DOWNEY | BRAND
ATTORNEYS LLP

555 Capitol Mall, 10th Floor
Sacramento, CA 95814

P: 916/444-1000
F: 916/444-2100
downeybrand.com

Lois Navarrot
lnavarrot@downeybrand.com

July 17, 2008

BY HAND DELIVERY

Bill Pfanner
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Beacon Solar Energy Project, Docket No. 08-AFC-2

Dear Bill:

Pursuant to your conversations with Jane, enclosed please find:

- 1 hard copy of the Streambed Alteration Agreement (4 more hard copies will follow later today).
- 5 hard copies of the Draft Raven Monitoring, Management and Control Plan.
- 5 hard copies of the letter to California Department of Fish & Game regarding the SSA package.
- 5 hard copies of a letter to you regarding the Raven Monitoring, Management and Control Plan.
- 5 hard copies of the signature page on the "Notification of Lake or Streambed Alteration".
- 10 cds with pdf versions of all these documents.

CDs of these documents will be docketed with the docketing office and served on all parties on the proof of service list today.

If you need anything additional, please don't hesitate to contact me.

Very truly yours,

DOWNEY BRAND LLP

Lois Navarrot
Assistant to Jane Luckhardt

LN:ln

Enclosures

DRAFT
Raven Monitoring, Management, and Control Plan
Beacon Solar Energy Project

Prepared for:

Beacon Solar, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by:

EDAW, Inc.
1420 Kettner Boulevard, Suite 500
San Diego, California 92101
(619) 233-1454

July 11, 2008

Table of Contents

Introduction

Part 1 Raven Monitoring

1.0 Purpose and Objectives 1-1

2.0 Monitoring Design 1-1

2.1 Study Design Spatial Component 1-1

2.2 Point Count Methodology 1-2

2.3 Raven Nest Surveys 1-4

2.4 Preconstruction Monitoring (Approximately 1-year) 1-4

2.5 Construction Phase 1-5

2.6 Postconstruction Monitoring (2-years) 1-5

3.0 Data Interpretation 1-5

3.1 Point Count Data 1-5

3.1.1 Hypothesis 1 1-6

3.1.2 Hypothesis 2 1-7

3.1.3 Hypothesis 3 1-7

3.2 Raven Nest Searches and Surveys 1-8

4.0 Adaptive Management 1-8

4.1 Definition 1-8

4.2 Adaptive Management Conditions 1-8

4.2.1 Monitoring Period 1-9

4.2.2 Spatial Design (Data Points) 1-9

4.2.3 Study Design 1-9

5.0 Monitoring Report Requirements 1-9

6.0 References 1-9

Part 2 Raven Management and Control

1.0 Purpose and Objectives 2-1

2.0 Management Practices 2-1

2.1 Construction 2-1

2.1.1 Ponding Water 2-1

2.1.2 Waste Management 2-2

2.2 Operation 2-2

2.2.1 Evaporation Ponds 2-2

2.2.2 Perching, Roosting, and Nesting Sites 2-2

2.2.3 Waste Management 2-2

3.0 Control Practices 2-2

3.1 Nest Removal 2-3

3.2 Road Kill Removal 2-3

3.3 Methyl Anthranilate 2-3

3.4 Evaporation Pond Designs 2-3

3.5 Lethal Removal 2-3

4.0 Adaptive Management 2-3

5.0 References 2-3

Figures

Figure 1: Site Location ii

Figure 2: Sampling Design 1-3

Figure 3: Primary and Secondary Sessions 1-4

Introduction

Raven Monitoring, Management, and Control Plan
Beacon Solar Energy Project

Introduction

This section introduces the project background, purpose, objectives, and conditions of concern related to raven monitoring, management and control in the vicinity of the Beacon Solar Energy Project.

