raven predation on hatchling and juvenile desert tortoises thereby increasing hatchling and juvenile desert tortoise survivorship and recruitment into the adult population, which is expected to contribute to the recovery of the species (USFWS 2008b).

Human subsidies that attract ravens include roads (where vehicles cause road kills or litter accumulates that provide forage), open water sources, trash, and structures suitable for sheltering and nesting (trees, radar towers, power poles, telephone poles, and buildings) or perch sites (security fencing). In addition, at the Project site, ground disturbance during construction, decommissioning, and site restoration would likely result in unearthing of natural food sources for ravens such as rodents and insects. Increased subsidies lead to an increase in the raven population in the immediate area. The establishment of new raven nests can have dire effects on the local juvenile tortoise population because nesting ravens spend 75 percent of their foraging time within 400 meters of their nest (Boarman 2002). Reducing human subsidies is a key element in the *Final Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a) and this goal should be incorporated into all projects that would likely provide such subsidies within desert tortoise habitat.

3.0 Baseline Conditions

3.1 Solar Farm Site and Gen-Tie Line

3.1.1 Existing Raven Subsidies

Existing raven subsidies at and near the Desert Sunlight Holdings components of the Proposed Action include roads, human developments, and open water sources. There are several existing paved roads (e.g., Interstate 10, Highway 177, Kaiser Road, and Eagle Mountain Road) in the vicinity of the Proposed Action, which potentially attract ravens because they may provide food from litter and road kill. The Lake Tamarisk Golf Club housing development is located south of the Solar Farm site and there are several other human settlements within the project area including Desert Center south of the Solar Farm site, Metropolitan Water District (MWD) housing near the MWD substation west of the Solar Farm site, and Eagle Mountain Mine northwest of the Solar Farm site. These settlements have small human populations, which likely provide food, shelter, and nesting opportunities for ravens. Open water sources include three artificial lakes at the Lake Tamarisk Golf Club, located south of the Proposed Action, as well as the Colorado River aqueduct north and northwest of the Solar Farm site.

3.1.2 Raven Presence at the Proposed Action

Common raven are known to occur at the Solar Farm site and along the Gen-Tie Line. Several methods have been useful in approximating the abundance of common raven at the Desert Sunlight Holdings components of the Proposed Action, including those used by Ironwood Consulting during Project surveys (incidental sightings from other surveys, bird point counts, and nest surveys – documented in Ironwood 2010), and Wildlife Research Institute (WRI) during aerial surveys for nesting golden eagles (WRI 2010). Figure 3 depicts the results of surveys of raven presence at the Desert Sunlight Holdings components of the Proposed Action.

Incidental Sightings

During all project biological surveys, all common ravens were tallied on standardized data forms with approximately 192 individuals counted (Ironwood Consulting 2010).

Aerial nest surveys by WRI were conducted for golden eagle on April 2-3 and May 14, 2010 following draft protocols (USFWS 2010). No common ravens were observed on or within three miles of the Desert Sunlight Holdings project components during these surveys. These surveys focused on the more mountainous regions of the region, but did cross the valley where the Project Action is located. Common ravens and nests observed by helicopter within 10 miles of the Solar Farm site boundaries were recorded and are included on Figure 3.

Point Counts

Point count surveys for all birds were conducted between April 7 and 17, 2010 and between October 10 and November 15, 2010 by an experienced desert avian biologist at a total of 15 locations, 9 on Solar Farm Site locations and 6 controls, using point count methodology as described in *Monitoring Bird Populations by Point Counts* (Ralph et al. 1995). The surveys are intended to allow compilation of bird species and their relative numbers at each fixed study point location (point counts). Point count methodology is well described and widely used in bird studies. Each point is visited for a fixed amount of time and all birds detected within an often fixed radius are recorded. Research suggests that the amount of time spent at a sampling location increases standard error especially at times greater than 10 minutes (Smith et al. 1997). Each count was limited to 10 minutes to minimize standard error introduced by double counting and flyovers. Additionally, incidental flyovers were recorded separately from typical

observations and each count was divided into three survey periods consisting of the first three minutes, minutes 3 to 5, and minutes 5 to 10.

