# Appendix E: Golden Eagle Report

# Golden Eagle (***Aquila chrysaetos***) Survey Report
# Libra Solar Project

## Mineral and Lyon Counties, Nevada

## 2022 Nesting Season

Prepared for:
Libra Solar, LLC
c/o Arevia Power

Prepared by:
Dugan Biological Services, LLC
&
Phoenix Biological Consulting

August 20, 2022

TABLE OF CONTENTS

## EXECUTIVE SUMMARY

This Golden Eagle (*Aquila chrysaetos*) Survey Report (Report) provides the results of the 2022 nesting season Phase 1 occupancy and Phase 2 productivity golden eagle surveys performed for Libra Solar LLC c/o Arevia Power (Libra Solar), on an approximately 5,413-acre parcel of undeveloped BLM land in Mineral County, Nevada. The proposed project (Project) includes the construction, operation and maintenance, and decommissioning of a 700 megawatt (MW) alternating current (MWac) photovoltaic (PV) solar project and ancillary facilities, including a battery energy storage system (BESS). Survey methodologies and timing were modeled on discussions with Joe Barnes at the Nevada Department of Wildlife (NDOW), the NDOW Golden Eagle Occupancy and Productivity Survey Protocol (NDOW, 2017), and the U.S. Fish and Wildlife Service's (USFWS) *Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations* (Pagel et al. 2010; NDOW, 2022).

The Phase 1 aerial occupancy survey area encompassed a 10-mile buffer around the Project footprint, for an area of approximately 476 square miles. Dugan Biological Services, LLC (DBS) golden eagle biologists visually surveyed by helicopter all suitable eagle nesting habitat within the survey area on February 24-25, 2022. The Phase 1 aerial surveys focused on detecting golden eagle occupancy using visual searches of all known golden eagle territories and suitable golden eagle nesting habitat within the Survey Area. A total of 17 stick nests were observed during the Phase 1 aerial survey. Of these, six were unoccupied golden eagle nests that were observed across 3 nesting territories (Exhibit 3). All eagle nests were observed in rocky cliff habitats. Five nests were in good condition, and one was deteriorated and in poor condition. In addition to these six nests, 6 live golden eagles were observed, consisting of an adult pair on a rocky perch at nest NV-LYO-WR-7a-c, an adult pair perched on opposite sides of a large canyon, and an adult pair perched near nest NV-MIN-SC-26. The adult pair of eagles associated with nest NV-LYO-WR-7a-c were observed a second time in a nearby location during a refueling flight. Suitable golden eagle nesting habitat and historic golden eagle nests located outside of the ten-mile buffer were not surveyed as part of this effort.

The Phase 1 ground occupancy survey was performed on April 8-9, 2022. The Phase 1 ground survey focused on detecting additional occupied nesting territories that were either overlooked during or became active subsequent to the Phase 1A aerial survey. No additional nests were observed during the ground survey, however observations of 2 golden eagles, 2 red-tailed hawks (*Buteo jamaicensis*), 1 turkey vulture (*Cathartes aura*), and 1 prairie falcon (*Falco mexicanus*) were noted.

The Phase 2 aerial survey was performed on June 8, 2022 and focused on determining productivity at the 3 territories located during the Phase 1 occupancy surveys. Nests NV-LYO-WR-7a-c, NV-MIN-WR-10a-b, and NV-MIN-SC-26 were all inactive and unoccupied at the time of the Phase 2 aerial survey. None of the nests showed any signs of use or maintenance during the 2022 nesting season. Based on the condition of the nests (confirmed by photos) during the Phase 2 survey, it appears that none of the nests advanced beyond courtship and early territory occupancy stages. In addition to the six eagle nests, 6 inactive red-tailed hawk nests, 4 inactive common raven (*Corvus corax*) nests, and 1 unknown falcon (*Falco sp.*) nest were located and mapped. All 11 nests were located on rocky substrates including vertical cliff faces, rocky buttes, or in rocky cavities with the exception of one red-tailed hawk nest located in a large tree. Incidental non-nest associated observations were made of 12 red-tailed hawk, 6 golden eagle, 3 common raven, 2 American kestrel (*F. sparverius*), 1 ferruginous hawk (*B. regalis*), 1 sharp-shinned hawk (*Accipiter cooperii*), and 1 long-eared owl (*Asio otus*).

# 1 INTRODUCTION

Libra Solar, LLC (Applicant) proposes to develop approximately 5,413 acres of BLM lands in Mineral County, NV for the construction of a 700 MWac solar photovoltaic power with an integrated 700 MWac battery energy storage system (Project). The Project is located entirely on federal lands, administered by the BLM, under the 2001 Carson City Consolidated Resource Management Plan. The Project is located within a variance area for solar power generation under the 2012 Approved Resource Management Plan Amendments/Record of Decisions for Solar Energy Development in Six Southwestern States.

Due to potential biological impacts associated with the development of the site, Dugan Biological Services conducted protocol level aerial and ground surveys for the golden eagle. The aerial and ground surveys were conducted in accordance with U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW) guidelines. The surveys focused on locating active golden eagle nesting territories and nests, and assessing productivity of all eagle nests within the survey area.

# 2 PROJECT DESCRIPTION

**Solar Panel Arrays**

The proposed Project would utilize high-efficiency commercially available solar PV modules that are Underwriters Laboratory (UL)-listed or approved by another nationally recognized testing laboratory. Materials commonly used for solar PV modules include monocrystalline silicon, polycrystalline silicon, amorphous silicon, cadmium telluride (CdTe), and copper indium selenide/sulfide.

The Project would use monocrystalline or polycrystalline silicon solar PV modules mounted on single-axis, horizontal tracker mounting systems. Mounted PV modules, inverters, and transformers would be combined to form array blocks, approximately 2 MW in size.