Background

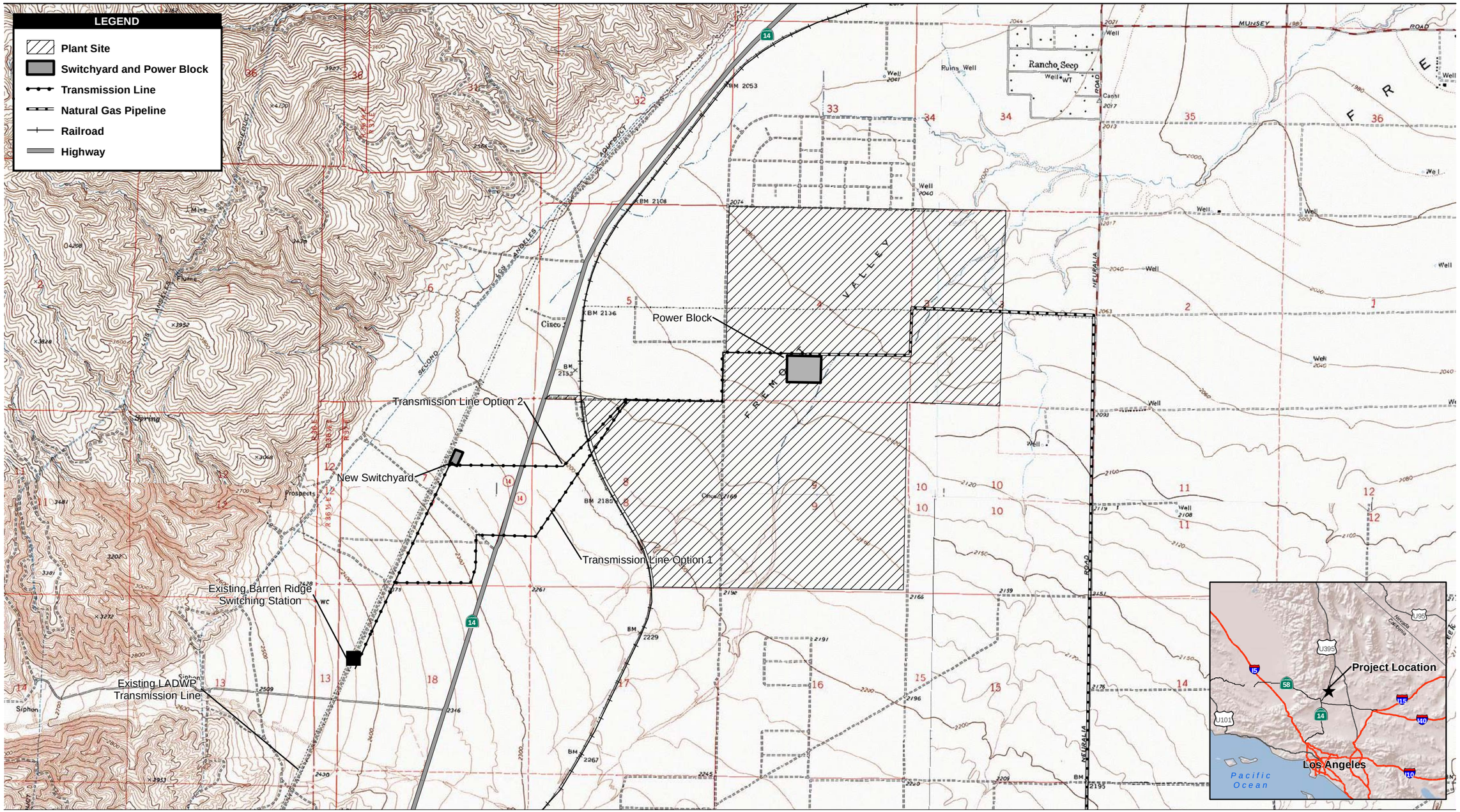
The proposed Beacon Solar Energy Project (BSEP or "Project") is located along California State Route 14 (SR-14), approximately 10 miles north-northwest of California City, approximately 15 miles north of the Town of Mojave, and approximately 24 miles northeast of the City of Tehachapi, in Kern County, California (Figure 1). Landmarks in the area include Red Rock Canyon State Park to the north, Koehn Dry Lake to the east-northeast, and the Desert Tortoise Natural Area to the east.

Beacon Solar, LLC (Beacon) proposes to develop a 250 megawatt solar energy facility on approximately 2,012 acres. The BSEP will use parabolic trough solar thermal technology to concentrate the sun's energy on a linear receiver located at the center point of each parabolic solar subarray. Energy collected in the array is used to generate steam, driving a turbine which generates electricity. This solar array would be located east of the railroad tracks, which run parallel to and east of SR-14. Two options are under consideration for a short (<3.5 miles) transmission line, which will be constructed from the solar array across SR-14 to interconnect with the Los Angeles Department of Water and Power's (LADWP) existing transmission system west of the site. Three evaporation ponds (8.3 acres each), used to manage the cooling tower blowdown stream, are planned within a highly disturbed portion of the survey area. A 17.6-mile, eight-inch natural gas line, which will connect an existing Southern California Gas pipeline in California City with the Project, will be constructed to provide fuel for startup and emergency operations.

The proposed Project has the potential to indirectly impact populations of the desert tortoise, Mojave population (*Gopherus agassizii* [DT]), listed as threatened under the Endangered Species Act (ESA) and California ESA, by increasing the attraction of common ravens (*Corvus corax* [raven]) in the area and thereby increasing potential DT depredation by raven. While potential attractants are not within DT habitat, the movement of raven throughout the area and over potential DT habitat adjacent to and in the vicinity of the Project area could increase the chances of a raven encountering and depredating a DT.

Purpose

The purpose of this plan is to identify the conditions of concern specific to the BSEP that may attract ravens to the area and to define a monitoring, management and control plan that will 1) monitor raven activity and identify potential impacts to the DT using a scientifically defensible approach, and 2) specify management and control measures. The Raven Monitoring component (Part 1) is the first part of the overall plan and is intended to be supplemented by the Raven Management and Control component (Part 2) that establishes management and control measures that will avoid, minimize, or mitigate impacts. Both Part 1 and Part 2 include implementable adaptive management techniques to refine the program over time, as needed, to meet the objectives.



Source: TetraTech 2007; Kern County 2007; USGS 2007; WorleyParsons 2007

2,750 1,375 0 2,750 Feet

Scale: 1:33,000; 1 inch = 2,750 feet

Figure 1
Site Location

Path: P:\2008\08080001 FPLE Proj Beacon Solar\5GIS\MXD\Raven\Figure 1 Vicinity Map.mxd, 07/10/08, LeeJ

Conditions of Concern

The conditions of concern are those project features or activities that, when not properly managed, may result in changes in raven population or behavior that could potentially adversely affect the DT population. There are four basic conditions of concern that have been identified for the BSEP and have been considered in developing the Raven Monitoring, Management, and Control Program:

1. Water from evaporation ponds;

2. Potential creation of new perching/roosting/nesting sites;

3. Water ponding potential from dust suppression; and,

4. Construction/operation waste management.

The study design for raven monitoring (Part 1), as well as measures for raven management and control (Part 2), are 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 three evaporation ponds that are used to collect blowdown water from the cooling towers. The three evaporation ponds will have a nominal surface area of 8.3 acres each for a total of 25 acres. The addition of a new water source to an area where water sources are generally sparse may result in the attraction of raven to the BSEP. Ravens will travel up to 65 kilometers (km) from their roosts for subsidies including water (Boarman 2003). However, much shorter distances to point subsidies are more common and Kristan and Boarman (2003) observed that raven densities declined with increasing distance from point subsidies.