Nest Surveys

Driving surveys were conducted on April 23-24 and May 20, 2010 following draft protocols for identifying raptor nests (CEC and CDFG, 2010 draft) to look for existing raven nests within and adjacent to the Desert Sunlight Holdings Project components. Nests located during this survey included those found on existing transmission lines and trees. The surveys confirmed presence of two existing active nests just northeast of the Solar Farm site and none near the Gen-Tie Line (Figure 3).

3.2 SCE Project Components

3.2.1 Existing Raven Subsidies

Existing raven subsidies near the SCE components of the Proposed Action include roads and human developments, and open water sources. There are several existing paved roads (e.g., Interstate 10, Highway 177, and Kaiser Road) in the vicinity of the SCE components of the Proposed Action, which potentially attract ravens because they may provide food from litter and road-kill. There are several other human settlements within the project area including Desert Center northeast of the Proposed Action, and several homes and farms along Highway 177. These settlements have small human populations which likely provide food and shelter opportunities for ravens. Open water sources include three artificial lakes at the Lake Tamarisk Golf Club, located northeast of the SCE components of the Proposed Action. Four ravens were detected during these surveys (two individual birds and one pair), all as flyovers. These are shown on Figure 3.

3.2.2 Raven Presence at the Proposed Action Site

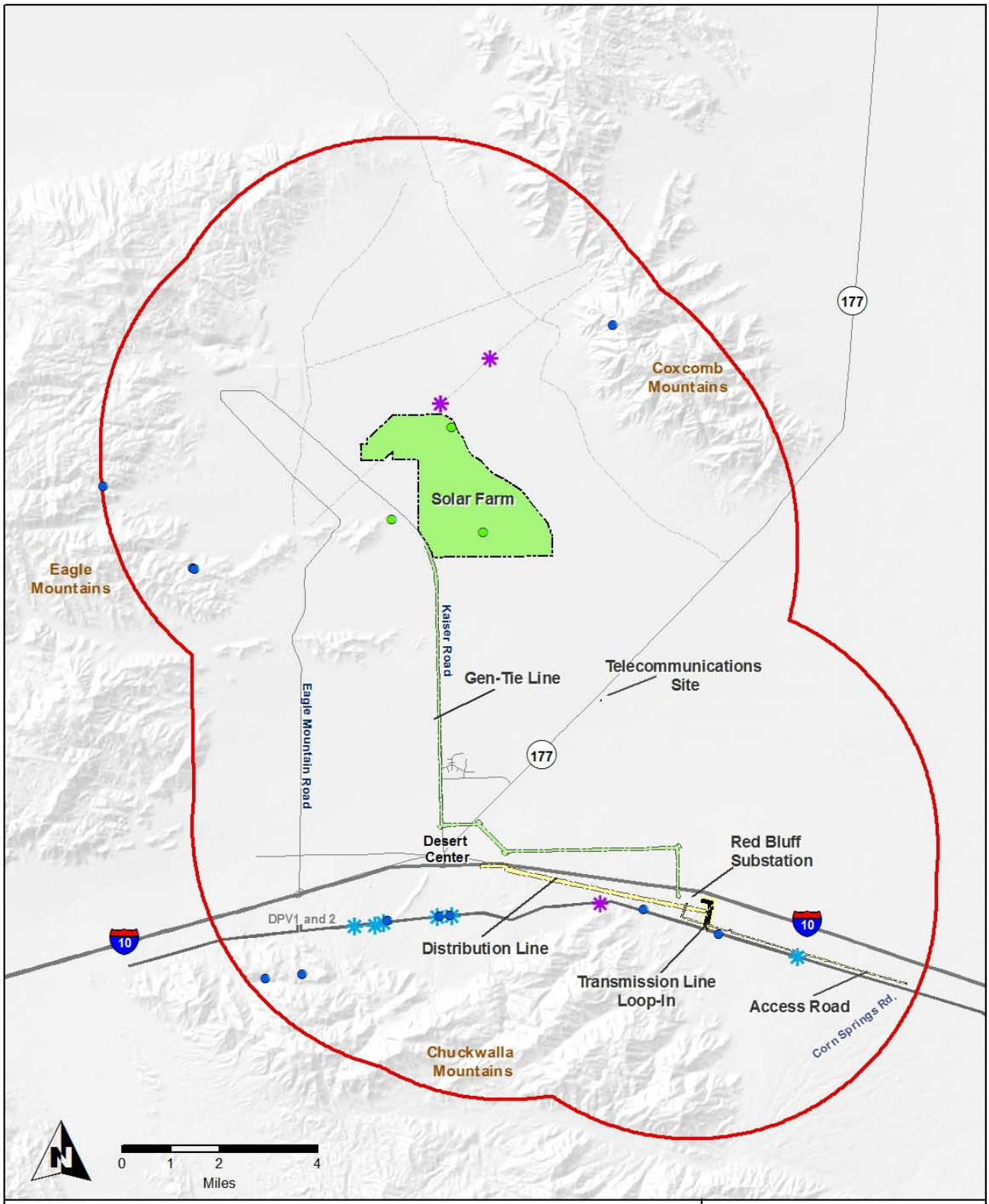
Common ravens are known to occur at all areas of the SCE components of the Proposed Action, including near the Red Bluff Substation, along the access road and distribution line, and at the telecommunications site. Several methods have been used to determine the presence and quantify approximate abundance of common raven at the SCE components of the Proposed Action, including tallying incidental sightings and conducting nest surveys. Figure 3 shows raven presence at the SCE components of the Proposed Action. Four ravens were detected during these surveys (two individual birds and one pair), all as flyovers. These are shown on Figure 3.

