Avian and Bat Mortality Monitoring Plan

Libra Solar Project
N-99846

Mineral and Lyon Counties, Nevada

Prepared for:
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Table of Contents

List of Figures

List of Tables

Attachment

1 INTRODUCTION

1.1 BACKGROUND

This Avian and Bat Mortality Monitoring Plan (Plan) was developed to establish protocols to monitor avian and bat fatalities associated with the Libra Solar Project (Project). The Project is being undertaken by Libra Solar, LLC (Proponent). The Project is located on public land administered by the Bureau of Land Management (BLM) in the northeastern portion of the Great Basin Desert; approximately 12 miles southeast of Yerington, Nevada and 55 miles southeast of the Reno metropolitan area (Figure 1). The Project is located in an unincorporated area of Mineral County, Nevada, and some of the linear features are also located in Lyon County, Nevada. The Project site is east of Mason Valley and 12 miles east of State Highway 239 within the Hussman Spring and Buckbrush Spring United States Geological Survey (USGS) 7.5-minute topographic quadrangles.

The Project is located within a variance area for solar power generation under the *2012 Approved Resource Management Plan Amendments/Record of Decision for Solar Energy Development in Six Southwestern States* (BLM 2012). The Project is on an approximately 5,778-acre right-of-way (ROW) located on federal lands administered by the BLM under the *2001 Carson City Consolidated Resource Management Plan* (BLM 2001), with the exception of a portion of the generation tie-in (gen-tie) line located on state lands within the Mason Valley Wildlife Management Area (Figure 2). The ROW application contains a larger area than required for the solar field to allow for adjustments in the facility layout to minimize environmental impacts, based on the National Environmental Policy Act (NEPA) analysis (Libra Solar, LLC 2022).

Baseline biological inventory surveys were conducted over the ROW area, or portions thereof, throughout the Project area in 2022 and 2023. Biological inventory surveys included a botanical inventory (Phoenix Biological Consulting [PBC] 2022 and 2023a), golden eagle surveys (Dugan Biological Services [DBS] and PBC 2022), avian point count surveys (PBC 2023b), burrowing owl surveys (PBC 2023b), raptor surveys (PBC 2023b), and bat acoustic surveys (Western Ecosystems Technology, Inc. [WEST] 2023). Of note, only botanical inventory surveys were conducted over the entire ROW area (the solar site, gen-tie line, and access road). Bird and bat surveys were conducted only for the solar site, as such, the "Study Area" for the purposes of this report refers only to the solar site while the gen-tie line and access road are discussed separately.

1.2 PROJECT DESCRIPTION

The Project includes the construction, operation, maintenance, and decommissioning of an up to 700-megawatt (MW) alternating current (MWac) photovoltaic (PV) solar power generating facility and ancillary facilities, including a 700-MW battery energy storage system (BESS).

Project components include on-site facilities, off-site facilities, and temporary facilities needed during Project construction. The major on-site facilities are comprised of solar array blocks, a 34.5-kilovolt (kV)

collection system, substations, energy storage systems, the 230-kV gen-tie line, and O&M facilities (Figure 2). Each array block would have an integrated battery energy storage system, inverters, and medium voltage transformers. Electricity generated by the Project would be interconnected to the NV Energy transmission system via overhead gen-tie lines extending from the Project switchyards to NV Energy's Fort Churchill Substation (Figure 1).

The panel arrays are arranged in north-south oriented rows on the horizontal tracker mounting system and drive motors would rotate the horizontally mounted solar panels from east to west to follow the sun (on a single axis) throughout the day. The highest point for a horizontal tracker would be reached during the morning and evening hours when the trackers are tilted at their maximum angle and would be a maximum of 12 feet above the ground surface depending on the grade where the posts are installed. When solar modules are roughly parallel to the ground, the overall height of the tracker unit would be a maximum of 6 feet above the ground surface depending on the grade where the posts are installed.

All overhead electrical lines would be designed and installed in accordance with the Avian Power Line Interaction Committee's (APLIC) Suggested Practices for Avian Protection on Power Lines (APLIC 2006). This Plan was developed to establish standardized protocols for monitoring avian and bat mortality at the site and for quantifying the fatality rates associated with the Project. This Plan is modeled on the *Gemini Solar Project Avian and Bat Fatality Monitoring Plan* (PBC 2019), which was modeled on the *Playa Solar Facility Avian and Bat Fatality Monitoring Plan* (Playa Solar LLC 2016) and the *Silver State Solar South Avian and Bat Mortality Monitoring Plan* (Silver State Solar Power South LLC 2013). Systematic long-term studies of the risks of solar energy facilities to birds and bats are still in the early stages of development and implementation.

