



TETRA TECH EC, INC.

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Docket No. 09-AFC-8
1516 9th St.
Sacramento, CA 95814

Genesis Solar Energy Project - Docket Number 09-AFC-8

Docket Clerk:

Included with this letter is one hard copy and one electronic copy of the **DRAFT COMMON RAVEN MONITORING, MANAGEMENT, AND CONTROL PLAN** for the **Genesis Solar Energy Project**.

Sincerely,

A handwritten signature in black ink that reads 'Tricia Bernhardt'.

Tricia Bernhardt
Project Manager/Tetra Tech EC

cc: Mike Monasmith /CEC Project Manager



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**DRAFT
COMMON RAVEN MONITORING, MANAGEMENT,
AND CONTROL PLAN**

for the

Genesis Solar Energy Project

Docket No. 09-AFC-8

Prepared for:

Genesis Solar, LLC

Prepared by:

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January 2010

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ABBREVIATIONS AND ACRONYMS

BLM	Bureau of Land Management
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CPM	Compliance Project Manager
DB	Designated Biologist
ECM	Environmental Compliance Manager
Genesis Solar	Genesis Solar, LLC,
GRAS	generally recognized as safe
MA	Methyl anthranilate
MW	megawatt
PDFs	Project Design Features
Plan	Common Raven Monitoring, Management, and Control Plan
Project	Genesis Solar Energy Project
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

Genesis Solar, LLC, (Genesis Solar) proposes to develop a 250 megawatt (MW) solar power project, the Genesis Solar Energy Project (Project), near the city of Blythe in Riverside County, California. This section introduces the project background, purpose, objectives, and conditions of concern related to raven monitoring, management, and control.

1.1 Background

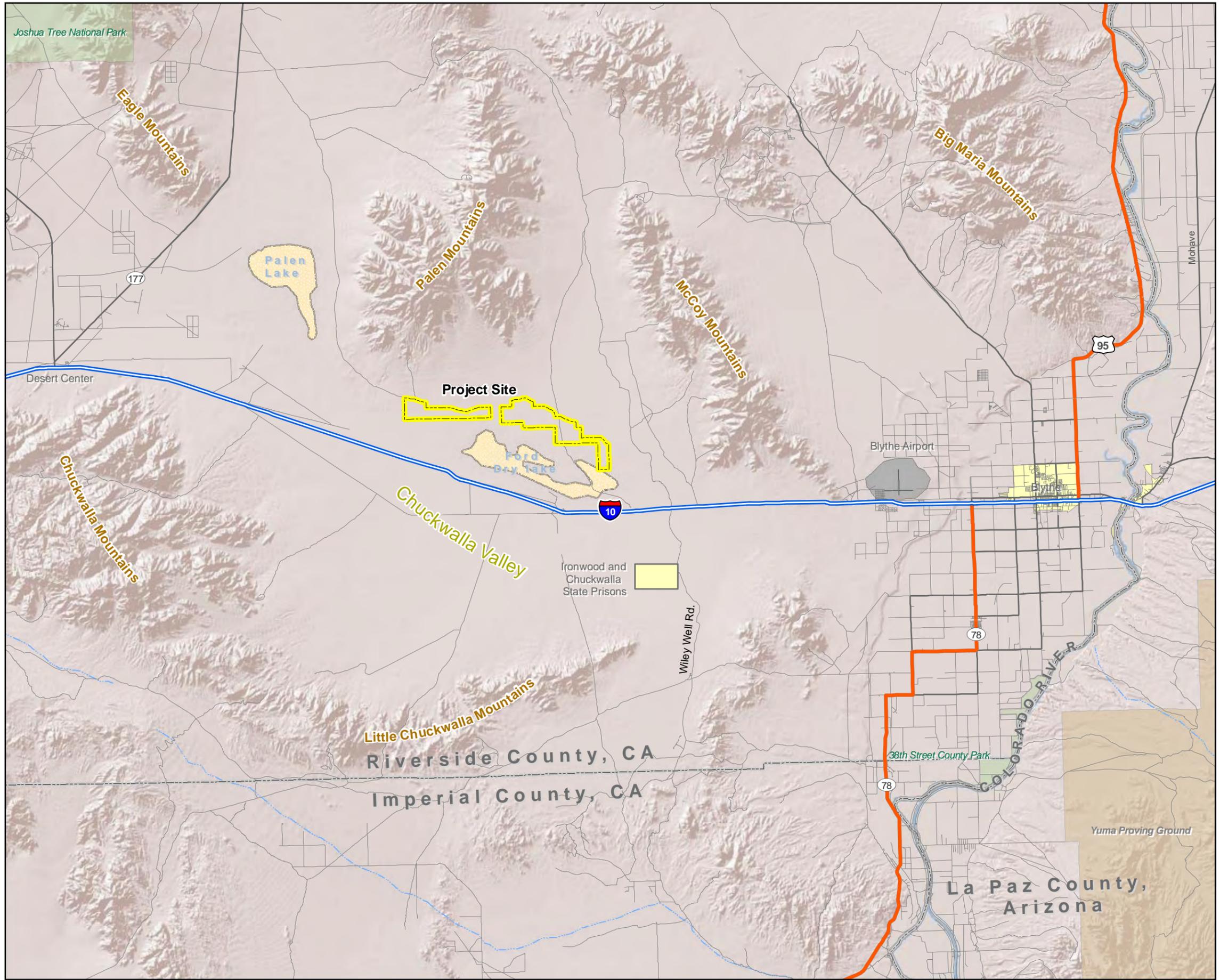
The proposed Project is located approximately 25 miles west of the city of Blythe, in an undeveloped area of the Sonoran Desert, on lands managed by the Bureau of Land Management (BLM). Surrounding features include the McCoy Mountains to the east, the Palen Mountains (including the Palen/McCoy Wilderness Area) to the north, and Ford Dry Lake (a dry lakebed) to the south. Interstate-10 is located to the south of the Project facility. The Chuckwalla Mountains and Little Chuckwalla Mountains Wilderness Areas are also located to the south-southwest of the Project (Figure 1). While currently undisturbed, the area on and around the Project has been used for grazing and off-highway vehicle recreation in the past. Ford Dry Lake was formerly open to the public for off-highway vehicle use, but has since been closed. Access to the Project facility is poor, and limited to 4-wheel-drive tracks located on the western end of the Project area.