Incidental Sightings

During all Project biological surveys, common ravens were tallied on standardized data forms with approximately 55 individuals counted (Ironwood Consulting 2010). Aerial surveys were conducted for golden eagle in April and May 2010 following draft protocols (USFWS 2010). These surveys also recorded common ravens and nests observed by helicopter and are included on Figure 3. Six common ravens were observed on or within three miles of the SCE project components and several more within five miles (Figure 3).

Nest Surveys

Surveys were conducted on April 23-24 and May 20, 2010 following draft protocols for identifying raptor nests (CEC and CDFG, 2010) to look for existing raven nests within and adjacent to the SCE Project components. Nests located during this survey included those found on existing transmission lines and within trees. The survey confirmed presence of two existing active nests and seven potential raven nests observed without ravens present (Figure 3).


Coxcomb Mountains
Solar Farm
Eagle Mountains
Kaiser Road
Gen-Tie Line
Telecommunications Site
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Red Bluff Substation
DPV1 and 2
10
Distribution Line
Transmission Line Loop-In
Access Road
Corn Springs Rd.
Chuckwalla Mountains
0 1 2 4
Miles
Project Area
Sunlight Component
SCE Component
5-Mile Project Buffer
Raven Location (Wildlife Research Institute)
Raven Location (Ironwood)
Active nest (Ironwood)
Potential Nest (Ironwood)
Ironwood Consulting, Inc. 2010. (Point Count and Nest Surveys)
Wildlife Research Institute, 2010. (Golden Eagle Surveys)
DESERT SUNLIGHT SOLAR FARM PROJECT
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Figure 3
Common Raven and Nest Sites
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4.0 Potential Project-Specific Raven Subsidies

The Project could result in additional opportunities for raven attractants and subsidies, including those during the construction, O&M, and decommissioning phases of the Proposed Action.

4.1 Solar Farm Site and Gen-Tie Line

The following activities associated with the construction, O&M, and decommissioning of the Solar Farm and Gen-Tie Line could provide raven attractants or subsidies.

Construction

- Temporary water supply ponds
- Ponding water from incidental flooding due to leaking water tanks or trucks
- Surface disturbance unearthing food sources such as rodent remains
- Additional traffic increasing road kills on local and Project roads
- Increased trash availability from increased human presence
- Additional temporary and permanent nesting, perching, and roosting sites created by project components, such as the Solar Farm Site fence and structures, and the Gen-Tie Line

Operations and Maintenance

- Trash and water availability from human presence
- Temporary and permanent nesting perching, and roosting sites created by project components, such as the Solar Farm Site fence and structures, and the Gen-Tie Line

Decommissioning

- Ponding water from incidental flooding due to leaking water tanks or trucks
- Ponding water associated with revegetation efforts
- Surface disturbance unearthing food sources such as rodent remains
- Additional traffic increasing road kills on local and Project roads
- Increased trash availability from increased human presence

4.2 SCE Project Components

The following activities associated with the construction, O&M, and decommissioning of the SCE Project components could provide raven attractants or subsidies.