1.3 PURPOSE

The primary goal of this Plan is to demonstrate how impacts to birds and bats from the Project will be assessed during mortality monitoring in order to determine whether additional risk-reduction measures are needed to further protect birds and bats. The standardized approach to monitoring described herein will follow methods and collect results that allow for comparison with other large-scale solar facilities, should sufficient data be available, in order to better understand and address the risks of large-scale solar projects on birds and bats. Monitoring methods are designed to yield estimates of total bird and bat mortality rates and total numbers of mortalities, to determine spatial or temporal/seasonal patterns of mortality, and to evaluate risk to species (including special-status species) and/or taxonomic groups or behavioral guilds. This Plan follows the methods proposed in the Gemini Solar Plan, including using the most current, scientifically validated, and accepted methods to calculate fatality rates adjusted for carcass removal rates, searcher efficiency, and spatial and temporal sampling intensity (PBC 2019).

FIGURE 1. LIBRA SOLAR PROJECT COMPONENTS AND LOCATION

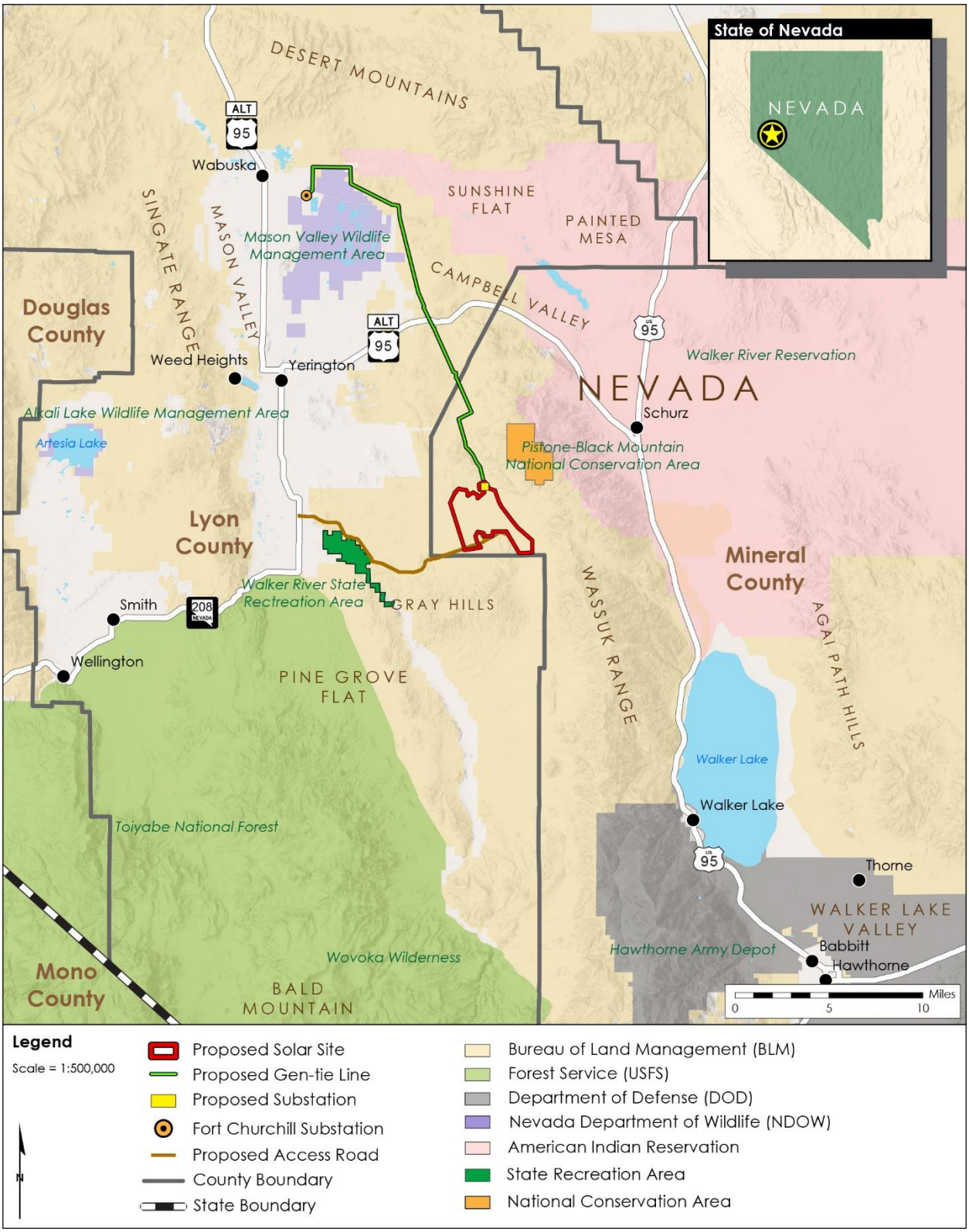
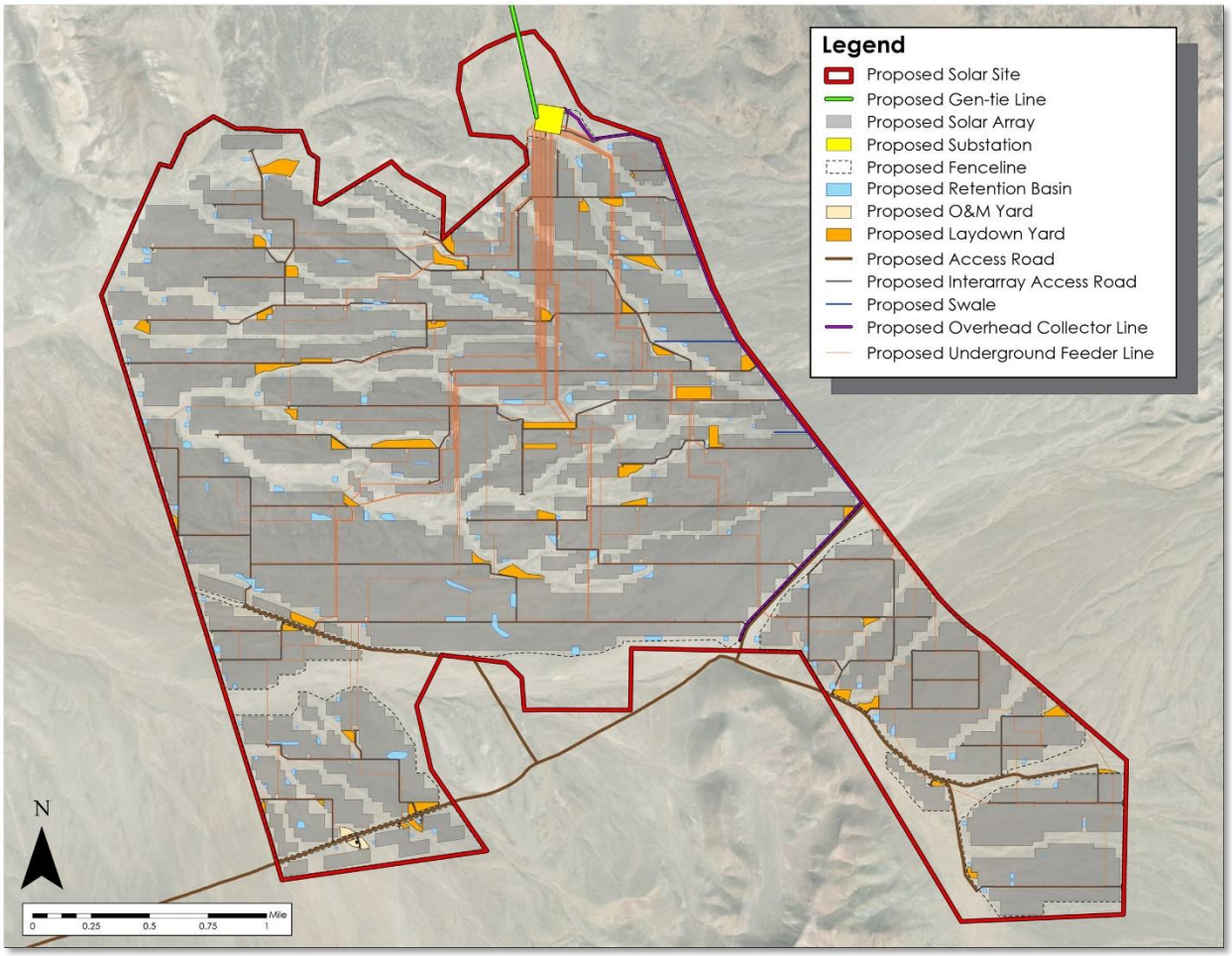