The Project includes two independent solar electric generating facilities, each of which would have a nominal net electrical output of 125 MW, 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 generators receive heated transfer fluid from solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun.

The Project proposes to use a wet cooling tower for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing would be supplied from onsite groundwater wells. Project cooling water blowdown would be piped to lined, onsite evaporation ponds.

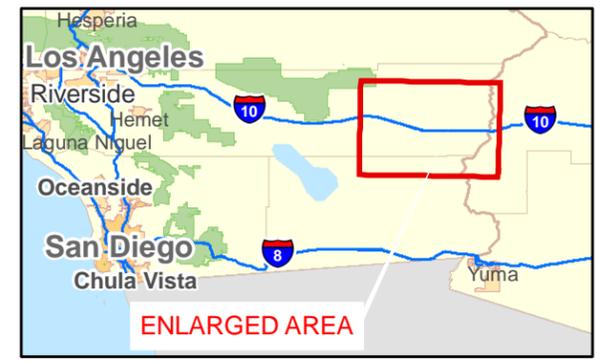
A transmission line, access road, and natural gas pipeline will be co-located in one linear corridor to serve the main Project facility. This corridor would exit the facility to the south and would be approximately 6.5 miles long. The tie-line would cross Interstate-10, connecting to the Blythe Energy Project Transmission Line. This tie-line would use the existing pole structures of the Blythe Energy Transmission Line to interconnect with the proposed Colorado River Substation located to the east of the Project.

Without the implementation of monitoring, mitigation, and control measures, the proposed Project has the potential to indirectly impact populations of the Mojave fringed-toed lizard (*Uma scoparia*) and burrowing owl (*Athene cunicularia*) by increasing the attraction of common ravens (*Corvus corax*) into the area, thereby increasing the potential for depredation by ravens. The Mojave fringed-toed lizard and burrowing owl were observed during Spring 2009 field surveys and are BLM sensitive species as well as California Species of Special Concern; therefore, impacts to these species are of concern. In addition, although no live desert tortoises (*Gopherus agassizii*; a state- and federally listed threatened species) or signs of recent tortoise presence were found within the Project footprint during Spring 2009 surveys, signs of possible tortoise presence were found within 0.5 miles of the Project to the north. Therefore, the potential of attracting ravens to the Project could also have an indirect impact on any desert tortoises present in the adjacent area.