With a horizontal tracker mounting system, the panel arrays are arranged in north-south oriented rows 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. A typical panel array layout using horizontal trackers is shown in Figure 1-2. The highest point for a horizontal tracker would be achieved 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 (Figure 1-3). 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.

**34.5 kV Collection System**

The 34.5 kV collection system would comprise both underground and overhead cabling. From the medium-voltage transformers to the PVCSs, the 34.5 kV system would be installed underground using 35 kV-rated medium voltage cables listed for direct buried applications except that overhead cabling would be installed where necessary to avoid existing underground facilities. Underground 34.5 kV cables would be installed to comply with the minimum burial depth in accordance with the National Electrical Code.

From the PVCSs to the onsite substation, the 34.5 kV system would be installed overhead. Overhead 34.5 kV collector lines would be installed as double circuit lines on wood poles with post insulators (typical of medium voltage installations in electric distribution systems). Pole height would be up to 75 feet above grade.

**Substations**

A 2.5-acre 230 kV Substation would be developed within the Project site. Individual 35 kV "Circuits" will feed approximately 10 blocks each. Substation would be constructed based on applicable electrical safety codes. The substation would be separately fenced to provide increased security around the medium and high voltage electrical equipment. The substation area would include a transformer containment area, a microwave tower, a control house, and one or more transformers. Containment measures for all substation equipment shall be provided in accordance with Environmental Protection Agency 40 CFR Part 112 and all applicable codes required by the local, state, and federal governing authorities. The transformer containment area would be lined with an impermeable membrane covered with gravel, and would include a drain with a normally closed drain valve. Transformers will be provided with secondary oil containment equal to 110% of the volume of oil present in the transformer in addition to the volume of rainwater for a 25-year, 24-hour rainfall event.

**Energy Storage**

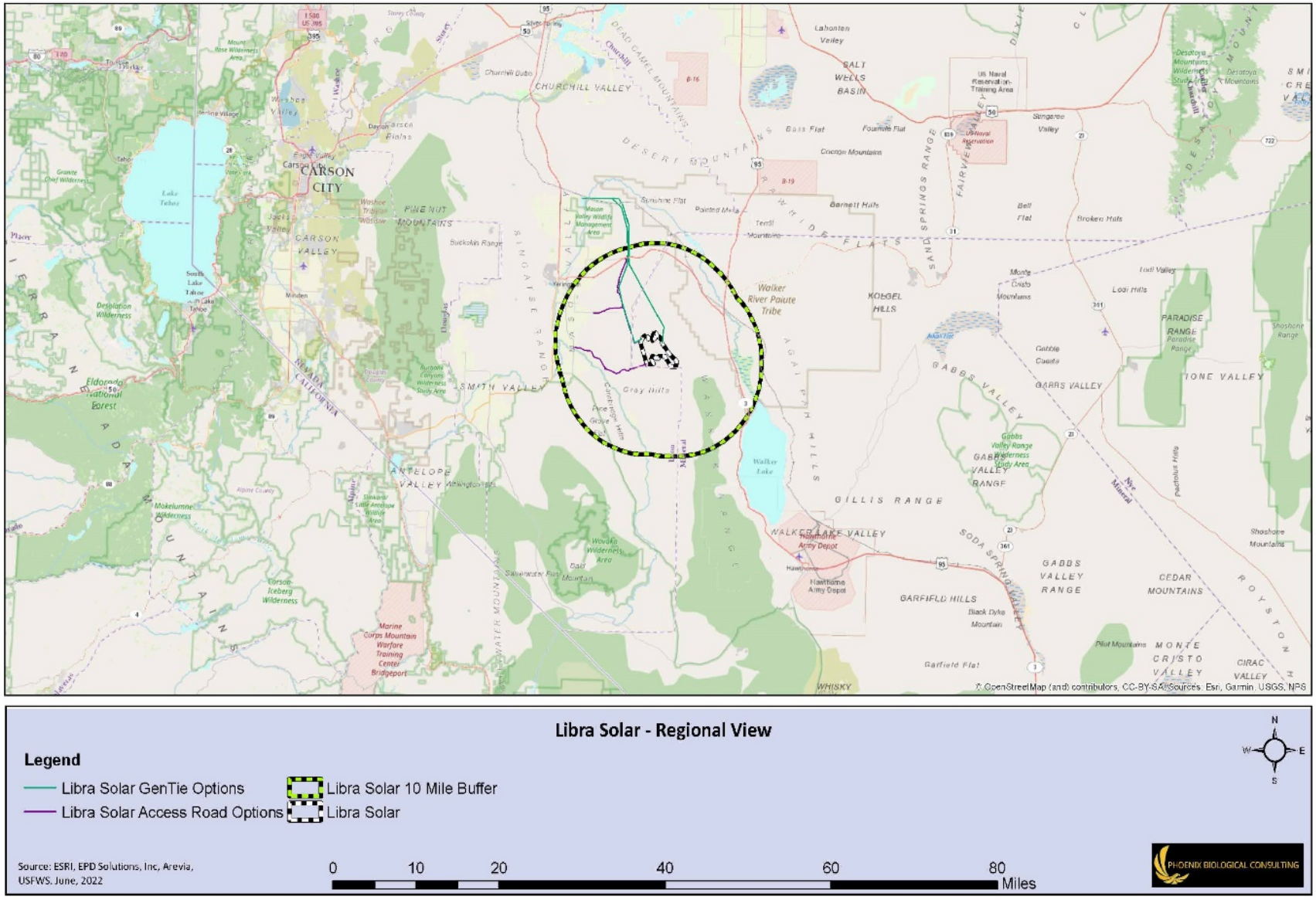
A battery energy storage system (BESS) would be located within the site. Approximately 700MW of battery systems will be installed at the Project, with each battery system installed at an inverter.