FIGURE 2. LIBRA SOLAR ARRAY AND COMPONENTS



2 MONITORING METHODS

2.1 OVERVIEW

Because large-scale solar facilities are a relatively new technology, many of the systematic avian and bat fatality monitoring studies are either under development or in the early stages of implementation. To date, there is no agency-issued protocol for conducting avian and bat fatality monitoring at large-scale solar facilities; however, the United States Geological Survey (USGS), in coordination with USFWS, recently published the Mortality Monitoring Design for Utility-scale Solar Power Facilities (Huso et al. 2016), which is based in part on the distance sampling techniques that are currently being utilized at large-scale solar facilities. In consultation with the BLM, it was determined that this Plan will follow the distance sampling survey techniques and analytical methods described in the Gemini Plan (PBC 2019), which were developed based on other similar plans and in consultation with the USFWS.

Recently developed systematic mortality monitoring studies for large-scale PV facilities use distance sampling to acquire a valid estimate of mortality rates and total numbers of fatalities. The distance sampling program used at the Gemini Solar Project, and proposed for use at this Project, includes the following fundamental components: sampling methods, spatial and temporal sample coverage, adjustments of counts for search efficiency and carcass removal, and selection of an appropriate statistical fatality estimator (PBC 2019).

The following terms are used below in the sampling methods:

- PV module: the PV cartridge or panel.
- Row: a collection of PV modules that are mounted on support structures in a horizontal tracking device that follows the sun throughout the day.
- Subsection: a collection of rows surrounded on all sides by access roads.
- Array: A collection of four subsections that are connected to a common inverter/transformer, and the associated access roads. The array is the sample unit used in the statistical analysis.
- Solar field: The collection of arrays that comprise the solar facility.

Distance sampling is the preferred method for conducting carcass searches at traditional solar facilities because the PV arrays (as well as the linear features: the gen-tie lines, collector lines, and perimeter fencing) are relatively flat and typically clear of visual obstructions (i.e., vegetation) (Huso et al. 2016). To conduct distance sampling searches in the PV array field, the surveyors walk or slowly drive along the roads between the PV arrays and search the PV rows without leaving the roads (observers will carry binoculars). Distance sampling assumes that the probability of carcass detection along the roads is 1.0 and that the probability of carcass presence along the road is uniform. Distance sampling assumes that searcher efficiency decreases as a function of distance from the observer so that the number of carcasses detected will be highest along the road and will decrease with distance away from the road. As would be expected, and as has been shown in other studies, there is high likelihood of detecting all of the carcasses along the road (Huso et al. 2016; Playa Solar LLC 2016). Likewise, the potential risk of a PV array to birds and bats is expected to be relatively uniform throughout the traditionally developed array field due to the uniform distribution, low height, and flat terrain; as documented in Huso et al. (2016) and in the Gemini, Playa, and Silver State South plans, data collected at other PV facilities supports the assumption that there is a lack of systematic variation to carcass occurrences within solar arrays (PBC 2019; Playa Solar LLC 2016; Silver State Solar Power South LLC 2013).

The analysis of distance sampling involves estimating the function (p[x]) that describes how the probability of detection (p) varies with distance from the road (x). With this estimate, the number of carcasses that were not detected can then be calculated based on the prevalence and distribution of the carcasses that were detected. In addition, searcher efficiency trials and carcass removal trials will be conducted to address carcasses detection biases and carcass persistence biases under various conditions.

2.2 SPATIAL SAMPLING

Based on statistical simulations and analyses at the California Valley Solar Ranch PV facility, as reported in the Playa and Silver State South plans, the Proponent proposes initial sampling of approximately 25 percent of the solar arrays and perimeter fencing, as well as the entire gen-tie lines and collector lines (Playa Solar LLC 2016; Silver State Solar Power South LLC 2013). The portions of the Project elements to be sampled will be selected in a systematic design with a random start point in order to ensure representative coverage. Sampling will begin once all Project-related construction activities are completed. Surveys will be conducted for at least 2 years following construction.

Sampling will be conducted in the randomly selected survey areas by either walking or driving slowly along the roads perpendicular to the solar array rows, the gen-tie lines, collector lines, or the perimeter fencing. Searchers will look for carcasses between each row in the solar array fields and along the linear features and will carry binoculars to be used at their discretion to help identify carcasses.

2.3 CLEARANCE SURVEYS

2.3.1 OVERVIEW

A clearance survey will be conducted beginning two weeks before the first round of carcass searches. The carcass clearance survey will take place throughout the survey area to remove all carcasses that may be present. This will ensure that the first round of carcass searches will not include carcasses from outside of a preceding time interval equal to the interval that will follow the first survey.

2.3.2 SOLAR ARRAY FIELD

The solar array field for the Project would cover approximately 3,062 acres (Figure 2). Twenty-five percent of the solar arrays will be sampled in the first year of monitoring. After the first year, the sampling effort interval may be adjusted based on the results and in consultation with the agencies.

Observers will survey the rows of the solar array from the access roads and each survey pass will cover approximately half of the width of the array on both sides of the road. Searchers will look down each row on both sides of the road. Final row length configuration has not been designed and will vary considerably depending on location but will likely range between 140 to 330 feet in length.

The direction of survey will be consistently rotated. Because the proposed Project plans to use tracking technology, the rows may be searchable from a slow-moving vehicle because tracking arrays are higher off the ground, though this is dependent on the specifics of the Project. The final survey approach will account for the array height, all safety concerns, visibility, and other factors and will be approved by the agencies prior to the start of monitoring. As discussed in the Gemini Plan, effective sampling for medium and larger birds could be expected to a distance of 140 meters and for smaller birds and bats to potentially

at least 75 meters, depending on visibility (PBC 2019). These assumed distances may be further defined based on the detectability levels within either type of management practices utilized throughout the solar fields; traditional versus mowing approach. Species found outside of this viewshed will be processed but will be analyzed as incidental detections.