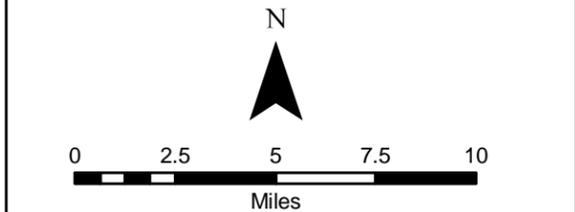
GENESIS SOLAR, LLC

GENESIS SOLAR ENERGY PROJECT RIVERSIDE COUNTY, CALIFORNIA



Legend

Project Site	Lake/River
Interstate	Lake Intermittent
Highway	Parks (Regional)
Major Road	Military Installation
Local Road	Urban Areas
Airport Area	
County Boundary	
State Boundary	



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

FIGURE 1 REGIONAL LOCATION MAP



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1.2 Purpose and Objectives

The purpose of the Common Raven Monitoring, Management, and Control Plan (Plan) is to ensure that the construction, operation, maintenance, and decommissioning of the Project does not attract ravens (*Corvus corax*) to the Project area by creating food or water subsidies, perch sites, roost sites, or nest sites, and to identify the conditions of concern specific to the Project that may attract ravens to the Project area. The Plan includes monitoring, management, and control measures that will 1) monitor raven activity and 2) specify management and control measures that will avoid, minimize, or mitigate impacts. The monitoring effort is intended to provide qualitative data that can be interpreted by the Designated Biologist (DB; see Section 3.2) to determine if Project Design Features (PDFs) are effective, or if additional management and control measures are needed to meet the objective.

Specific plan objectives include:

1. Identify the conditions of concern specific to the Project that may attract ravens to the area.
2. Identify how the Project would utilize PDFs and other measures to manage the conditions of concern.
3. Document the effectiveness of PDFs and specific raven management and control measures implemented by the Project.
4. Specify how, when, and what other measures would be selected and implemented if the monitoring suggests the need for additional controls.
5. Define triggers for modification of management and control measures using adaptive management principles.

The Plan will work in concert with the U.S. Fish and Wildlife Service's (USFWS') rangewide raven monitoring and control program (see Section 2.0). Genesis Solar is supportive of contributing to the USFWS' program in lieu of a comprehensive onsite raven monitoring and control program. As such, the Plan presented here will comprise a subset of a more comprehensive program.

1.3 Conditions of Concern

The conditions of concern are those Project features or activities that, when not properly managed, provide new subsidies that may result in changes in raven population or behavior that could potentially adversely affect populations of prey species such as the Mojave fringed-toed lizard, burrowing owl, or desert tortoise. Five basic conditions of concern have been identified for the Project and have been considered in developing this Plan:

1. Availability of water from evaporation ponds;
2. Creation of new perching/roosting/nesting sites for ravens;
3. Temporary water ponding potential from dust suppression;
4. Raven food sources from soil disturbance (e.g., rodents, insects, etc.); and
5. Human food and waste management.

The study design for raven monitoring, as well as measures for raven management and control, is dependent upon the accuracy of defining these conditions. Each of these conditions of concern is defined in more detail below.

Evaporation Ponds

The proposed Project includes evaporation ponds that will collect blowdown water from the cooling towers. The addition of a new water source to an area where water sources are sparse may result in the attraction of ravens to the Project area. Ravens will travel up to 40.4 miles from their roosts for subsidies, including water (Boarman 2003). However, much shorter distances to point subsidies are more common – distances of zero to four miles (Engel and Young 1992, Mahringer 1970 [in Boarman and Heinrich 1999], Kristan and Boarman 2003). Kristan and Boarman (2003) observed that raven densities declined with increasing distance from point subsidies.

Raven Perching, Roosting, and Nesting Sites

The majority of raven predation on prey species is thought to take place during the spring, most likely by breeding birds that have been shown to spend most of their time foraging within 1,300 feet of their nests (Kristan and Boarman, 2003). Therefore, structures that facilitate nesting in areas where ravens could not otherwise nest may pose a danger to nearby prey populations. Project components, such as tower structures, transmission poles and lines, and support structures will provide new types of nesting and perching sites in the Project area that have the potential to increase raven use of the area.