Construction

- Ponding water from incidental flooding due to leaking water tanks or trucks
- Surface disturbance unearthing food sources such as rodent remains
- Additional traffic increasing road kills on local and Project roads
- Increased trash availability from increased human presence
- Additional temporary and permanent nesting, perching, and roosting sites created by project components, such as the Red Bluff Substation wall and structures, and associated distribution line, transmission connection lines, and telecommunications tower and structures

Operations and Maintenance

No additional attractants or subsidies are expected from the operation and maintenance of the SCE Project components. Most of these components are within an established utility ROW with an existing level of operations and maintenance activities that will not substantially increase due to the Project.

Decommissioning

- Ponding water from incidental flooding due to leaking water tanks or trucks;
- Ponding water associated with revegetation efforts;
- Surface disturbance unearthing food sources such as rodent remains;
- Additional traffic increasing road kills on local and Project roads; and
- Increased trash availability from increased human presence.

5.0 Roles and Responsibilities

The Applicant and SCE will each appoint an Environmental Compliance Manager and Designated Biologist who will be responsible for the implementation of common raven control and management (Section 6.0) and adaptive management (Section 8.0). If at any time a change is proposed to the Environmental Compliance Manager and/or Designated Biologist, the Applicant and SCE will obtain concurrence with the experience of new personnel from BLM, USFWS, and CDFG.

5.1 Environmental Compliance Manager

The Environmental Compliance Manager (ECM) will be independently or jointly assigned by the Applicant and SCE for their components of the Project. The ECM will be responsible for facilitating the implementation of all environmental management components of the project, including avoidance, minimization and mitigation measures for air quality, water quality and streambed permits, and other biological permits. The name, contact info, and qualifications of the ECM(s) will be listed in the Project's *Final Biological Resources Mitigation, Implementation, and Monitoring Plan*.

The ECM will have specific experience in the implementation of similar environmental compliance programs. The ECM will complete an extensive training program with the Project's Designated Biologist(s) and work closely together to ensure compliance with all environmental avoidance, minimization, and mitigation measures for the Project.

5.2 Designated Biologist

The Designated Biologist (DB) will be independently or jointly assigned by the Applicant and SCE for their components of the Project. The DB will be responsible for facilitating the implementation of avoidance, minimization and mitigation measures for streambed permits and other biological permits.

The name, contact info, and qualifications of the DB(s) will be listed in the Project's *Final Biological Resources Mitigation, Implementation, and Monitoring Plan* and their resume(s) will have been previously confirmed by BLM, USFWS, and CDFG as appropriate individuals for this position.

The DB will have specific experience in the implementation of similar environmental compliance programs. The DB will complete an extensive training program with the Project's ECM(s) and work closely together to ensure compliance with all biological avoidance, minimization, and mitigation measures for the Project. In addition, the DB will hold a Bachelor's or higher degree in Biological Sciences, Zoological Sciences, or a related field and will have at least five years of field experience in California desert habitats.

6.0 Common Raven Control and Management

All of the raven control and management measures discussed in this section apply to both the Sunlight and SCE components of the Proposed Action. Measures are discussed for the construction, O&M, and decommissioning phases of the Proposed Action.

6.1 Construction

The Applicant and SCE propose the following minimization and avoidance measures during Project design and construction:

1. Design facilities to discourage ravens
2. Minimize or eliminate food and water subsidies
3. Provide training to on-site personnel
4. Monitor common raven presence

6.1.1 Design Facilities to Discourage Ravens

Temporary construction ponds will include raven deterrents in their design to minimize these areas becoming raven attractants. These ponds will not remain on the solar farm site after the construction phase of the Project. The following design features and deterrents will be incorporated into the ponds as raven avoidance and minimization measures:

- Using anti-perching devices around the perimeter of each pond to exclude ravens and other birds from accessing the edge of the ponds to drink.
- Lining the ponds and maintaining two feet of freeboard in the ponds at all times
- Designing the ponds with interior side slopes at a 33 percent slope (3:1, horizontal:vertical)
- Netting will be used to cover ponds when not in use to reduce avian access. Appropriate material will be used to ensure that nocturnal bird species and bats will not become entangled in the netting

Project facilities will be designed to discourage roosting and nesting by comment ravens to the extent practicable by including deterrents such as bird spikes and auditory and visual deterrents. The Project's Gen-Tie Line design will incorporate these deterrents in all areas where it passes through the Chuckwalla DWMA and CHU.