**230 kV Gen-Tie Transmission Line**

The Project would require the construction of an approximately 18 to 20 mile 230 kV circuit and telecommunications system (fiber optic system data) for interconnection to the utility transmission grid system at the Fort Churchill Substation. The exact routing is still to be determined. A 20-foot-wide gen-tie road would run the length of the gen-tie line. The overhead line and telecommunications system (fiber optic system data) would be installed per local and national electrical code requirements. Structures would be galvanized steel with a dull gray appearance similar to existing steel poles installed adjacent to the site and would be used to support interconnection to the transmission system.

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). The Applicant also would prepare a Bird and Bat Conservation Strategy to address potential impacts to birds and bats during the construction, operations, and maintenance phases of the Project.

Exhibit 1: Regional View



## 3 REGULATORY SETTING

Golden eagles are protected under both the Migratory Bird Treaty Act (Title 16 of the United States Code [U.S.C.] Sections 703–711) and the Bald and Golden Eagle Protection Act (16 U.S.C. Section 668). Both Acts prohibit the "take" (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt any such activity) of golden eagles. More specifically, the Golden Eagle Protection Act protects against agitating an eagle to the degree that causes or is likely to cause (1) injury to an eagle, (2) decreased productivity as a result of interfering with normal breeding, feeding, or sheltering habits, or (3) nest abandonment as a result of interfering with normal breeding, feeding, or sheltering behavior (Pagel et al., 2010).

## 4 GOLDEN EAGLE NATURAL HISTORY

Golden eagles are large aerial predators that inhabit in a wide range of diverse habitats, including grasslands, open tundra, islands, forested mountains, arid deserts, and chaparral woodlands (Kochert et al., 2002; Pagel et al., 2010). They prey mainly on small rodents, reptiles, and birds, and larger prey including jackrabbits, foxes, coyotes, deer, and elk fawns (Olendorff, 1976; Collins and Latta, 2009). (Carnie, 1954; Bloom and Hawks, 1982), but are also well-known scavengers (Kochert et al., 2002).

Golden eagles are sensitive to many anthropogenic pressures (Palmer 1988) and nesting territories are typically located in open to semi-open habitats away from urban settings (McIntyre 1995, Pagel et al. 2010). Mated pairs typically build large stick nests on rocky cliffs, in the upper portions of large trees, on protected shelves of steep canyon walls, and on well-elevated man-made structures (e.g. transmission towers and windmills; Kochert et al. 2002). Nest locations typically provide an unobstructed view of the surrounding habitat. Multiple nests within a single active breeding territory are common (Palmer 1988). Nesting site fidelity is high (Collins and Latta 2009). Nests are often found in highest densities in open habitats.

Courtship behaviors, including display flights, vocalizations, and stick carrying, indicate the onset of the golden eagle reproduction season (Ellis 1979). In southern California, golden eagles typically commence breeding in January. Egg laying occurs in early spring (February–March), egg hatching in late spring to early summer (April–May), rearing of chicks in summer (May–June), and fledging mid-summer (December; Carl Thelander, 2017, pers. comm.; Hoechlin, 1976; Hunt et al. 1997). Adults continue to provide food for fledged chicks and teach them to hunt well into the fall months.

Factors negatively affecting golden eagles include anthropogenic mortality, nest failure, and population declines associated with habitat loss, habitat degradation, drought, and low prey availability (Bittner et al., 2003; Pagel et al., 2010; Lovich, 2015).

## 5 REGIONAL AND LOCAL SETTINGS

The 5,413-acre Project site is located in at the eastern edge of the Mason Valley approximately 10 miles east of Yerington, Nevada. The Wassuk Range lies to the north and east of the site, and the Gray Hills are immediately to the south. The western Project area is situated within a lowland known as Pumpkin Hollow. The Project site is within the Hussman Spring and Buck Brush Spring United States Geographical Survey 7.5-minute topographic quadrangles. The Project site is located within Mount Diablo Meridian, Nevada, T.12N. R.27E. portions of sections. 15-17, 20-23, 25-29, 32-33, and 35-36.

The parcels are situated on a landscape of gently sloping plains, alluvial floodplains and small hills with occasional bedrock outcroppings. The elevation at the site ranges from approximately 4,985 to 5,495 feet. Open, vacant BLM land use surrounds the Project area (Exhibit 1). The study area is situated within a Great Basin Salt Desert Scrub community dominated by Bailey's greasewood (*Sarcobatus baileyi*), bud sagebrush (*Picrothamnus desertorum*), shadscale (*Atriplex confertifolia*), and four-wing saltbush (*A. canescens*).

Locally, the Mesa Valley is a highly disturbed area with evidence of grazing, soil compaction, off-road OHV usage and/or presence of invasive plant species present throughout the Project area. Numerous boreholes and spoils piles, presumably from exploratory mining, occur throughout the Project area, many of which are visible in aerial imagery. The southern Project area is bisected by a transmission line and by Reese River Road/NV2C. Two-track dirt roads occur throughout the site.

No existing federally administered conservation areas are located in close proximity to the Project area. The closest conservation area is East Walker River State Recreation Area, approximately five miles to the west. Additionally, the Project area is not within, nor does it border any conservation area. The Project area is relatively isolated from Wilderness Areas, Areas of Critical Environmental Concern, National Wildlife Refuges or other conservation areas. East Walker River State Recreation Area, approximately five miles to the west, is the nearest conservation area. The Project area is surrounded by government lot land use, dirt roads and transmission lines.