Ponding Water

During construction, water will be applied to graded areas, construction rights-of-way, dirt roads, trenches, spoil piles, and other areas of ground disturbance to minimize dust emissions and topsoil erosion. Ponding water, resulting from these dust suppression activities, has the potential to attract ravens, thereby potentially resulting in increased predation on raven prey species. During operations, deionized water will be used to wash mirrors; however, the amount of water used will be minimal and is not anticipated to result in ponded water on site.

Raven Food Sources from Soil Disturbance

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

Human Food and Waste Management

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

2.0 REGION-WIDE RAVEN MANAGEMENT AND MONITORING PROGRAM

On January 29, 2009, the USFWS sent a letter to the California Energy Commission (CEC) describing a regional raven management and monitoring program that would include agreements with state and local governments, as well as private project applicants (USFWS 2009). Pursuant to this program, Genesis Solar 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 that Genesis Solar would contribute to the fund would be determined during consultation with the CEC and USFWS.

3.0 ROLES AND RESPONSIBILITIES

3.1 Environmental Compliance Manager

Genesis Solar shall assign an Environmental Compliance Manager (ECM) to the Project. The ECM will be responsible for implementation of the environmental conditions outlined in this document. Typical ECM duties will involve managing, supervising, and/or providing advice on work affecting air quality, water/streambed permits, and biological resources environmental compliance programs. The contact information for any ECM named to oversee the Project will be incorporated into the final Biological Resources Mitigation, Implementation, and Monitoring Plan. The ECM will have experience in the implementation of general environmental compliance measures and have been specifically trained by the DB to conduct biological monitoring activities specified in this Plan.

3.2 Designated Biologist

Genesis Solar shall assign a DB to the Project. The DB will be the same as the Project Authorized Biologist discussed in the Application for Certification. Genesis Solar shall submit the resume of the proposed DB, with at least three references and contact information to the CEC Compliance Project Manager (CPM), California Department of Fish and Game (CDFG), and USFWS for approval.

The DB will have at least the following background and training:

- A bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field; and 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; and
- At least one year of field experience with biological resources found in or near the Project.

In lieu of the above requirements, the DB's resume shall demonstrate to the satisfaction of the CPM, in consultation with the CDFG and USFWS, that the applicant has the appropriate training and background to effectively implement the Plan. Genesis Solar shall ensure that the DB performs the activities specified in the Plan. Genesis Solar shall also designate an alternate biologist with the same qualifications as the DB, outlined above.

4.0 MANAGEMENT PRACTICES

This section specifies management practices or PDFs that Genesis Solar proposes to implement in order to accomplish the goals of this Plan, as identified in Section 1.2. The PDFs are those project features that are built into the project's physical design and proposed operations to prevent the increased use of the Project area by ravens. The five basic conditions of concern identified in Section 1.3 have been grouped into construction and operation phase conditions, as appropriate for the Project. Construction phase conditions are considered temporary and will likely be avoided or minimized through the implementation of management measures as defined in Section 4.1. Operation conditions (considered long-term) will include management measures to minimize potential impacts, and may require additional control measures based on the results of the monitoring program (Section 4.2). If these PDFs or management practices are not effective in accomplishing the goals of this Plan, modifications to these practices and/or additional measures will be implemented, and monitored to ensure the Plan's goals are satisfied.

4.1 Construction

Construction phase impacts are considered more temporary in nature than operational impacts and therefore require temporary management practices in order to avoid or minimize the potential of attracting ravens to the Project area. Construction phase impacts will also occur during the decommissioning and restoration phases of the Project.

4.1.1 Evaporation Ponds

Evaporation ponds may collect rainwater during the construction phase, which could serve as an attractant to ravens. Monitoring (see section 5.0) will evaluate the presence of ravens during construction. If ravens are identified in the evaporation ponds, hazing will be employed to discourage use (discussed in section 6.3.1).

4.1.2 Raven Perching, Roosting, and Nesting Sites

Construction activities may create temporary perch or roost sites (and rarely, nest sites) for ravens by introducing equipment or materials to the landscape that provide suitable sites for ravens. Monitoring will evaluate the presence of ravens during construction. If ravens are regularly observed perching, roosting, or nesting on building materials, equipment, waste piles, or other construction debris, measures will be taken to change the quality or location of these materials, including hazing to discourage their use.