2.3.3 GEN-TIE LINES

The gen-tie lines would total approximately 24 miles long (Figure 2). Linear surveys along the gen-tie lines will entail two passes centered 15 meters apart on each side of the line. Half (approximately nine miles) of the gen-tie lines will be surveyed in the first year of monitoring and the other half (approximately nine miles) will be surveyed in the second year of monitoring.

2.3.4 COLLECTOR LINE

The collector lines would be approximately 34 miles long (Figure 2). Linear surveys along the collector line will entail two passes centered 15 meters apart on each side of the line. Half (approximately 17 miles) of the gen-tie lines will be surveyed in the first year of monitoring and the other half (approximately 17 miles) will be surveyed in the second year of monitoring.

2.3.5 PERIMETER FENCING

The perimeter fencing for the Project will surrounding the development area (Figure 2). Twenty-five percent of the perimeter fencing will be sampled in the first year of monitoring. Because most fatalities associated with fences are due to collisions with the barrier, the associated carcasses are expected to remain near to the fence, thus creating a condition where the searcher efficiency along the transect is high. For this reason, the survey transect along the fence will be only 10 meters wide and centered on the fence line. The observers will walk or drive slowly along the perimeter fence during each survey and search both inside and outside the fence for carcasses. After the first year, the sampling effort interval may be adjusted based on the results and in consultation with the agencies.

2.4 TEMPORAL SAMPLING

The frequency of carcass searches is dependent on the species or group of interest and the corresponding carcass persistence times (USFWS 2012). Depending on scavenging and decay rates, larger birds may persist for weeks to months, while smaller birds and bats will generally disappear much sooner. Carcass persistence is also affected by many other variables such as habitat, scavengers, climate, season, etc. (PBC 2019). Huso et al. (2016) suggest using a survey interval where an average of 50 percent of carcasses persist until the next search.

Following the approach taken in the Gemini Plan, carcass searches will be conducted every seven days during the standard migration periods (March 1 through May 31 in spring and August 15 through October 31 in fall) and every 21 days during the summer (June 1 through August 14) and winter (November 1 through February 28/29) periods. Following the first six months of mortality monitoring (and concurrent carcass removal trials [described below]), the search interval may be adjusted based on the initial estimates of carcass persistence with a focus on the precision of the detection of water birds (medium and large birds) as opposed to smaller songbirds.

2.5 SURVEY AND DATA COLLECTION PROTOCOLS

Carcass searches will be conducted on foot or from a slow-moving vehicle at a consistent pace and approach and with a uniform effort throughout the search area. Searchers will have binoculars that they may use at their discretion.

If a carcass is detected, the searcher will immediately walk down the row to confirm and document the detection, as appropriate (see below for documentation protocols). Special-status species detected will not be handled; if a state or federally listed species is found, the observer will contact the USFWS and the Nevada Department of Wildlife (NDOW), as appropriate, within 24 hours and follow the regular recording protocols without handling the specimen. If multiple surveyors are working in the same area, all detected carcasses will be marked with a brightly colored flag immediately following or preceding documentation of the find in order to avoid re-counting carcasses. Following the end of the survey, all flag(s) will be removed and/or carcasses will be buried under a small mound of soil to minimize common raven or other scavenger food sources.

In order to be classified as a detection, feathers found must include a feather spot of at least five tail feathers and two primary feathers or a total of at least 10 feathers equal to or less than 5 meters apart (PBC 2019). Feather spots will be identified to species or size class to the degree possible. If species or size class cannot be determined, the mortalities will be assigned to a size class, in proportion to the observed data, so that they will be counted in the mortality estimates. Digital photographs will be taken as part of the documentation of each detection and the plausible cause of death will be recorded on the data sheets based on any evidence observed (e.g., blood or fecal smears on solar panels, signs of electrocution, or blunt trauma).

A Global Positioning System (GPS) waypoint will be taken to document the location of the detection. In addition, the observer will record the distance to the nearest Project component and to the end of the panel row using a laser rangefinder. In order to accurately measure the distance between the carcass and the end of the row, the observer will place a marker at the end of the row to reliably use as a reflection point. All data will be collected for each detection on standardized forms (Attachment 1).

It is important that any carcasses encountered while walking within the rows that were not detected from the road be classified and documented as “incidental” finds. These carcasses will be recorded following the same protocol as all other detections but will not be included in the calculation of the mortality estimates.

Following completion of each survey, the GPS waypoints will be uploaded to master maps of all the carcasses found. Each carcass will have a unique identifier and notes regarding the find (e.g., date, name of observer, species, or group [if determinable], condition, and estimated time since death) will be maintained in a corresponding data table. The Lead Avian Biologist will be responsible for keeping the master map and data table current and making it available to all surveyors prior to surveys. The up-to-date master map and the corresponding data table must accompany each surveyor on every survey and will be consulted whenever a carcass is detected to ensure that it is not a previously detected carcass.