6.1.2 Minimize or Eliminate Food and Water Subsidies

Raven food subsidies generated by the project will be avoided and/or minimized by maintaining a clean construction site, minimizing road kill due to project vehicle traffic, minimizing dead animals present on the Project, and minimizing open water sources. The following measures will be implemented:

- Temporary construction water supply ponds will include design features as described above to avoid and minimize these areas become raven attractants.
- Traffic speeds on all project-related dirt roads will be limited to 15 miles per hour to reduce the potential for road-killed animals. Biological monitors will be monitoring vehicle speeds during construction activities.
- Construction methods will be designed to minimize disturbance to burrowing rodents. By discing the site and minimizing grading, less dirt is moved and fewer rodents are likely to be unearthed during the construction process.
- Refuse management will be an integral part of the construction process. A sufficient number of refuse containers will be supplied and all containers will have sealable and lockable lids with the goal of

preventing strong winds from blowing garbage around, wildlife from entering refuse containers, and unauthorized people from tampering with refuse. On a daily basis biological monitors will check refuse containers to ensure they are not overflowing and are being closed properly.

- All work vehicles will have a sufficient supply of strong garbage bags to aid in collection and of any refuse found onsite. At the end of each day, bagged refuse will be placed into the large containers discussed above.
- Waste management contractors will supply an adequate number of portable toilets to promote a hygienic environment.

The following measures will be implemented to reduce incidental ponding during construction:

- Water used to prevent fugitive dust generation will not be allowed to pond onsite and will be dissipated immediately if such ponding occurs.
- Water sources for the project (such as wells) will be checked regularly by biological monitors to ensure they are not creating open water sources by leaking or consistently overfilling trucks.

6.1.3 Provide Training to On-Site Personnel

All Project-related personnel that enter any component of the Project site during construction will be required to complete a Worker Education and Awareness Program (WEAP) for Biological Resources. This program will be standardized and conducted by the Project's ECM or DB. A portion of this program will be focused on the natural history and biology of the common raven and will discuss the Project's Common Raven Management Plan including the necessity of avoiding and minimizing the creation of new raven subsidies as part of the approved Terms and Conditions of Project permits.

6.1.4 Monitor Common Raven Presence

During construction of the Proposed Action, biological monitors will continue to record raven sightings incidentally, during follow-up surveys of baseline point count locations, and during annual nest surveys. The goals of this monitoring are to:

1. Measure any potential increase or decrease in the numbers of common raven sighted within a 1-mile radius of the Project components
2. Identify offending ravens (those who are preying on desert tortoise), to include the removal of problem raven nests and reporting to USFWS and request raven removal of individual birds as required by wildlife agencies.

Incidental Sightings

During construction, all common ravens sighted by biological monitors will be recorded on standardized data forms during regular daily monitoring activities.

Point Counts

Point count surveys for all birds will continue to be conducted by an experienced desert avian biologist at the same locations on the Solar Farm Site and controls using the same methods employed in baseline surveys (Ralph et al. 1995). These point counts will be conducted twice every year (fall and spring) during Project construction.

Nest Surveys

Driving surveys according to current raptor protocols (CDFG 2010) will be conducted during construction at least twice yearly between February 15 and June 1, and separated by at least 30 days to

look for existing raven nests within and adjacent to the Project components. The ground beneath confirmed raven nests would be inspected for any desert tortoise remains. If the DB recommends nest or problem raven removal, the DB will contact the project personnel at BLM, USFWS, and CDFG for guidance as discussed in Section 7.0.

6.2 Operations and Maintenance

The Applicant and SCE propose the following minimization and avoidance measures during the O&M phase of the Project:

1. Minimize or eliminate food and water subsidies
2. Provide training to on-site personnel
3. Long-term monitoring of common raven presence

6.2.1 Minimize or Eliminate Food and Water Subsidies

Raven food subsidies generated by the project will be avoided and/or minimized by implementing the following measures:

- Traffic speeds on all project-related dirt roads will be limited to 15 miles per hour to reduce the potential for road-killed animals. Biological monitors will be monitoring vehicle speeds during construction activities.
- Refuse management will be an integral part of the construction process. A sufficient number of refuse containers will be supplied and all containers will have sealable and lockable lids with the goal of preventing strong winds from blowing garbage around, wildlife from entering refuse containers, and unauthorized people from tampering with refuse. On a daily basis, Project personnel will check refuse containers to ensure they are not overflowing and are closed properly.
- All work vehicles will have a sufficient supply of strong garbage bags to aid in collection and of any refuse found onsite. At the end of each day, bagged refuse will be placed into the large containers discussed above.
- Waste management contractors will supply an adequate number of portable toilets to promote a hygienic environment.