## 6 METHODS

### SURVEY AREA

The USFWS Interim Golden Eagle Inventory and Monitoring Protocols (Protocols) state that "Inventories for golden eagles should occur if nesting, roosting, and foraging habitat are contained within the project boundary and exists within 10 miles of the project boundary (Pagel et al. 2010)." Therefore, the Survey Area consisted of the Project boundary and a buffer extending 10-miles from the edge of the Project footprint (Exhibit 2). The Phase 1 aerial survey area included all suitable golden eagle nesting habitat within the Project footprint and the associated 10-mile buffer, whereas the Phase 1 ground survey was generally limited to portions of the Survey Area where golden eagles were not detected during the Phase 1 aerial survey.

### LITERATURE REVIEW AND HABITAT ASSESSMENT

DBS reviewed the USFWS Protocols (Pagel et al. 2010), the American Eagle Research Institute Protocol (Driscoll, 2010), numerous reports from previously conducted golden eagle surveys (EPC, 2017; DBS, 2019), and consulted a NDOW golden eagle biologist familiar with the survey area (J. Barnes 2021, 2022, pers. comm.).

Prior to these surveys, DBS eagle biologists reviewed sensitive data provided by NDOW for 8 previously identified nests documented in the survey area. Two of the 8 nests reviewed were associated with golden eagle, both were located within the northern half of the Survey Area. Four of the nests provided were associated with hawk species, and two others with owl species. Additionally, relevant references on golden eagle nesting ecology, nesting phenology, chick development, feeding ecology, and population trends were reviewed. Potential golden eagle nesting habitat within and adjacent to the survey area was reviewed using aerial imagery, land cover data maps and digital GIS databases (USGS, 2005), including Google Earth.

### FIELD METHODS

The USFWS golden eagle survey protocol (Pagel et al., 2010) provides the following survey requirements and methods:

- Surveys are to be performed by qualified observers with experience conducting golden eagle aerial surveys.
- All potential suitable nesting habitats within the survey area will be surveyed.
- A minimum of two aerial surveys spaced at least 30 days apart will be performed.
- Timing of the Phase 1 occupancy survey will coincide with early stages of golden eagle nesting chronology (courtship, incubating, brooding).
- Surveys will be limited to weather conditions favorable for aerial surveys, golden eagle activity, and preferably during morning hours.
- Active nests, occupied territories, and alternate nests will be documented and reported along with pertinent Global Positioning System (GPS) data.
- Cliff nesting habitats are to be approached from the front rather than from behind or overhead.
- Hovering at a nest will not exceed 30 seconds and will be at least 66 horizontal feet from the nest during data collection.

In consultation with BLM and NDOW, a three-visit survey methodology was developed. First, a Phase 1 aerial golden eagle nest inventory of the Project area and suitable golden eagle nesting habitat within a 10-mile buffer of the Project area. Second, a Phase 1 ground survey of suitable golden eagle nesting habitat within a 10-mile buffer of the Project area. This survey focused on locating nests where occupancy could not be confirmed during the aerial visit. Lastly, a Phase 2 aerial productivity survey of all golden eagle nests identified in the Phase 1 aerial and ground occupancy surveys.

### SURVEY TIMING

Surveys were scheduled to coincide with specific reproductive stages and nesting phenology of golden eagles in central Nevada (NDOW, 2017; J. Barnes, NDOW, personal communication, 2022). Phase 1 nest occupancy surveys are typically scheduled to coincide with late courtship and/or egg laying (Pagel et al. 2010).

The Phase 2 productivity survey is generally timed to occur when occupied nests contain chicks that are at least 20-days old, but before fledging has occurred. Surveys of nests that contain chicks 51 days or older are ideal for assessing productivity (Pagel et al., 2010).

### SURVEY METHODS

The search protocol focused on suitable nesting habitats, with only cursory flights through developed areas and relatively flat potential foraging areas. Visual encounter surveys were conducted in areas with suitable golden eagle nesting habitat and concentrated on areas containing rocky features including cliff faces, cavities, buttes, and ledges. Significant efforts were made to locate these features at locations with exposures offering protection from the elements. Factors associated with habitat visibility, habitat accessibility, human safety factors, and topographic considerations limited nest searches in several smaller canyons within the survey area. While the survey methodology focused primarily on detection of nesting golden eagles, ancillary data was recorded for opportunistic observations of other cliff-nesting species.

Phase 1 aerial surveys were performed using a Hughes 500 helicopter operated by English Air Services. Dr. Eric Dugan (Observer 1; front right seat; Table 1) served as navigator for the survey as well as primary observer for the right side of the helicopter. Dave Lohr (Observer 2; back left seat; Table 1) served as the primary observer for the left side of the helicopter and the survey photographer. The pilot, Mike Zemlock, has extensive experience performing aerial golden eagle surveys.

Phase 1 ground surveys were conducted at several locations near suitable golden eagle nesting habitats within 10 miles of the Project footprint. Dr. Eric Dugan conducted the surveys on foot and from dirt roads with the use of binoculars and spotting scopes as needed (Table 1). The surveys concentrated on areas of high-quality golden eagle nesting habitat identified during the Phase 1 aerial survey.

Phase 2 aerial surveys were performed using a Bell 407 helicopter operated by Skydance Helicopters. Dr. Eric Dugan (Observer 1; front left seat; Table 1) served as navigator for the survey as well as primary observer for the left side of the helicopter. Dave Lohr (Observer 2; back right seat) served as the primary observer for the right side of the helicopter and the survey photographer. Chris Creamer served as the pilot for the Phase 2 aerial survey.