Any injured or rescued birds and bats found during searches will be recorded and reported to the BLM within 48 hours. Observers will immediately report injured or rescued birds and provide them transportation to the nearest permitted wildlife rehabilitation facility for proper care. Water birds that are alive and unable to take off will also be immediately reported and transported to the nearest

permitted rehabilitation facility for help. The information on permitted wildlife rehabilitators will be kept up to date and will be provided to all biologists:

http://www.ndow.org/uploadedFiles/ndoworg/Content/Forms_and_Resources/Wildlife-Rehabilitation-List.pdf

The nearest wildlife rehabilitation facility capable of handling all avian and bats species is:
[to be provided at Final]

2.6 INCIDENTAL INJURY/FATALITY REPORTING

Carcasses that are discovered incidentally will be documented and reported following the same protocols as all carcass detections; however, they will not be included in the mortality estimates. Also, carcasses that are discovered incidentally throughout the Project area during the construction or post-construction period will be reported to the Lead Avian Biologist or Avian Biologists and will be documented on the Avian/Bat Mortality/Injury Form (Attachment 1).

2.7 2.7 SEARCHER EFFICIENCY TRIALS

Searcher efficiency is the ability of observers to detect carcasses of varying sizes under varying conditions. Multiple factors may affect whether or not a carcass is detected during surveys including surveyor ability, habitat, visibility, lighting, carcass characteristics, and more, and it is assumed that not all carcasses will be found. In order to correct for detection biases during sampling and to calculate an adjusted mortality estimate, searcher efficiency will be quantified using searcher efficiency trials. Distance sampling does not require the use of separate searcher efficiency trials if enough carcasses are detected; however, they will be conducted for this Project in order to improve the detection probability estimate.

Searcher efficiency trials will be conducted once per season to assess and adjust for the potential spatial bias in the distribution of mortalities among arrays; separate trials will also be conducted to assess detection probability along the linear features. A total of 100 bird carcasses will be placed within the areas scheduled for carcass searches during each season of the first year of post-construction mortality monitoring (Table 1).

Following the first year of seasonal searcher efficiency trials, it will be determined whether searcher efficiency trials will be adjusted for future years based on the results. If changes to visibility occur due to allowing vegetation to grow under the arrays, for example, then adjustments to searcher efficiency trials may be needed.

TABLE 1. SAMPLE SIZE FOR SEARCHER EFFICIENCY TRIALS PER SEASON.

Project Component	Carcass Size Class[1]	Sample Size
Solar arrays	Small	12-15
	Medium	12-15
	Large	12-15
Gen-tie lines	Small	12-15
	Medium	12-15
	Large	12-15
Perimeter Fencing	Small	12-15
	Medium	12-15
	Large	12-15
Total		**108-135**

1 Class sizes are Small 1-99 grams, Medium 100-999 grams and Large 1,000+ grams

It is assumed that not all carcasses will be detected before they disappear. Carcass persistence, like searcher efficiency, can also be quantified to correct for biases during sampling in order to calculate an adjusted mortality estimate. Carcass removal trials will be implemented to quantify how long a carcass remains in the survey area and is available for detection.

Carcass persistence depends on a variety of factors including size, species or taxonomic group, the scavenger community, and climate conditions. Carcass persistence may also vary seasonally as a result of some of these factors. As such, carcass removal trials need to take place each season that mortality monitoring takes place to account for seasonal variations and also must account for the influence of carcass size class and species or taxonomic group on persistence.

To conduct the carcass removal trials, approximately 100 carcasses will be randomly distributed throughout the Project area each season. The carcasses must be distributed across the entire Project area in order to minimize any potential bias associated with scavenger swamping; for this reason, sample sizes along the gen-tie and collector lines are also smaller (Smallwood et al. 2010; Playa Solar LLC 2016) (Table 2). The carcasses will be monitored with either motion-triggered digital trail cameras or visited regularly (on days 1, 2, 3, 4, and approximately once every seven days thereafter) for 30 days or until the carcass has been removed or degraded to the point where it would no longer count as a detection. If cameras are used, then 'fake' camera stations without associated carcasses would also be placed throughout the Project area to deter scavengers from associating the cameras with the carcasses.

With the permission and appropriate permits from USFWS and NDOW, the trial carcasses would ideally be fresh carcasses that are identified during carcass searches or incidentally in the Project area. In these cases, the carcasses would need to be monitored in situ and would not be moved. In addition to and/or in lieu of the in-situ specimens, fresh, intact bird/bat carcasses would be acquired (from other sources where specimens had been frozen immediately following death) and randomly placed throughout the Project area. As reported in the Playa Plan, the fresh carcasses discovered on site are preferable to surrogates, commonly game birds, and domestic waterfowl, because the scavenging rates for these surrogate birds may be artificially high (Smallwood 2007 and 2013 as cited in Playa Solar LLC 2016). The following protocols will be followed during carcass placements to reduce biases related to attracting scavengers (e.g., scent or visual cues): latex gloves will be used when handling carcasses, handling time

will be limited to the minimum amount necessary, and trial carcasses will be made distinguishable from unmarked carcasses by an inconspicuous piece of colored tape wrapped around one leg.