No additional water (apart from sanitary facilities for project personnel and visitors) will be used on site during the O&M phase of the project.

6.2.2 Provide Training to On-Site Personnel

All Project-related personnel that enter any component of the Project site during the O&M phase of the Project will be required to complete the same WEAP for Biological Resources discussed above for the construction phase.

6.2.3 Monitor Common Raven Presence

During the O&M phase of the Proposed Action, project personnel and biological monitors will continue to record raven sightings incidentally, during follow-up surveys of baseline point count locations, and during nest surveys.

Incidental Sightings

During the O&M phase of the Project, all common ravens sighted by regular Project personnel will be recorded on standardized data forms during their daily activities.

Point Counts

Point count surveys for all birds will continue to be conducted by an experienced desert avian biologist at the same locations on the Solar Farm Site and controls using the same methods employed in baseline surveys (Ralph et al. 1995). These point counts will be conducted every five years during the O&M phase of the Project.

Nest Surveys

Driving surveys, according to current raptor protocols (CDFG 2010), will be conducted during the O&M phase of the Project to look for existing raven nests within and adjacent to the Project components. The ground beneath confirmed raven nests would be inspected for any desert tortoise remains. If the DB recommends nest or problem raven removal, the DB will contact the project personnel at BLM, USFWS, and CDFG for guidance as discussed in Section 7.0.

These nest surveys would be conducted" (1) twice yearly between February 15 and June 1, and separated by at least 30 days during the first five years post-construction, and (2) twice (between February 15 and June 1, and separated by at least 30 days) every five years subsequently until decommissioning.

6.3 Decommissioning

The Applicant and SCE propose the following minimization and avoidance measures during the decommissioning phase of the Project:

1. Minimize or eliminate food and water subsidies
2. Provide training to on-site personnel
3. Long-term monitoring of common raven presence

6.3.1 Minimize or Eliminate Food and Water Subsidies

Raven food subsidies generated by the project will be avoided and/or minimized by implementing the following measures:

- Traffic speeds on all project-related dirt roads will be limited to 15 miles per hour to reduce the potential for road-killed animals. Biological monitors will be monitoring vehicle speeds during construction activities.
- Refuse management will be an integral part of the construction process. A sufficient number of refuse containers will be supplied and all containers will have sealable and lockable lids with the goal of preventing strong winds from blowing garbage around, wildlife from entering refuse containers, and unauthorized people from tampering with refuse. On a daily basis, Project personnel will check refuse containers to ensure they are not overflowing and are closed properly.
- All work vehicles will have a sufficient supply of strong garbage bags to aid in collection and of any refuse found onsite. At the end of each day, bagged refuse will be placed into the large containers discussed above.
- Waste management contractors will supply an adequate number of portable toilets to promote a hygienic environment.

Water will be used to prevent fugitive dust generation and for revegetation during the decommissioning phase of the Project, with the following measures implemented to avoid or minimize creating additional raven subsidies:

- Water will not be allowed to pond onsite and will be dissipated immediately if such ponding occurs.
- Water sources for the project (such as wells) will be checked regularly by biological monitors to ensure they are not creating open water sources by leaking or consistently overfilling trucks.

6.3.2 Provide Training to On-Site Personnel

All Project-related personnel that enter any component of the Project site during the decommissioning phase of the Project will be required to complete the same WEAP for Biological Resources discussed above for the construction phase.

6.3.3 Monitor Common Raven Presence

During the decommissioning phase of the Proposed Action, project personnel and biological monitors will continue to record raven sightings incidentally, during follow-up surveys of baseline point count locations, and during annual nest surveys.

Incidental Sightings

During the decommissioning phase of the Project, all common ravens sighted by project personnel or biological monitors will be recorded on standardized data forms during their daily activities.