4.1.3 Ponding Water

The application rates of water for dust suppression activities will be set at a limit in order to minimize excessive application and ponding. The application rate should consider soil infiltration and evaporation rates. The ECM will patrol areas to ensure water does not puddle for long periods (more than 1 hour) and make recommendations for reduced water application rates where necessary as discussed in Section 6.0 (Adaptive Management). The fill station will be designed to adequately drain water to prevent ponding.

4.1.4 Raven Food Sources from Soil Disturbance

During construction activities, specifically grading, there is a potential for animals to be unearthed, providing a food subsidy for scavengers and thereby potentially attracting ravens. However, this will be a very temporary food resource, primarily occurring during initial site grubbing and grading. Road kills that may attract ravens could also occur on the access road from Interstate 10. However, enforced speed limits of 15 mph will minimize road kills.

4.1.5 Human Food and Waste Management

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

4.2 Operations

Operational impacts are considered ongoing and require PDFs and ongoing management practices to avoid or minimize the potential to attract ravens to the Project area. No soil disturbance is anticipated to occur during operation or maintenance that could result in raven food sources becoming exposed; therefore this condition of concern is not addressed.

4.2.1 Evaporation Ponds

Because the ponds need to remain uncovered to maximize evaporation rates, completely covering the ponds is not a preferred option. However, a series of avian deterrence measures are being incorporated into the design and operation of the evaporation ponds in order to discourage access to the ponds by ravens. The operational design of the ponds includes a minimum depth of 2 feet and a minimum freeboard of 2 feet. If water needs to be rerouted to specific ponds in order to maintain a 2-foot minimum depth, the remaining ponds would be pumped dry. In addition, the interior sides of the ponds would be relatively steep at a 33 percent slope (3:1, horizontal: vertical).

Netting of the ponds may also be implemented if other design measures do not prove to be effective. Other options for preventing use of these ponds by ravens include the use of anti-perching devices placed at strategic locations along the perimeter of the ponds in order to exclude ravens and other birds from accessing the edge of the ponds.

The DB would be responsible for making qualitative observations on the relative success of the deterrent(s) at each pond, and providing recommendations for future improvements in monthly reports, including adapting the current configuration of the anti-perching devices to maximize efficiency as needed.

4.2.2 Raven Perching, Roosting, and Nesting Sites

PDFs that would be considered to reduce raven perching, roosting, and nesting include the use of physical bird deterrents such as bird spikes and auditory and visual deterrents. In addition, nest removal would occur in conjunction with monitoring, as discussed below in Section 5.3.

4.2.3 Ponding Water

To minimize the occurrence of ponding water during construction, the application rates of water for dust suppression activities will be set at a limit in order to minimize excessive application. The application rate will consider soil infiltration and evaporation rates. The ECM will patrol the Project area to ensure that water does not puddle for long periods, and make recommendations for reduced water application rates where necessary. During operations, deionized water will be used to wash mirrors; however, the amount of water used will be minimal, and is not anticipated to result in ponding of water. If water ponding is found to be a concern, changes will be made through adaptive management.

4.2.4 Human Food and Waste Management

The trash abatement program, developed for the construction phase, will also include operational measures that would be implemented for the life of the Project. These will include items such as requiring that trash and food items be contained in closed, secured containers and removed daily to reduce the attractiveness to opportunistic predators such as ravens. The ECM will continue to ensure that these practices are enforced and make recommendations for improvements where applicable as discussed in Section 6.0.

5.0 MONITORING PRACTICES

Semi quantitative and qualitative monitoring will be implemented to assess the effectiveness of PDFs and management measures, and to determine the need for implementing additional control measures. These monitoring practices will evaluate the potential impacts that construction and operation have had on raven activity and populations, and is designed as an observational reconnaissance level study aimed at monitoring the effectiveness of the PDFs and management measures. Raven monitoring will be implemented in the construction and operation phases of the Project.

5.1 Construction Phase

To identify potential increases in raven activity, the ECM will conduct at least weekly reconnaissance-level surveys in all Project construction zones and disturbed areas (more surveys would be conducted if determined necessary). Surveys will focus on all potential attractant areas, including waste disposal areas, erected structures, staging areas where large equipment or material may be stored, evaporation ponds, and any area where water is applied to control dust and erosion or where there are recent surface disturbances.

Data will be recorded for each raven observed, including activity (categorized as flying, perched, or on the ground); type of perch (if applicable); and the general location of the bird within the Project. In addition, any nesting locations will be recorded and unoccupied nests will be reported to the DB for removal (see Section 5.3 for a discussion on nest removal). Data sheets will be developed and submitted to the agencies prior to implementation of this Plan. Initially and periodically, the DB will assist the ECM to ensure that monitoring objectives are being achieved.