Perching, Roosting, and Nesting Sites

Project components, such as tower structures, transmission poles and lines and support structures may provide new elevated perching and roost sites that have the potential to increase raven use of the area. Nesting ravens generally remain within 400 meters (m) (Kristan and Boarman 2003) to 560 m (Karl 2007) of the nest.

Ponding Water

During construction, water will be applied to the graded areas, construction right-of-way, dirt roads, trenches, spoil piles, and other areas of ground disturbance to minimize dust emissions and topsoil erosion. Ponding water resulting from these dust suppression activities has the potential to attract ravens, thereby potentially resulting in increased predation by raven on the DT.

Waste Management

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

PART 1
Raven Monitoring

Raven Monitoring, Management, and Control Plan
Beacon Solar Energy Project

1.0 Purpose and Objectives

The purpose of this component of the Raven Monitoring, Management, and Control Plan is to summarize the monitoring approach for the BSEP, including the survey and data interpretation methodologies.

Specific objectives for Raven Monitoring include:

1. Document the impact of the BSEP on raven activity.

2. Document DT predation by ravens at nesting sites in the immediate BSEP area.

3. Document if there is a relationship between the BSEP conditions of concern and raven activity.

4. Document the effectiveness of raven management and control measures (Part 2) implemented at the BSEP.

5. Define conditions for implementation of management and control measures using adaptive management principles.

2.0 Monitoring Design

Raven monitoring is designed to be implemented in the preconstruction, construction, and postconstruction (operations) phases of the BSEP. The monitoring program is designed as an observational study utilizing *a priori* hypotheses. It is intended to allow for the comparison of desired metrics or indices representing raven populations (e.g., activity or presence) to the overall effects of the Project and to specific features such as the evaporation ponds or non-project related features that may also provide subsidies to ravens. In addition, raven predation of DT will be documented in any new nesting areas within 1 km of the Project.

The proposed design is a modification of a Before-After-Control-Impact (BACI) study (Pollock 1994). The Before-After is the temporal component of the design and the Control-Impact is the spatial component of the design. It is necessary to include both components to most accurately describe change as a result of a project. BACI studies are intended to distinguish impacts of a project from surrounding environmental change. They function on the assumption that it is possible to sample replicate units in an area both before and after an impact (Pollock 1994) to identify changes that are associated with the impact rather than with natural changes in the region.

Because change in the environment is common and can be caused by human activity or natural events not associated with the Project, it is necessary to pair treatment sampling points (area where impact occurs) with reference or control sampling points (Smith 2002; Paul and Bustard 2004; Pollock 1994; Kerlinger 2002). The BACI study design also assumes that the control and impact sites are subject to the same trends over time (Smith et al. 1993) and behave in a linear relationship to each other. This design requires sufficient sample sizes to reduce outside variation in the data collected.

2.1 Study Design Spatial Component

Up to 40 points will be selected at sufficient distances to be spatially independent. This number of points should provide adequate variation for proposed analyses for a species often found to have low detection rates. Points will be within five different categorical groupings in all directions

based on spatial distance to the Project site up to 30 km. Reported distances from a roost to a point resource include means of 6.9 km (Engel and Young 1992) and 27 km (Boarman and Heinrich 1999). The proposed survey distance (30 km) therefore incorporates the maximum mean distance that ravens have been reported to travel for subsidies. Group A is within the Project boundary, Group B is within 1 km of the Project area, Group C is between 1 km and 10 km, Group D is within 10 km and 20 km, and Group E is within 20 km and 30km (Figure 2).