## GLOBAL POSITIONING SYSTEMS AND PHOTOGRAPHY

Location-specific data was recorded with a Garmin hand-held GPS unit (GPSmap 78) accurate to 3 meters under ideal conditions. Each observation was assigned a sequential and unique identifier. Flight tracks were recorded using the helicopter's on-board GPS and the aforementioned Garmin GPSmap 78.

Photographs were taken with a Nikon D300 digital camera fitted with a 70x210 millimeter optical telephoto lens. The telephoto lens allowed for quality images to be collected from a distance, thereby limiting disturbance to nesting raptors and sensitive wildlife. Subsequent review of the images in the office provided additional data, species identification, and data on nesting status and nesting success.

## DATA

Data were collected for all raptor and potential raptor nests observed during the surveys.

The survey area boundaries were downloaded to GPS units and appeared on each unit's screen. The survey team used headset communication during the entirety of each survey to facilitate efficiency and accuracy of observations, resolving questions or problems, and reporting significant findings in real time.

Data collected for each nest included the following (based on Pagel et al. 2010):

- Date
- Location of observation (Universal Transverse Mercator [UTM], WGS84, Grid 11)
- Species
- Number of nests
- Nest condition
    - Good — Nest maintained or added to within the last 1 to 2 years; nest containing a bowl made of yucca or other new nesting materials
    - Fair — No evidence of recent use; no sign of recent maintenance; nest not used within the last 1 to 2 years
    - Poor — Currently inactive; deteriorated condition; extensive signs of weathering; significant slumping of parts of the nest; significant decomposition of nest material
- Nest activity
    - Occupied — A nest being used in the current year; adult, eggs, and/or young observed at the nest; considered occupied throughout the egg-laying to post-fledging dependency stages (Photo 1)

    - Active — Evidence of fresh nesting material in the nest; the presence of a newly constructed bowl; any other signs of preparation for egg-laying; active nests may not be ultimately end up being occupied in a given year (Photo 2)
    - Inactive — Not currently being used; lacking evidence of recent maintenance, adults, eggs, chicks, and dependent young; inactive have the potential of becoming active in subsequent breeding seasons (Photo 3)
- Nest aspect
- Nest substrate
- Nest height
- Number of eggs (when possible)
- Number of chicks (when possible)
- Age class of raptors if determinable
- Pertinent notes

Weather conditions were recorded at the start and end of each flight. Weather conditions included the shaded air temperature at 5 feet, wind speeds and direction, and relative humidity. Wind speeds were measured with a Kestrel® wind meter. Measurements were taken until average wind speed stabilized.

### SURVEY PERSONNEL

Aerial and ground surveys were conducted by experienced raptor and golden eagle biologists Dr. Eric Dugan (Phases 1A, 1B & 2) and Dave Lohr (Phases 1A & 2). Dr. Dugan and Dave Lohr both met the Observer Qualifications recommended for "helicopter-borne raptor surveys around cliff ecosystems" as presented in the USFWS Protocols (Pagel et al., 2010). A brief summary of their eagle survey experience is provided as an Attachment.

## 7 RESULTS

### FLIGHT TRACKS

Complete flight tracks for the Phase 1 and Phase 2 surveys are shown in Exhibit 2. The Phase 1 flight departed from and returned to Minden-Tahoe airport. The Phase 2 flight departed and returned to the Eastern Sierra Regional Airport in Bishop, California. Refueling trips to and from local airports were completed as needed.

### SURVEY CONDITIONS

#### *Phase 1 Aerial Occupancy Surveys*

The Phase 1 aerial occupancy surveys were conducted on February 24 and 25, 2022 during good weather conditions for observation of golden eagles. Excessive winds and downdrafts were not a significant issue during either aerial survey. Surveyors were afforded access to all suitable nesting habitats within the survey area. No precipitation fell during the survey.

Variable winds were prevalent during the survey, with calm conditions at the start of both surveys. Winds were out of the SW at 2 mph at the end of the survey on the 24th and out of the NE @ 2 mph on the 25th (Table 1). Temperatures ranged from 27-34° Fahrenheit (°F) at the start to 37-44°F at end of the surveys (Table 1), well within accepted standards (Pagel et al. 2010).

### *Phase 1 Ground Occupancy Surveys*

The Phase 1 ground occupancy survey on April 9, 2022 was conducted during good weather conditions for observation of golden eagles. No precipitation fell during the survey. Winds were calm at the start of the survey, and 9 mph out of the NW at the end of the survey. Temperatures ranged from 44°F to 55°F (Table 1) and skies were partly cloudy.

### *Phase 2 Aerial Productivity Surveys*

The Phase 2 aerial productivity survey on June 8, 2022 was conducted during ideal weather conditions for observation of golden eagles. No precipitation fell during the survey. Winds were light and out of the east, with wind speed of 3 mph at the start, and 7 mph at the end of the survey. Temperatures ranged from 76°F to 88°F (Table 1) and skies were partly cloudy.

### *Phase 2 Ground Productivity Surveys*

Due to the absence of occupied golden eagle nests within the survey area during the Phase 2 aerial surveys, a Phase 2 ground productivity survey was not conducted.

## 8 GOLDEN EAGLE NEST OBSERVATIONS

### *Phase 1 Aerial Occupancy Surveys*

A total of 17 inactive nests were observed during the aerial Phase 1 survey. The 17 inactive nests included 6 golden eagle nests, 6 red-tailed hawk nests, 4 common raven nests, and 1 unidentified falcon nest. All 17 nests were all on rocky substrates including vertical cliff faces, rocky buttes, rock cavities and ledges with the exception of 1 red-tailed hawk nest observed in a large tree. The 6 golden eagle nests were inactive at the time of the Phase 1 aerial survey.