5.2 Operation Phase

To identify potential increases in raven activity during operation and maintenance of the Project, the ECM (in coordination with the DB as appropriate) will conduct biweekly (every 2 weeks)

reconnaissance level monitoring for the life of the Project, in addition to annual breeding season raven monitoring, as discussed below.

5.2.1 Ongoing Biweekly Raven Monitoring

The ECM will conduct biweekly surveys for raven activity at pre-designated locations throughout the Project area for the first 3 years of Project operation. This monitoring will begin once the Project becomes operational. After the first 3 years of Project operation, surveys will be conducted biweekly for one year, every 3 years for the next 12 years, then once per 8 years unless results indicate more frequent or less frequent monitoring is necessary. The ECM will be accompanied by the DB during the first four surveys, in order to ensure appropriate data collection is conducted. The DB will also periodically look at data sheets and discuss the monitoring with the ECM to ensure that monitoring objectives are being achieved.

Survey locations will be identified by the DB and will focus on Project components that may influence raven abundance, activity, and behavior by potentially allowing perching, roosting, and nesting opportunities or by providing supplemental resources such as food and water. These Project components include tower structures, transmission poles and lines, and support structures, as well as evaporation ponds and waste disposal facilities. The survey locations may also include areas immediately adjacent to the Project in areas where ravens are likely to roost or nest.

A five-minute sampling session observing and listening for ravens will occur at each survey location. The surveyor will record the number of ravens and will document the behavior of the raven (e.g., perched, flying, on the ground, nesting), perch type (if applicable), and distance and direction from the survey location. Additional data collected will include the survey start/stop time, and weather (including temperature, average wind speed, and percent cloud cover). To aid the ECM and ensure consistency throughout the duration of the Project's life, a data sheet will be prepared in advance, outlining the required data to be collected.

As part of the biweekly surveys, the ECM will document any evidence of nests where predation of desert tortoises, Mojave fringe-toed lizards, or burrowing owls (Boarman 2002, 2003) is evident. A Universal Transverse Mercator (UTM) coordinate, as well as nesting substrate and current breeding status (if detectable) will be recorded for each nest located. Once data have been collected, the DB will determine if the nest is unoccupied (i.e., no eggs in the nest or nestlings have fledged), in which case the nest will be removed by the DB or the ECM (see description of nest removal below). The DB will search a 30-meter radius surrounding each nest or perch site for evidence of desert tortoise, Mojave fringe-toed lizard, or burrowing owl predation. Any evidence of predation will be photographed, and a UTM coordinate collected. In addition, all evidence of predation will be marked to avoid duplication of data recording on subsequent surveys. If occupied nests are detected during surveys, Genesis Solar will notify the Raven Management Workgroup for assistance with control measures.

Descriptions of nesting behavior and predation will be semi-quantitative and qualitative, and will produce data that is valuable for assessing raven behavior and documenting potential problem individuals for management actions. In addition, an increase in the number of raven nests in the Project area may suggest the potential need for revisions to PDFs or additional control measures (as described in Section 6.0).

5.3 Nest Removal

The majority of raven predation on raven prey species, such as the desert tortoise, most likely occurs in the spring, from April to May, when tortoises are most active and ravens are feeding their young (Boarman and Heinrich 1999). The removal of unoccupied raven nests would be utilized to control predation. Genesis Solar would consult with the USFWS and CDFG regarding whether nest removal can be part of the Project-specific raven management efforts. Preliminarily, Genesis Solar proposes that nests be removed by the DBs only from within the Genesis Solar-controlled lands and the transmission line right-of-way. If nests are observed on adjacent lands, the resource agencies will be notified. The removal of unoccupied nests will occur simultaneously with the breeding season raven surveys, which will take place from mid-February to the end of June. Just prior to the initiation of the breeding season for ravens, extra effort should be taken to remove any inactive nests to prevent these nests from becoming active. Removing raven nests outside of the breeding season may have a smaller effect on the raven population, as they may readily rebuild the following season. However, evidence suggests that birds with no nests in their territory at the beginning of the breeding season were less likely to commence nesting than those who already had intact nests (Kristan and Boarman, 2003). If an unoccupied raven nest is detected outside of the breeding window during biweekly surveys, it would also be removed by the DB.