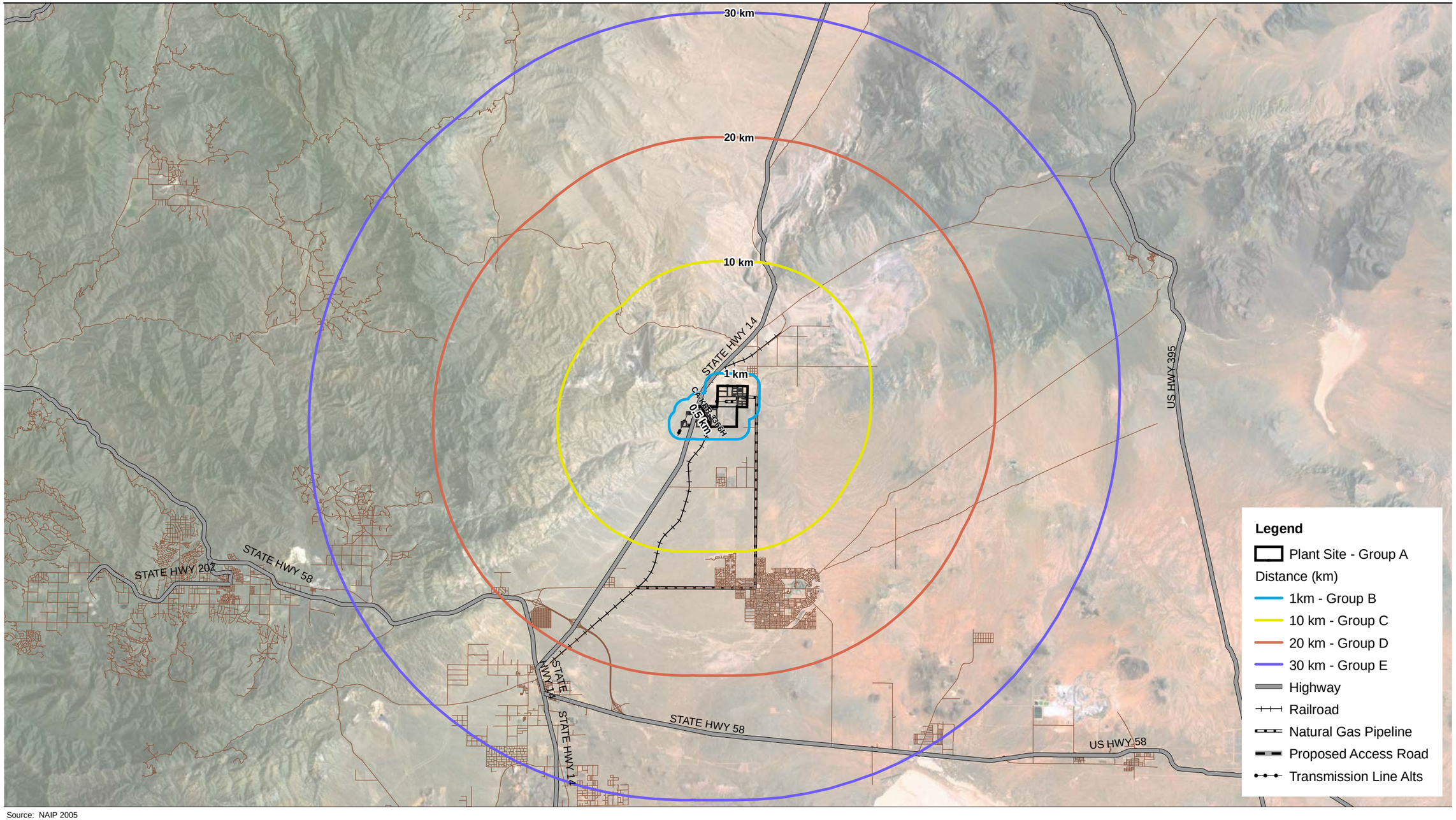
The points will be staggered strategically within each group, so when considered separate from groupings they will approximate a continuous distribution of points at different distances to the Project site (i.e., there will be points at varying distances and directions from the Project area from 0 to 30 km). In addition, point selection will also attempt to incorporate other potential sources of variation in raven activity to allow for alternative comparisons and explanations of appropriately documented baseline conditions.

Points will be selected based on accessibility and representation of features of concern. For instance, points within the Project boundary (Group A) will be placed within visual distance of structures of concern such as evaporation ponds and other manmade structures that may provide resource subsidies such as perching or nesting substrates. Some points outside the Project boundary will be placed at features that may also contribute to increased raven activity such as trees at the Honda Proving Center test track, Koehn Dry Lake, areas with increased human presence or activity (e.g., parks and residential and commercial areas), and agricultural areas representing preconstruction conditions. Remaining points will be placed to best represent an even spacing in all directions within each group. By placing points in this manner, it allows for several potential analytical comparisons, increasing the chances of deriving useful information from statistical analyses. In addition, because distances of points to the BSEP and other outside potential sources of increased raven subsidies will vary, it will be possible to compare competing models describing raven activity to determine if the BSEP is a primary source of increase or other sources are more likely responsible. Potential analyses are discussed further in Section 3.1.

Sampling will consist of two methods: 1) point counts at established sampling points, and 2) focused raven nest surveys within 1 km of the BSEP (Groups A and B).

2.2 Point Count Methodology

At each established sampling point, a 12 minute point count will be conducted. This 12 minute count is the primary session (MacKenzie et al. 2006). The primary sampling survey at each point (Figure 3) will be broken into three equal secondary sessions, or consecutive four minute surveys (s(1)=0:00-4:00 min, s(2)=4:00-8:00 min, and s(3)=8:00-12:00 min) (Winchell and Doherty 2006). All raven detections will be recorded during each secondary session. The surveyor will document any raven detected when arriving at a point as detected during secondary session s(1). Any individual raven detected in consecutive secondary sessions (detection overlaps from one secondary session to the next) will be documented as such in both sessions. The surveyor will record raven detections as adults and juveniles and will document the behavior of detected raven (perched, flying, nesting, etc.) In addition, location of any nests detected during a survey will be noted and Universal Transverse Mercator (UTM) coordinates recorded immediately following the conclusion of the primary session at a point. Additional data collected will be time at start and end of survey, weather (including temperature, average wind speed, and percent cloud cover), and other bird species identified. Point counts should not be conducted when wind or rain interferes with audible detection or rain interferes with visual detection, or when unusual weather events may affect raven behavior.