Following the end of the monitoring period, the trial carcasses will be classified into the following categories:

- Intact: whole and unscavenged (other than by insects);
- Scavenged/depredated: Carcass present but incomplete, dismembered, or flesh removed;
- Feather spot: Carcass scavenged and removed, but sufficient feathers remain to quantify it as a mortality detection (as defined above); or,
- Removed: Missing completely or not enough remains to be classified as a mortality.

TABLE 2. APPROXIMATE SAMPLE SIZE FOR CARCASS REMOVAL TRIALS PER SEASON.

Project Component	Carcass Size Class[1]	Sample Size
Solar arrays and perimeter fencing	Small	25
	Medium	15
	Large	10
Gen-tie lines	Small	25
	Medium	15
	Large	10
Total		**100**

1 Class sizes are Small 1-99 grams, Medium 100-999 grams and Large 1,000+ grams

3 DATA ANALYSIS, REPORTING, AND ADAPTIVE MANAGEMENT

3.1 DATA ANALYSIS

A distance-sampling methodology will be used in data analysis to calculate the estimated mortality rates adjusted for searcher efficiency, carcass-removal rates, and the proportion of the area sampled. The Gemini Plan is currently using the USGS's Generalized Mortality Estimator (GenEst) program, which will also be used for this Plan in order to have comparable mortality estimates across projects (Dalthorp et al. 2018a and b; Simonis et al. 2018). A useful review of the history of the methodologies used in estimating mortality rates at renewable energy sites can be found in the Playa Plan (Playa Solar LLC 2016). As stated therein, the methods for conducting mortality surveys (and associated bias trials) and for quantifying the most accurate, adjusted, facility-wide mortality estimates are an evolving science.

The commitment of the Proponent in preparation of both the BBCS and this associated Plan is to conduct the mortality surveys (and associated bias trials) and to derive the estimated mortality rates in accordance with the most current and scientifically accepted methods available at the time of implementation, in consultation with the agencies.

3.2 REPORTING

All bird and bat fatalities will be documented with field forms (Attachment 1) and reported to the USFWS Injury and Mortality Reporting (IMR) system (https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/decision-support-tools/imr.php) by the Project's Lead Avian Biologist on a monthly basis. Any injury or mortality of special-status species will be reported to the BLM, USFWS, and/or NDOW, as appropriate, within 24 hours of discovery. If bird carcasses need to be removed to minimize subsidies to ravens, then a Special Purpose Utility Permit (SPUT) will be required to handle bird carcasses. All mortality data collected will be entered into an internal electronic database on a weekly basis.

The Lead Avian Biologist will prepare and submit quarterly reports, during the first year, to the BLM, USFWS, and NDOW summarizing all Project-related bird and bat injuries and/or mortalities detected and including the dates, durations, and results of all mortality monitoring conducted. Semi-annual reports will be submitted during the second year with the option for agency meetings, as needed. The annual reports will include the methods and results of the data analysis including the overall fatality estimates (with confidence intervals) and a discussion of bird or bat fatalities or injuries detected including a comparison between the findings for the Project and other similar large-scale PV facilities or suitable reference sites. In addition, the annual reports will include adaptive management recommendations, if needed. All Project reporting will continue as described for the duration of the post-construction monitoring effort.

3.3 ADAPTIVE MANAGEMENT

Based on the initial results of the mortality monitoring, the Proponent will consult with the agencies to determine if additional management actions and/or changes to the monitoring protocol may be needed. After each year of monitoring, the biologists will recommend adaptive management actions, as needed, and, following their review of the annual report, the agencies will also make recommendations for actions or changes. The Proponent will meet with agencies to discuss any actions or changes that are needed.

Based on the results of the mortality monitoring, should the agencies determine that the Project's impacts to birds or bats are substantial and/or that the Project is adversely affecting special-status species, then adaptive management actions to address the issues will be discussed; these actions could include installing bird flight diverters, changing Project components that have been identified as a mortality risk, or implementing other appropriate actions to address the issue(s) based on the data.

Ongoing research addressing avian interactions with solar energy facilities may also inform adaptive management decision-making. In their Science Coordination Plan, the Multiagency Avian-Solar Working Group emphasizes the importance of both a consistent and standardized approach to fatality monitoring across solar development projects and transparency and data sharing to improving the assessment of avian-solar interactions (Avian-Solar Working Group 2016). The Proponent is committed to transparency, data sharing, and adaptive management as part of this monitoring program.