5.4 Decommissioning and Restoration Phase

To identify potential increases in raven activity, the ECM will conduct at least weekly reconnaissance-level surveys on the Project during ground disturbance activities associated with decommissioning and grading associated with restoration. These surveys will mirror those for the construction phase (see Section 5.1, above). Surveys will focus on all potential areas of raven attraction, including waste disposal areas, erected structures, staging areas where large equipment or material may be stored, evaporation ponds, and any area where water is applied to control dust and erosion or there are recent surface disturbances.

Data will be recorded for each raven observed, including activity, categorized as flying, perched, or on the ground (likely scavenging); type of perch (if applicable); and the general location of the bird within the Project area. In addition, any nesting locations will be recorded and unoccupied nests will be removed (see Section 5.3 for a discussion on nest removal). Data sheets will be developed and submitted to the agencies prior to implementation of this Plan, after final Project design is complete.

6.0 ADAPTIVE MANAGEMENT

This section defines how adaptive management principles will be applied to this Plan, specifically in reference to PDF and control/mitigation measure implementation. This section defines potential changes to the mitigation and any conditions that may trigger these changes.

6.1 Definition

Adaptive management is typically used in environmental management efforts to facilitate more effective management of resources to achieve desired objectives. Adaptive management can be defined as an iterative and structured optimal decision-making process intended to reduce uncertainty through system monitoring. The decision-making process simultaneously maximizes

one or more resource objectives and accrues information needed to improve future management, either actively or passively. Using current knowledge, passive adaptive management involves the use of conceptual modeling to guide management actions. The model is adjusted as new knowledge is obtained and management decisions are subsequently modified. Active adaptive management involves testing alternative hypotheses through system manipulation employing management strategies. Thus, passive adaptive management is based on information gained from observational studies, whereas active adaptive management is based on information gained from experimental manipulation (Holling 1978). This Plan will focus on passive adaptive management but may ultimately apply both passive and active adaptive management.

6.2 Adaptive Management Triggers

To facilitate meeting Plan objectives, it may be necessary to make changes to the PDFs or initiate the implementation of additional control measures. Implementation of adaptive management measures (described below in Section 6.3) would occur if both of the following conditions are met:

- a. The results of the biweekly and/or annual breeding season raven monitoring events suggest that current PDFs are ineffective at controlling substantial and (at least seasonally) sustained increases in raven occurrences in the Project area, thereby increasing the potential for depredation on sensitive prey species.
- b. Genesis Solar has made every attempt to adjust PDFs to control raven occurrences and avoid the need for additional control measures, and has contacted and worked with the DB and the resource agencies to identify other sources of ravens and/or management measures; however, increased raven occurrences continue to occur.

6.3 Adaptive Management Measures

If the results of the monitoring efforts suggest that there is a substantial and sustained (i.e., consecutive years) increase in raven activity that may result in predation on desert tortoises, even with the implementation of Project PDFs, then Genesis Solar may need to implement additional measures to further control ravens in the Project area. Adaptive management measures will be identified during implementation of the monitoring program and will be discussed by Genesis Solar, the DB, CEC, USFWS, and the CDFG before any decisions are made. Adaptive management measures may include modifications to PDFs, or implementation of additional control measures. Potential control measures are discussed in more detail below. If new control measures do not accomplish appropriate raven management objectives, additional control measures will be reassessed for potential implementation.

6.3.1 Control Practices

Road Kill Removal

Ravens are well known for eating animals that have been killed along roads and highways, which are often abundant in the desert region (Boarman and Heinrich 1999). Road kill provides a food source for ravens, which facilitates increased raven nesting near roads and highways in areas that might otherwise offer little food (Kristan et al. 2004). For the Genesis Project, there is only one access road, on which the speed limit during operations will be 25 mph for Project employees. This low speed limit, and the fact that the solar field and operations area will be

fenced, makes it unlikely that a sufficient quantity of road kills would occur to generate a raven increase. However, the ECM will document the occurrence of road kills during the biweekly raven monitoring surveys. Operations staff will also report road kills on a daily basis, if observed. If road kills occur frequently and ravens are commonly noted feeding on road kills, then Genesis Solar may implement a road kill removal program. Details of a road kill removal program would be designed by the ECM in coordination with the DB and CEC.