Source: NAIP 2005

25,500 12,750 0 25,500 Feet

Scale: 1:306,000; 1 inch = 25,500 feet

Figure 2
Sampling Design

Path: P:\2008\08080001 FPLE Proj Beacon Solar\5GIS\MXD\Raven\30km_buffer_map.mxd, 07/10/08, LeeJ

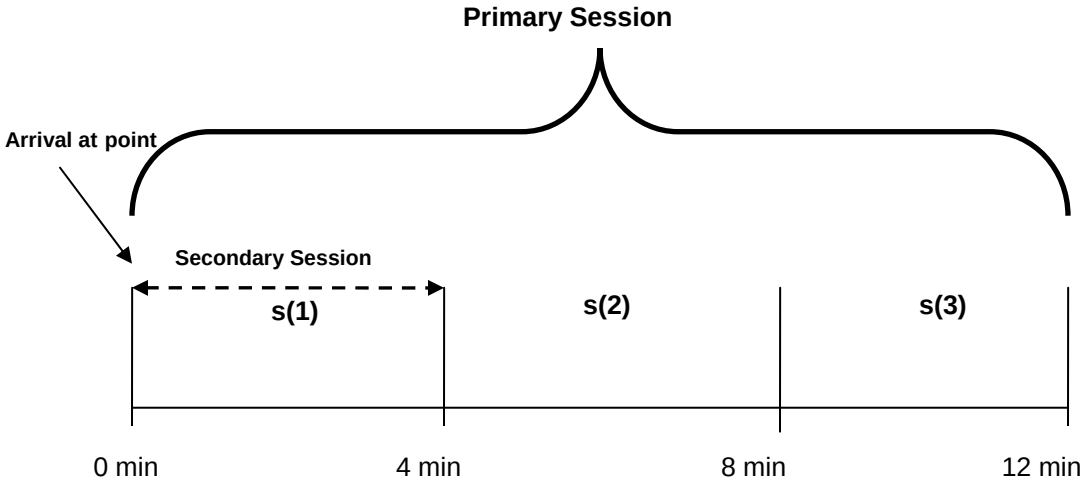


Figure 3: Primary and Secondary Sessions

2.3 Raven Nest Surveys

Raven nest surveys will follow a modified form of raptor nest search protocol (CEC 2007). Nesting surveys will be conducted one time at the end of the typical breeding season (mid-June) to identify nests or evidence of predation at nests (USFWS 2008). Each survey will consist of systematically searching the immediate project area and within 1 km of the Project boundary (Groups A and B). Surveys will be conducted by vehicle when possible and by foot when necessary. All Joshua trees, landscape trees, utility poles, transmission towers, and manmade structures within the survey area will be searched. A UTM coordinate, as well as nesting substrate and current breeding status, will be recorded for each nest located. Known nests will be revisited during systematic searches for each successive survey and status recorded. Biologists will search a 30 m radius surrounding each nest for evidence of DT predation. All DTs depredated will be photographed, and the length measured (or estimated). Each DT will be marked to avoid duplication of data recording on subsequent surveys.

2.4 Preconstruction Monitoring (Approximately 1-year)

Preconstruction monitoring will occur for as close to one year prior to start of construction (anticipated June 2009) as the approval of the monitoring plan by the resource agencies allows. If one year of data is not collected, the data can still produce statistically useful and valid information as the analysis will account for the survey duration. One year of monitoring provides a substantial amount of baseline data and will assist in addressing concerns and uncertainties involving variation in seasonal activity and detection rates. In addition, a comprehensive preconstruction data set provides quantitative evidence of required survey effort for future monitoring.

Raven point count surveys will be conducted every other week for up to two times a month. Point count surveys will be sampled by multiple teams (2) throughout a single day. The chronological

order in which points are monitored will be rotated each survey to ensure points are monitored at multiple times of the day in each season, reducing potential detection bias.

2.5 Construction Phase

Monitoring will consist of weekly reconnaissance surveys at the Plant Site, by the onsite BSEP Environmental Compliance Monitor, to identify potential increases in raven activity.

2.6 Postconstruction Monitoring (2-years)

Postconstruction monitoring will be conducted for two nonconsecutive years (years 1 and 4 postconstruction) during the operations phase of the BSEP. It is likely that if there is no detectable difference in raven activity indicating adjusted behavioral patterns in that amount of time, then the likelihood of a cause-effect relationship from the Project may be low (and/or management or prevention measures are working) and indices would not warrant the continued collection of data. If, however, in a single year, or after both years, statistically significant trends are observed, then mitigation measures may need to be considered and adaptive management principles may be implemented (see Section 4.0 below), including monitoring of those conditions and measures.

If, following analysis of data collected during preconstruction monitoring, the timing of raven point counts is determined to be more effective during specific times of day, monitoring may be adjusted to include only those periods (morning or mid-day) when detection is greatest. In addition, if the number of raven point count surveys is determined to be redundant following analysis of data collected during preconstruction monitoring, the number of surveys may be reduced appropriately in consultation with appropriate agencies. Redundancy will be determined using quantitative methods such as high percentages of temporal correlation between surveys in the same month or power analysis. Potential reductions in number of surveys may include, but are not limited to, reducing surveys to one time per month or conducting surveys only during spring and fall.

3.0 Data Interpretation

The monitoring approach includes data collection and interpretation for both population (point count data) and nesting activity. The data interpretation methods for each of these are described in this section.

3.1 Point Count Data

Data collected during pre-construction point count monitoring will be analyzed to answer specific questions as outlined in the monitoring objectives. The following describes the proposed tests for data analysis. However, should the distribution of data collected not conform to required assumptions for the proposed test, or not yield results with a reasonable ability to detect change (high Type II error, low power), the structure of the study design and sampling protocol allow for alternate tests to be employed, increasing the potential usefulness of the data without increasing sampling effort. Alternative tests that can be supported by the design and monitoring protocol include but are not limited to binary probabilistic models such as logistic regression and occupancy modeling. The proposed statistical tests to employ and the triggers to prompt adaptive management conditions are described below.

Raven activity at each sampling point will be quantified as a continuous Relative Activity index (RA [Eq. 1]) (George and Crooks 2006).

Eq. 1.

$$RA = v_S/n_P$$

v_S = number of raven observations during secondary session s.

n_P = number of secondary sessions in primary session P.