In addition to the six eagle nests, 6 live golden eagles were observed. These observations consisted of an adult pair on a rocky perch near Nest NV-LYO-WR-07a-c (Photo 4), an adult pair perched on opposite sides of a large canyon (Photo 5), and an adult pair perched near Nest NV-MIN-SC-26. The adult pair associated with Nest #7 was observed in a nearby second location during a refueling flight.

In addition to nests, incidental non-nest associated observations were made of 12 red-tailed hawk, 6 golden eagle, 3 common raven, 2 American kestrel, 1 ferruginous hawk, 1 sharp-shinned hawk, and 1 long-earned owl.

### *Phase 1 Ground Occupancy Surveys*

Two lone adult golden eagles were observed during the Phase 1 ground survey. One adult was observed perched on a rocky feature near Nest NV-LYO-WR-07a-c. A second lone adult was observed in flight near Nest NV-MIN-WR-10a-b. Additionally, incidental observations were made of 2 red-tailed hawks, 1 turkey vulture, and 1 prairie falcon during the ground survey.

### *Phase 2 Aerial Productivity Surveys*

DBS biologists revisited all of the 6 golden eagle nests identified during the Phase 1 aerial occupancy survey.

Three nests present at point NV-LYO-WR-07a-c were all unoccupied at the time of the survey (Photo 1). Based on the condition of all 3 nests and the lack of recent whitewash, it is presumed the nest was not used during the 2022 nesting season.

Neither of the two nests present at point NV-MIN-WR-10a-b were occupied at the time of the survey (Photo 2). Based on the condition of both nests and the lack of recent whitewash, it is presumed the nest was not used during the 2022 nesting season.

Nest NV-MIN-SC-26 was observed to be inactive and did not show any signs of recent use or maintenance (Photo 3). Based on the condition of the nest and the lack of recent whitewash, it is presumed the nest was not used during the 2022 nesting season.

***Phase 2 Ground Productivity Surveys***

Due to the absence of occupied golden eagle nests within the survey area, a Phase 2 ground productivity survey was not conducted.

## 9 DISCUSSION

Raptor nest data provided by NDOW prior to the surveys indicated the presence of two historical golden eagle nesting territories within the survey area (Exhibit 3). Results of the present survey identified 6 inactive golden eagle nests among three breeding territories within the Survey Area. One of the territories identified during these surveys was represented in the historical data, and two others territories were not. The second historical nesting location provided by NDOW was no longer present. In total, the current surveys identified 0 golden eagle nests within 1-3 miles, 1 golden eagle nest within 3-6 miles, and 5 golden eagle nests within 6-10 miles of the Project right of way. All 6 nests were inactive during the 2022 nesting season.

Mountainous areas within the Wassuk Range located north, northeast, east and southeast of the Project footprint supported the greatest density of high-quality golden eagle nesting habitat (Exhibit 3). The western half, central, and eastern most portions of the survey area are generally characterized by flat topography, low-lying alluvial features, and riverbed habitats (Exhibit 4). Due to the lack of vertical cliff and rocky features, these areas were identified as low-quality golden eagle nesting habitat. This included the Project footprint and the majority of lands within the 3-mile buffer. Nesting habitats in these areas were largely limited to low-lying structures within isolated foothills.

Moderate levels of anthropomorphic disturbances were noted during the surveys, including but not limited to paved roads, off-road vehicle travel, fence lines, farming, and mining operations. Given the locations of golden eagle nests within the survey area, the moderate level of anthropogenic activity is not likely to result in nest disruption issues. All six nests documented during the survey were located high on cliff features in locations that offered shelter from most potential anthropogenic disturbances.

Inactive nests NV-LYO-WR-7a, NV-LYO-WR-7b, and NV-LYO-WR-7c are clustered together high on the same cliff feature at the northwestern terminus of the Wassuk Range, south of Highway 95, and east of Yerington, Nevada. Highway 95 is a paved public road that receives light to moderate vehicle traffic in the general vicinity of the nest. Two nests were in good condition, and a third was in poor condition. A pair of adult golden eagles were observed perched next to each other near the nests during the Phase 1 aerial survey. A lone adult eagle was observed perched near the nests during the Phase 1 ground survey. During the subsequent Phase 2 aerial survey, the 3 nests appeared unmaintained, lacked a developed nest bowl, and contained no eggs or chicks. Additionally, adult eagles were absent and neither nearby rocky perches, nor the nest location had fresh whitewash present. It appears that this territory did not progress beyond courtship during the 2022 nesting season. The nest locations offer protection from both the sun and predation, as well as a direct vantage point into foraging areas north of the territory. Potential Project-related impacts to golden eagle occupying these nests are extremely low, and includes loss of foraging habitat. The nest locations are approximately 7 miles from the Project right of way boundary.

Inactive nests NV-MIN-WR-10a and NV-MIN-WR-10b are located together high on the same cliff feature at the northern terminus of the Wassuk Range, south of Highway 95, and east of Yerington, Nevada. Highway 95 is a paved public paved road that receives light to moderate vehicle traffic in the general vicinity of the nest. Both nests were in good condition during the Phase 1 aerial survey. A single adult golden eagle was observed in flight during the Phase 1 ground survey. During the Phase 2 aerial survey, both nests looked unmaintained, lacked a developed nest bowl, and contained no eggs or chicks. Notably, abundant whitewash was present on rocky perches near the nest during the Phase 2 survey, suggesting the presence of eagles between the two surveys. It appears that this territory did not progress beyond courtship during the 2022 nesting season. The nest locations offer protection from both the sun and predation, as well as a direct vantage point into foraging areas northeast of the territory. Potential Project-related impacts to golden eagle occupying these nests are extremely low, and includes loss of foraging habitat. The nest locations are approximately 8 miles from the Project right of way boundary.