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Attachment 1

Avian and Bat Monitoring Mortality/Injury Form

Avian/Bat Mortality/Injury Form

Surveyor full name, role:_____ **Date found:**_____ **Time found:** _____

(Indicate full name/role of individual who found specimen if not surveyor): _____

Detection/specimen code:_____ **Species common name:**_____ **No. of individuals or nests:** _____

Gender: □ Male □ Female □ Unknown □ Mixed (multiple birds) **Age:** □ Adult □ After hatching year □ After second year □ Hatching year □ Juvenile □ Sub-adult unknown □ Mixed (multiple birds)

How was it found? □ Mortality survey □ Incidental detection

Condition: □ Active nest relocation □ Alive, injured □ Alive, no sign of physical trauma □ Alive, sick □ Dead, fresh (eyes moist) □ Dead, semi-fresh (eyes desiccated, rigor mortis) □ Mummified □ Broken up/dismembered □ Articulated skeleton □ Feather spot

Time since death: □ 0-8 hours □ 8-24 hours □ 2 days □ 3-6 days □ 7 days □ 2 weeks □ 3 weeks □ 1 month+ □ Unknown (feather pile/drowning) □ N/A (animal still alive)

Describe carcass or injury:

Evidence of scavenging: □ Yes □ No □ Unknown **Describe:**

Cause of death/injury: □ Barotrauma □ Blinded/optical trauma (radiant flux) □ Collision (other) □ Collision with solar panel/heliostat □ Collision with wind turbine □ Collision with wire □ De-oiled □ Disease/illness □ Drowned (evaporation pond) □ Drowned (stock tank) □ Drowned (other) □ Electrocution □ Entangles (net) □ Entrapment □ Exposure/dehydration □ Physical trauma (unknown) □ Poisoned (lead) □ Poisoned (pesticide) □ Poisoned (other) □ Predated □ Predated while entangled □ Scorched or singed □ Trauma (hard landing) □ Unknown

Describe evidence of predation:

Level of certainty of cause of death or injury (% certainty in parentheses): □ Observed or confirmed (100%) □ Valid (90%) □ Probable (50%) □ Possible (<50%, 0) □ N/A or unknown

Disposition of live bird: □ Sent to rehab □ Released □ Euthanized □ Died **Location of release or name of rehab facility:** _____

Comments:

Project:_____ **Site Name:**_____Zone **11S:** *Easting:*_____ Northing*:* _____

Describe habitat:

For detections within a solar array field:

Nearest block:_____Nearest array:_____ Row (if bird or bat is found within array): _____

Precipitation in last 24 hours? □ Yes □ No **Current temperature (°C):**_____**Current wind speed (mph):**_____ **Cloud cover (%):**_____

High winds (25 mph sustained) in last 24 hours? □ Yes □ No **Weather at death/injury:** □ Clear □ Fog □ Raining □ Snowing □ Windy □ Unknown

Estimated wind speed at death/injury:_____**Estimated max. wind gust at death/injury:**_____**Estimated wind direction at death/injury:** _____

Moon phase: □ New moon (no moon) □ Crescent moon (sliver) □ Quarter moon (half-moon) □ Full moon

Nearest Project component: □ Brine pond □ Communications tower □ Evaporation pond □ fencing □ Guy wires □ Heliostat □ None - open desert
□ Other machinery □ Pond net □ Project building □ PV panel □ Road □ Solar array framework (no panels)
□ Solar concentrator tower □ solar trough □ Transmission line □ Transmission tower □ Vehicle □ Water supply pond
□ Wind turbine □ other (describe in comments)

Distance from nearest component (m):_____ **Azimuth to nearest component:**_____**Distance to nearest PV panels (m):** _____

Flight diverters present? □ Yes □ No □ Unknown **Type of flight diverter:**_____**Transmission compliant with APLIC?** □ Yes □ No □ Unknown

Additional comments/details about the nearest component:

Biometric details of the bird/bat:

Photo Code 1 (close-up shot #1):_____	Photo Code 2 (close-up #2): _____	Photo Code 3 (close-up #3): _____
Photo Code 4 (area to north): _____	Photo Code 5 (area to east): _____	Photo Code 6 (area to south): _____
Photo Code 7 (area to west): _____	Photo Code 8 (infrastructure #1): _____	Photo Code 9 (infrastructure #2): _____

Carcass disposition

Collector name:_____**Date of collection:**_____ **Time of collection:** _____

Carcass disposition: □ BLM investigation □ NDOW investigation □ USFWS law enforcement □ Buried on-site □ Freezer on-site □ Incinerated
□ Left in place □ Nest relocated □ Sent to National Eagle Repository □ Transferred to other permittee (enter permit # in comments)
□ Used in research trials □ other (describe in comments)

Disposition **comments:** ___

_____ **Date and time of agency notification:**_____

Shipped to (institution name):_____**Date shipped:**_____**Time shipped:** _____