RA uses the secondary session structure of a primary session to account for the amount of raven activity at a point. For example, the activity index for a point where a raven flew over and was observed one time in one of the three secondary sessions would equal 1/3, or 0.33 and the activity index for a primary session where a raven was observed on a transmission tower in all three secondary sessions would equal 3/3, or 1, accounting for the greater amount of activity observed during the primary survey at that point.

The benefit of using an activity index as opposed to only using point count numbers is it allows for more descriptive assessment of activity in data analyses without increasing the complexity or level of effort of the field survey. The activity index allows for a quantitative method of analyzing raven activity in addition to raven numbers and hence the attractiveness of a particular site to ravens. For example, it has been suggested the evaporation ponds could provide a resource subsidy and therefore attract ravens. Thus, it is important to measure not only the presence of a raven at the evaporation ponds, but the level of activity of the raven at those ponds to help distinguish the strength of that attractant. If a raven is merely flying over the ponds and is not enticed to use them, the activity index would be lower than an activity index representing a raven that spends considerable time around the ponds, which would show a higher correlation to the attractant.

Because the distribution of indices based on count data is often skewed, especially when occurring in low numbers, typical transformations such as log- or square root may be required to conform to the assumption of normal distribution for some statistical tests.

If data distribution conforms to required test assumptions, hypotheses will be tested in the following manner:

3.1.1 Hypothesis 1

Hypothesis (null): raven activity does not change with distance from the BSEP within a single year.

Test: Linear Regression.

Dependent variable: RA (continuous).

Independent variable: distance of each point to the BSEP (continuous).

This test attempts to determine if there is a statistically significant linear relationship (positive or negative) between raven activity levels and the project site. A significant test statistic indicates there is a trend and raven activity varies with distance to the project site. A negative relationship would indicate ravens are more active near the project site and a positive relationship would reflect the inverse. This same test can be used to determine the effect of other spatial features in the study area by using alternate independent variables such as distance to California City, distance to Honda Proving Center test track, distance to Red Rock Canyon State Park, and/or distance to Koehn Dry Lake. The use of these alternate variables will allow comparison between the impacts of the BSEP and outside variables.

Trigger: A significant test statistic (90% confidence, p=0.10) indicating raven activity is negatively associated with increasing distance from the BSEP would result in changes to the monitoring program duration (see Section 4.1.2) and may trigger the analysis and implementation of raven control measures to reduce raven activity as defined in Part 2.

3.1.2 Hypothesis 2

Hypothesis (null): raven activity does not increase with time as construction and operation of the BSEP proceeds.

Test: repeated measure Generalized Linear Model (rm-GLM)

Dependent variable: average RA for each year (continuous)

Independent variable: distance of each point to the BSEP (continuous) and year of sampling (categorical)

A more advanced method of the linear regression described above, rm-GLM incorporates repeated sampling over time at the same points. The test will compare differences in the yearly average raven RA at particular sampling points between the one year of preconstruction and the two years of postconstruction monitoring. A significant test statistic indicates there is a trend and raven activity varies with distance to the project site. In addition, the test will also determine if there is a statistically significant linear relationship between raven activity and time since commencing operations. In other words, this test attempts to distinguish between variation in data collected as a result of distance to the BSEP while incorporating and accounting for general changes in raven activity over time.

Trigger: A significant test statistic (90% confidence, p=0.10) indicating raven activity is negatively associated with increasing distance from the BSEP would result in changes to the monitoring program duration (see Section 4.1.2) and may trigger the analysis and implementation of raven control measures to reduce raven activity as defined in Part 2.

3.1.3 Hypothesis 3

Hypothesis (null): raven activity is not higher at manmade structures.

Test: two tailed t-test

Dependent variable: average RA for each year (continuous)

Categorical grouping variable: Points are located at a manmade structure resulting from project activities (treatment) or points are not located at a manmade structure (control).

This test will evaluate if manmade structures such as evaporative ponds or roofs on new structures are increasing raven activity. A significant test statistic would indicate raven activity is different at points adjacent to project-related manmade structures than points not adjacent to project related manmade structures. A significant test statistic where the mean raven RA in the treatment group is greater than the mean raven activity in the control group would indicate raven are more active at project related manmade structures.

Trigger: A significant test statistic (90% confidence, p=0.10) indicating raven RA is higher at project related manmade structures will result in measures to reduce raven activity as defined in the Part 2.

3.2 Raven Nest Searches and Surveys

Because monitoring of raven predation on DTs will only occur in the immediate area of known nests, descriptions of nesting behavior and DT predation will be qualitative. Data documenting DT predation will be valuable for assessing raven behavior and documenting potential problem individuals for management actions.

Trigger: An increase in the number of raven nests with signs of DT predation, above observed regional nesting increases, will result in measures to control new raven nesting activity in the immediate area as defined in Part 2.

4.0 Adaptive Management

This section defines how adaptive management principles will be applied to the Raven Monitoring portion of the Plan.

4.1 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).

Although the overall Raven Monitoring, Management, and Control Plan may ultimately apply both passive and active adaptive management, adaptive management for this monitoring component will only apply passive adaptive management techniques. Changes to the proposed approach under the auspices of adaptive management will only be made if the desired objectives are not being met.

4.2 Adaptive Management Conditions

Based on assumptions made in development of the proposed monitoring approach defined in Sections 2 and 3 above, potential changes to the monitoring approach may occur to facilitate meeting Plan objectives. Foreseeable areas where changes may occur include the following design parameters:

1. Monitoring Period
2. Study Design
3. Statistical Analysis

Each of these situations and the conditions that may prompt them are described in more detail below. Other adaptive management techniques may also be identified during implementation of the monitoring program. If the need for changes arise, beyond those identified below, those

conditions will be discussed with the Project proponent and the resource agencies before any decisions are made.