Point Counts

Point count surveys for all birds will continue to be conducted by an experienced desert avian biologist at the same locations on the Solar Farm Site and controls using the same methods employed in baseline surveys (Ralph et al. 1995). These point counts will be twice a year (fall and spring) during the decommissioning phase of the Project.

Nest Surveys

Driving surveys, according to current raptor protocols (CDFG 2010), will be conducted during the decommissioning phase of the Project to look for existing raven nests within and adjacent to the Project components. The ground beneath confirmed raven nests would be inspected for any desert tortoise remains. If the DB recommends nest or problem raven removal, the DB will contact the project personnel at BLM, USFWS, and CDFG for guidance as discussed in Section 7.0.

These nest surveys would be conducted twice yearly between February 15 and June 1, and separated by at least 30 days.

6.4 Reporting

Results from all monitoring activities will be recorded on standardized reporting forms and included in the annual raven monitoring report to be submitted to BLM on or before January 15th.This will provide necessary reporting to the USFWS and CDFG in their annual permitting report, which is due on or before February 1 of each year. The annual report shall summarize the activities and results of the monitoring conducted during the year and include an assessment of the effectiveness of the monitoring and the potential need to incorporate adaptive management measures (Section 7.0) into the monitoring program.

This annual report will also include a section reporting on the long-term monitoring program for common raven. This section will include number of ravens observed incidentally, results of nest surveys conducted during that year, and a discussion of whether these observations represent an increase or decrease in raven activity and associated theories of cause.

7.0 Regionwide Raven Management and Monitoring Program

Although the Project is not under the jurisdiction of the California Energy Commission (CEC), the Applicant will participate in the regional raven management and monitoring program as specified by the October 2010 Draft Summary *Renewable Energy Development in the California Desert: Common Raven Predation on the Desert Tortoise*. This document describes the regional raven management and monitoring program that includes agreements with state and local governments as well as private project applicants. Pursuant to this program, the Applicant and SCE would contribute to the region-wide effort in an amount related to the anticipated level of the Project's adverse impacts to desert tortoise populations from predation by ravens. The amount to be contributed are summarized below in Tables 3 and 4 and discussed in further detail in the Project's Habitat Compensation Plan (First Solar and Ironwood Consulting 2010).

Table 1. Raven Compensation Desert Sunlight Solar Farm and Gen-Tie Line

Resource	Acres of Impact	Compensation
Solar Farm Site	3,912	$410,760
Gen-Tie Line	104	$10,920
Total Compensation for Raven Mitigation		**$421,680**

Table 2. Raven Compensation for SCE Project Components

Resource	Acres of Impact	Compensation
Red Bluff Substation	149	$15,645
Total Compensation for Raven Mitigation		**$15,645**

8.0 Adaptive Management

Adaptive management will be implemented as necessary to continually improve upon previous decision-making. Any adaptive management strategies would be proposed by the Applicant or SCE and approved by BLM, USFWS, and CDFG prior to implementation. If monitoring data suggest the need for adaptive management, several additional measures may be implemented to minimize the attractiveness of the Project site to this species, to include devices to discourage roosting or nesting on project-related structures.

8.1 Solar Farm Site and Gen-Tie Line

If monitoring data show a significant increase in roosting by common ravens, measures to discourage roosting on the Sunlight Project components will be implemented using one or more of the following methods, decided in conjunction with the wildlife agencies:

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

If monitoring data show a substantial and sustained (e.g., over several consecutive years) increase in nesting by common ravens that could lead to increased desert tortoise predation, then measures to discourage nesting on the Sunlight Project components will be implemented using one or more of the methods described above for discouraging roosting. Inactive raven nests discovered during the monitoring efforts will be dismantled and passive nest deterrents would be installed to inhibit future nest building at the site. In the event that an active nest is found, it will be monitored closely throughout the season by a biological monitor to determine number of fledglings and status of development. As soon as it is determined that the nest is no longer active, it will be removed and passive deterrents installed.

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

8.2 SCE Project Components

If monitoring data show a substantial and sustained (e.g. over several consecutive years) increase in nesting by common ravens near the Red Bluff Substation and other SCE components that could lead to increased desert tortoise predation, SCE shall coordinate with the resource agencies on the appropriateness of implementing additional common raven control measures that will be conducted by SCE within the adjacent to DPV 1, including the potential to use methods to discourage roosting and nesting, or the removal of problem ravens as discussed above.

9.0 References

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