Inactive nest NV-MIN-SC-26 is located in the upper reaches of a large narrow canyon on the eastern side of the Wassuk Range. The nest is situated west of Highway 95, approximately 9 miles northwest of Walker Lake. Highway 95 is a paved public paved road that receives light to moderate vehicle traffic in the general vicinity of the nest. The nest was in good condition during the Phase 1 aerial survey. A pair of adult golden eagles were observed perched on a rock ledge at the nest during the Phase 1 aerial survey. During the Phase 2 aerial survey, the nest looked unmaintained, lacked a developed nest bowl, and contained no eggs or chicks. It appears that this territory did not progress beyond courtship during the 2022 nesting season. The nest location offers protection from the sun, winds, and predation. Given the location on other opposite side of the Wassuk Range from the Project, related impacts to golden eagle occupying this nest are not expected. The nest is approximately 5 miles from the Project right of way boundary.

Potential indirect impacts on nesting golden eagles as a result of Project-related activities include the loss of foraging habitat, reduced prey species populations within foraging areas, and injury or mortality due to collisions with Project equipment. However, the distances of all 3 nesting territories from the Project right of way, along with the general topography around each nest, both suggest other direct impacts to nesting golden eagle would be low. Potential indirect impacts include increased anthropogenic disturbances, collisions with vehicles, and abandonment of a breeding territory or nest site.

Constraints and survey limitations were generally minimal for these surveys. Limitations include the presence of inaccessible nesting habitats located in narrow canyons and limited visibility into shaded areas within the survey area. Additionally, aerial surveys are known to result in underrepresentation of smaller raptors, ground-dwelling species, and crepuscular or nocturnal raptors. Surveyors are primarily focused on detecting golden eagle nesting features, further adding to the likelihood of not detecting smaller species.

## 10 REFERENCES


Barnes, J., Wildlife Staff Specialist/Raptor Biologist, Nevada Department of Wildlife (NDOW). 2022. Teleconference and emails (jbarnes@ndow.org) with Eric Dugan, Dugan Biological Services and Ryan Young, Phoenix Biological Consulting. February-May 2022.

Bloom, P. H. and S. J. Hawks. 1982. Food habits of nesting golden eagles in Northeast California and Northwest Nevada. Raptor Research 16(4):110-115.

Bittner, J. D., J. Oakley, J. Hannan, J. L. Lincer, N. Muscolino, and R. Domenech. 2003. Reproduction of golden eagles in a drought period. Paper presented at the Raptor Research Foundation's Annual Scientific Conference. Anchorage, Alaska.

Carnie, K. S. 1954. Food habits of nesting golden eagles in the Coast Ranges of California. The Condor 56(1):3-12.

Collins, P. W. and B. C. Latta. 2009. Food Habits of Nesting Golden Eagles (*Aquila Chrysaetos*) on Santa Cruz and Santa Rosa Islands, California. Proceedings of the 7th California Islands Symposium. Institute for Wildlife Studies, Arcata, CA. Pages 255–268 in Damiani, C.C. and D.K. Garcelon (eds.).

Dugan Biological Services (DBS). 2019. Golden Eagle (*Aquila chrysaetos*) Survey Report, Gemini Solar Project, Clark County, Nevada.

Driscoll, D.E. 2010. Protocol for golden eagle occupancy, reproduction, and prey population assessment. American Eagle Research Institute, Apache Jct., AZ. 55pp.

EnviroPlus Consulting (EPC). 2017. Golden Eagle (*Aquila chrysaetos*) Survey Report, West of Devers Upgrade Project, Riverside and San Bernardino Counties, California. May 2017.

Ellis, D. H. 1979. Development of behavior in the golden eagle. Wildlife Monographs No. 43.

Kochert, M. N., K. Steenhof, C.L. McIntyre, and E. H. Craig. 2002. Golden eagle (*Aquila chrysaetos*). In A. Poole and F. Gill (eds.). The Birds of North America, #684. The Birds of North America, Inc. Philadelphia, Pennsylvania.

Lovich, J. E. 2015. Golden eagle mortality at a wind-energy facility near Palm Springs, California. Western Birds 46:76-80.

McIntyre, C. L. 1995. Nesting ecology of migratory golden eagles (*Aquila chrysaetos*) in Denali National Park, Alaska. M.S. Thesis, University of Alaska, Fairbanks.

Nevada Department of Wildlife (NDOW). 2017. Golden eagle occupancy and productivity survey protocol in Nevada relating to desert bighorn sheep populations: Nevada Department of Wildlife recommendations.

Olendorff, R. R. 1976. The food habits of North American golden eagles. American Midland Naturalist 96:231-236

Pagel, J. E., D. M. Whittington and G. T. Allen. 2010. Interim golden eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Birds Management, U.S. Fish and Wildlife Service.

Palmer, R. S. 1988. Golden eagle. In R. S. Palmer (ed). Handbook of North American birds. Yale University Press.

Thelander, C., Senior Raptor Biologist, BRC-EQ3. 2017. Personal communication (ct@biorc.com) with Eric Dugan, Dugan Biological Services. April, 2015; December, 2017.

United States Geological Survey National Gap Analysis Program (USGS). 2005. Southwest Regional GAP Analysis Project-Land Cover Descriptions. RS/GIS Laboratory, College of the Natural Resources, Utah State University.