4.2.1 Monitoring Period

The proposed postconstruction monitoring period is set at two years (years 1 and 4) of operations. Beacon may extend the postconstruction monitoring period by an additional year in year 7 if the postconstruction data show a statistically significant trend ($p = 0.1$) of increasing raven population (nests or activity). If a monitoring period extension is initiated, the management measures defined in Part 2 will be assessed for effectiveness and appropriate control measures will be considered if a clear BSEP causal impact is identified. The study design will also be reevaluated at this time to determine appropriate sampling effort to yield statistically valid results as described in Section 2.6. Resulting actions may include but are not limited to a reduction in number of surveys or length and timing of point counts.

4.2.2 Spatial Design (Data Points)

The proposed number of data points includes five groups of up to eight points for a total of up to 40 individual points. The point groups are based upon distance from the BSEP. The individual points are based upon existing land uses that may influence raven populations independent of the BSEP as defined in Section 2.0. The individual points serve as either a control or effect point to evaluate the data based on statistical assessments discussed in Section 3.0 above. Beacon may reduce the number of points if data collected show no net benefit from individual locations (or for other justifiable reasons). Alternately, the Project proponent may relocate points for similar reasons. No more than 40 points will be surveyed.

4.2.3 Study Design

The proposed study design is based upon an observational study approach where the data are collected and analyzed on existing conditions. Under the proposed approach, no direct modifications or changes to the subject (i.e., ravens) are proposed. If monitoring data indicate that impacts are occurring and the decision is made to implement control measures that would result in direct impacts to raven populations (i.e., lethal removal under a depredation permit), the monitoring approach may need to be modified to account for the change from an observational study to an experimentally manipulated study. An experimentally manipulated study results when there is a direct change to the study population (i.e., removing raven from the study area). This modification will only occur if lethal depredation under an approved depredation permit is initiated for the proposed Project.

5.0 Monitoring Report Requirements

Monitoring summary reports will be prepared after each survey year to document survey results and data analyses. A comprehensive Raven Monitoring Report will be prepared after completion of all three survey years. Each report will include recommendations for mitigation in accordance with identified triggers and the conditions identified in Part 2.

6.0 References

Boarman, William I. 2003. Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises. *Environmental Management*. V32:2 p205-217.

Boarman and Heinrich. 1999. Common Raven. *The Birds of North America*. Eds. A.Poole, and F.Gill., No. 476. The Birds of North America, Inc., Philadelphia, PA.

California Energy Commission (CEC). 2007. California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy. Commission Final Report. CEC-700-2007-008-CMF.

Engel, K.A. and L.S. Young. 1992. Movement and habitat use by common ravens from roost site in southwestern Idaho. *Journal of Wildlife Management* 56:596-602.

Holling, C.S. 1978. *Adaptive Environmental Assessment and Management*. Chichester: Wiley.

George, S.L. and K.R. Crooks. 2006. Recreation and large mammal activity in an urban nature reserve. Biological Conservation 133:107-117.

Karl, Alice. 2007. Personal Communication with William Boarman.

Kerlinger, P. 2002. An assessment of the impacts of Green Mountain Power Corporation's Searsburg, Vermont, wind power facility and breeding and migrating birds. Curry & Kerlinger, L.L.C.

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

MacKenzie, D.I., J.D. Nichols, J.A. Royle, K.H. Pollock, L.L. Bailey, J.E. Hines. 2006. Occupancy Estimating and Modeling: Inferring Patterns and Dynamics of Species Occurrence. Academic Press, Oxford, UK.

Paul, A.J., and D. Bustard. 2004. Study designs for environmental impact assessment: an example using bull trout (*Salvelinus confluentus*) and the Kemess South Mine Project. Proc. Forest Land-Fish Conference II – Ecosystem Stewardship through Collaboration. Eds. G.J. Scrimgeour, G. Eisler, B. McCulloch, U. Silins and M. Monita, April 26-28, Edmonton, Alberta. pp. 17-18.

Pollock, K.H. 1994. Assessing avian-wind power interactions: sampling, study design and statistical issues. 1994 National Avian-Wind Power Planning Meeting Proceedings.

Smith, E.P. 2002. BACI design. *Encyclopedia of Environmetrics*. Eds. Abdel H. El-Shaarawi and Walter W. Piegorsch (ISBN 0471 899976), 1:141-148.

Smith, E.P., D. Orvos, and J. Cairns Jr. 1993. Impact assessment using before-after control-impact (BACI) models: concerns and comments. *Can. J. Fish. Aquat. Sci.* 50:627-637.

USFWS. 2008. Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise. March 2008.

Winchell, C., and P. Doherty. 2006. Estimation of California gnatcatcher pair abundance and occupancy rates. Report Prepared for California Department of Fish and Game, San Diego, CA.

PART 2
Raven Management and Control

Raven Monitoring, Management, and Control
Beacon Solar Energy Project

1.0 Purpose and Objectives

The proposed Project has the potential to indirectly impact populations of the DT as described in Part 1. The monitoring effort is intended to result in data that may be used to determine if additional mitigation is needed and to establish triggers to guide decisions regarding raven management and control. This Raven Management and Control component (Part 2) establishes management and control measures that will mitigate impacts to DTs. The purpose of this component of the Raven Monitoring, Management, and Control Plan is to summarize the management and control measures for the BSEP and the specific conditions for their implementation.

Specific objectives include:

1. Clearly identify how the Project will utilize project design features to manage the conditions of concern specific to the BSEP that may attract ravens to the area.