Hazing

Hazing techniques employ visual and/or auditory devices designed to scare birds and reduce the attractiveness of an area. Some common methods include air or gas cannons, human flushing, bioacoustic deterrents, and/or flags and streamers to create an integrated system of negative stimuli. Because many birds, especially ravens, quickly become habituated to a static program, the type, timing, and location of hazing techniques must be changed frequently. If deemed appropriate, a hazing program would be designed by the DB, in coordination with the ECM and CEC. Permission may also be required from the local police or municipality, as there may be local ordinances that prohibit the creation of loud noises.

Methyl Anthranilate

Methyl anthranilate (MA) is a naturally occurring GRAS (Generally Recognized As Safe) listed compound used as a food flavoring and fragrance additive. Chemical formulations containing MA have been found to be effective bird aversion agents, because MA acts as a chemosensory repellent, irritating pain receptors associated with taste and smell (Umeda and Sullivan 2001). When applied as a spray, MA has been found to be effective in repelling birds from feeding on crops such as cherries, blueberries, and table grapes. In addition, MA is used as a repellent for Canadian geese on lawns and in small pools of water. To date MA is thought to have limitations for topical application as it is considered highly volatile and breaks down readily under exposure to ultraviolet light. Repeat topical application would be necessary due to the breakdown of the chemical, but it may still prove useful as a short-term deterrent. After removing a current season unoccupied nest, the ECM could apply MA topically to the nest site to deter nest rebuilding in that location. Prior to the use of MA, research into the most current application of MA to deter raven activity should be conducted by the DB and methods approved in coordination with the ECM and CEC.

Lethal Removal (Depredation)

If ravens are still attracted to the Project area after the implementation of PDFs, modification to PDFs, and implementation of control measures, it may be necessary to consider lethal removal. There is no evidence that lethal removal will have a long-lasting effect on raven population levels, raven foraging behavior, or survival of raven prey species. Additionally, identifying, targeting, and successfully removing problem individuals, is also considered time consuming. However, this method is often used in management plans when specific raven pairs are determined to be responsible for taking relatively large numbers of desert tortoises (Boarman 2002). These individuals can often be identified by the presence of juvenile desert tortoise shells beneath their nests, which are often used for consecutive years by the same pair of breeding ravens (Boarman and Heinrich 1999). For this project, any evidence of a raven depredating burrowing owls or Mojave fringe-toed lizards would also result in a consideration for lethal removal. By removing those birds known to prey on desert tortoise, survival of juvenile desert tortoises in the vicinity may increase. However, it should be noted that it is very difficult to

identify the target bird(s) with absolute certainty, much less locate and lethally remove both members of a pair.

Under this control method, targeted ravens would be shot by rifle or shotgun. If shooting is not possible (e.g., on power lines) or has been unsuccessful, ravens could be trapped and humanely euthanized. Young ravens found in nests of removed adults would be euthanized humanely if they can be captured safely.

7.0 REPORTING

The ECM will prepare monthly monitoring reports during construction and the first year of operation summarizing the results of the biweekly and breeding season monitoring events as well as observations reported by operations staff and describing any noted raven activity in the Project area. Following the first year of operation, a report will be submitted every six months during years when monitoring occurs. These reports will summarize the survey results, discuss the success or failure of PDFs, and make recommendations for modification of PDFs or implementation of control measures as necessary. These monitoring reports will be submitted to Genesis Solar and the DB for review. Genesis Solar then will forward these reports to the CEC, USFWS, and CDFG.

8.0 REFERENCES

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U.S. Fish and Wildlife Service (USFWS). 2009. Beacon Solar Energy Projects Participation in Regional Monitoring and Management Plan for Common Ravens. Letter from USFWS to CEC. January 29.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
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**APPLICATION FOR CERTIFICATION FOR THE
*GENESIS SOLAR ENERGY PROJECT***

Docket No. 09-AFC-8

PROOF OF SERVICE
(Revised 1/04/10)

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DECLARATION OF SERVICE

I, Tricia Bernhardt, declare that on January 11, 2010, I served and filed copies of the attached **Draft Common Raven Monitoring, Management, and Control Plan for the Genesis Solar Energy Project** dated January 11, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/genesis_solar].**

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

sent electronically to all email addresses on the Proof of Service list;

by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);

OR

depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-8
1516 Ninth Street, MS-4
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docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original Signed By:



Tricia Bernhardt