2. Specify how and when mitigation measures will be implemented if the monitoring program triggers the need for additional controls.

2.0 Management Practices

This section specifies management practices (Project Design Features [PDFs]) to be implemented by the project to minimize the potential for the Project to attract ravens. The four basic conditions of concern were identified for the BSEP in the introduction of this Plan. These conditions of concern have been grouped into construction and/or postconstruction (operation) phase conditions, as appropriate for the project. Construction phase conditions are considered temporary and are anticipated to be avoided or minimized mainly by the implementation of management measures as defined in Section 2.0 below. Postconstruction conditions will include management measures to minimize potential impacts and may require additional control measures that are anticipated to be influenced by the results of the monitoring program (Section 3.0).

2.1 Construction

Construction phase impacts are considered more temporary in nature than postconstruction impacts and would therefore require temporary management practices to avoid or minimize the potential to attract ravens at the BSEP. Construction phase conditions of concern for the BSEP include ponding water and waste management as discussed further below.

2.1.1 Ponding Water

Water will be applied to the graded areas, construction right-of-way, dirt roads, trenches, spoil piles, and other areas where ground disturbance has taken place to minimize dust emissions and topsoil erosion. Ponding water resulting from dust suppression activities has the potential to attract ravens, resulting in increased predation of DTs by ravens.

Application rates of water for dust suppression will be determined to minimize excessive application that would result in ponded water, and should consider soil infiltration and evaporation rates. During the DT active season, a monitor will patrol areas to ensure water does not puddle for long periods of time.

2.1.2 Waste Management

Both construction and operation of the BSEP will result in increased waste generation in the Project area. Improper waste management can result in the attraction of raven to the Project area.

A trash abatement program will be established. Trash and food items will be contained in closed containers on the plant site and removed daily to reduce the attractiveness to opportunistic predators such as ravens. The Worker Environmental Awareness Program will assist in ensuring that no trash will be available that might attract DT predators.

2.2 Operation

Operations phase impacts are considered ongoing impacts and would therefore require ongoing management practices to avoid or minimize the potential to attract ravens at the BSEP. Operations phase conditions of concern for the BSEP include evaporation ponds, perching sites, and waste management as discussed further below.

2.2.1 Evaporation Ponds

The proposed Project includes three evaporation ponds that are used to collect blowdown water from the cooling towers. The three evaporation ponds will have a nominal surface area of 8.3 acres each for a total of 25 acres. The addition of a new water source may result in the attraction of ravens to the BSEP. PDFs to deter use of the ponds by ravens include pond design features that will make the pond water less available to ravens (e.g., steep pond sides, at least two feet of freeboard). In addition, reducing other potential site attractants (see below) will assist in reducing the attractiveness of the site to ravens

2.2.2 Perching, Roosting, and Nesting Sites

Project components, such as tower structures, the transmission poles and lines, and support structures provide new elevated perching sites that have the potential to increase raven use of the Project area. PDFs to reduce impacts from these features include the use of physical bird deterrents such as bird spikes, Bird-B-Gone, and WhirlyBirds to deter use by ravens and other birds.

2.2.3 Waste Management

The trash abatement program developed for the construction phase will also include operations phase measures to be implemented for the life of the Project. Trash and food items will be contained in closed containers and removed daily to reduce the attractiveness to opportunistic predators such as ravens.

3.0 Control Practices

If the monitoring efforts defined in the Raven Monitoring portion of the Plan (Part 1) indicate that there is a statistically significant increase (i.e., a significant test statistic [90% confidence, p=0.10]) in raven activity that is associated with DT predation, even with the implementation of PDFs as defined in Section 2.0 above, then the Project proponent will need to implement additional mitigation measures to further control ravens at the Project site. This section defines the types of control practices that may be implemented if additional mitigation is determined to be necessary.

3.1 Nest Removal

Raven nest removal may be utilized to control DT predation. Raven nest removal will only occur if monitoring identifies a significant increase in nests with evidence of DT predation. Raven nest removal by newly nesting ravens in the vicinity of the BSEP area (1 km) will only occur if there is evidence that specific raven pairs are depredating on DTs. Raven nest removal of specific nests will be approved by CDFG and USFWS.

3.2 Road Kill Removal

This measure may include the removal of observed roadkill during normal onsite activities.

3.3 Methyl Anthranilate

Methyl anthranilate is a naturally occurring GRAS (generally recognized as safe) listed compound used as a food flavoring and fragrance additive. Chemical formulations containing Methyl anthranilate have been found to be effective bird aversion agents. Formulations of methyl anthranilate act as chemosensory repellents by irritating pain receptors associated with taste and smell. Use of Methyl anthranilate for raven deterrents will be further investigated.

3.4 Evaporation Pond Designs

These must be selected and designed to maintain the intended function of an evaporation pond, not just biological considerations. Also, biological considerations for this document will be based upon raven deterrents only (not general wildlife impacts). Classes of controls may include pond covers or screens, hazing techniques, and altering the water quality.

3.5 Lethal Removal

4.0 Adaptive Management

Adaptive management in Part 2 is specifically in reference to PDF and control/mitigation measure implementation. This section will define potential changes to the mitigation and conditions that may trigger them. Key examples would be: (1) eliminating or refining a PDF or mitigation measure if it is not working, or (2) incorporating a defined mitigation measure if impacts are observed that would not otherwise be implemented (triggered). Other adaptive management techniques may also be identified in this section.

5.0 References

Boarman, William I. 2003. Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises. *Environmental Management*. V32:2 p205-217.