Table 1. Personnel and Weather Data for Aerial and Ground Golden Eagle Survey for the Libra Solar Project

| Date | Survey Type | Observer 1 | Observer 2/ Photographer | Pilot | Start Time (PDT) | End Time (PDT) | Start Temp (°F) | End Temp (°F) | Start Wind Speed (mph) | End Wind Speed (mph) | Start Precip (in.) | End Precip (in.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/24/22 | Phase 1 Aerial | Eric Dugan | Dave Lohr | Mike Zemlock | 1220 | 1505 | 34 | 44 | Calm | 2 | 0 | 0 |
| 2/25/22 | Phase 1 Aerial | Eric Dugan | Dave Lohr | Mike Zemlock | 0825 | 1320 | 27 | 37 | Calm | 2 | 0 | 0 |
| 4/9/22 | Phase 1 Ground | Eric Dugan | n/a | n/a | 0600 | 1300 | 44 | 55 | Calm | NW 9 | 0 | 0 |
| 6/8/22 | Phase 2 Aerial | Eric Dugan | Dave Lohr | Chris Creamer | 0915 | 1150 | 76 | 88 | E 3 | E 7 | 0 | 0 |

Table 2. Aerial Survey Phase 1 Nest Data — Libra Solar Project, 2022 Nesting Season

| Nest ID[1] | Species | Nest Status[2] | UTM[3] | UTM | Nest Site Description | Nest Activity Phase 2 | # Eggs | # Chicks | Nest Condition |
|---|---|---|---|---|---|---|---|---|---|
| 5a-c | RTHA | Inactive | *Redacted* | Redacted | Three stick nests on cliff feature | N/A | 0 | 0 | Good/Fair/Poor |
| 7a-c | GOEA | Active | Redacted | Redacted | Three stick nests on cliff feature; Adult pair present at nest | N/A | 0 | 0 | Good/Good/Poor |
| 8 | CORA | Inactive | Redacted | Redacted | Cliff feature | N/A | 0 | 0 | Good |
| 9 | FALCON | Inactive | Redacted | Redacted | Cliff feature; fresh mutes | N/A | 0 | 0 | Good |
| 10a-b | GOEA | Inactive | Redacted | Redacted | Cliff feature; two nests | N/A | 0 | 0 | Good/Good |
| 11 | CORA | Inactive | Redacted | Redacted | Cliff feature | N/A | 0 | 0 | Good |
| 13 | RTHA | Inactive | Redacted | Redacted | Old stick nest | N/A | 0 | 0 | Good |
| 16 | RTHA | Inactive | Redacted | Redacted | Cliff feature; Male RTHA present | N/A | 0 | 0 | Good |
| 17 | CORA | Inactive | Redacted | Redacted | Cliff feature | N/A | 0 | 0 | Good |
| 25 | RTHA | Occupied | Redacted | Redacted | Tree nest; Adult incubating | N/A | Unknown | 0 | Good |
| 26 | GOEA | Active | Redacted | Redacted | Cliff feature; Adult pair present at nest | N/A | 0 | 0 | Good |
| 27 | CORA | Inactive | Redacted | Redacted | Cliff feature | N/A | 0 | 0 | Good |

Footnotes:

1. ID = identification. 2) Nest Status during Phase 1 Aerial Survey. 3) UTM = Universal Transverse Mercator *(redacted from public document)*

Table 3. Incidental Species Observations Data — Libra Solar Project, 2022 Nesting Season

| Resource ID | Species | Status | Number | Survey | UTM | UTM | Notes |
|---|---|---|---|---|---|---|---|
| 1 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 2 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 3 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 4 | CORA | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 6 | AMKE | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 7 | GOEA | Live | 2 | Phase 1A | Redacted | Redacted | Adult pair perched near nest #7 (Table 2) |
| 12 | GOEA | Live | 2 | Phase 1A | Redacted | Redacted | Adult pair perched low on a rocky ridge |
| 14 | GOEA | Live | 1 | Phase 1A | Redacted | Redacted | Adult male perched on rocky ridge near female #15 |
| 15 | GOEA | Live | 1 | Phase 1A | Redacted | Redacted | Adult female perched on rocky ridge near male #14 |
| 16 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult male perched at nest #16 |
| 18 | CORA | Live | 2 | Phase 1A | Redacted | Redacted | Adult pair in flight |
| 19 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult female perched on rocky ridge |
| 20 | SSHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult in flight |
| 21 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult perched on wooden power pole |
| 22 | FEHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult perched in tree |
| 23 | AMKE | Live | 1 | Phase 1A | Redacted | Redacted | Adult in a low hover |
| 24 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult perched in tree |
| 25 | RTHA | Live | 1 | Phase 1A | Redacted | Redacted | Adult female incubating in nest #25 |
| 26 | GOEA | Live | 2 | Phase 1A | Redacted | Redacted | Adult pair perched near nest # 26 |
| 28 | LEOW | Live | 1 | Phase 1A | Redacted | Redacted | Adult flushed from rocky canyon |
| 29 | RTHA | Live | 2 | Phase 1A | Redacted | Redacted | Pair perched on rocky ridge |
| 30 | RTHA | Live | 2 | Phase 1A | Redacted | Redacted | Pair perched on tower |
| 31 | GOEA | Live | 1 | Phase 1B | Redacted | Redacted | Adult perched near Nest #7 |
| 32 | GOEA | Live | 1 | Phase 1B | Redacted | Redacted | Adult in flight east of Nest #10 |
| 33 | RTHA | Live | 1 | Phase 1B | Redacted | Redacted | Adult in flight |
| 34 | RTHA | Live | 1 | Phase 1B | Redacted | Redacted | Adult in flight |
| 35 | TUVU | Live | 1 | Phase 1B | Redacted | Redacted | Adult in flight |
| 36 | PRFA | Live | 1 | Phase 1B | Redacted | Redacted | Adult in flight |

# EXHIBITS

Exhibit 2. Flight Track Data – Phase 1 and Phase 2 Aerial Surveys

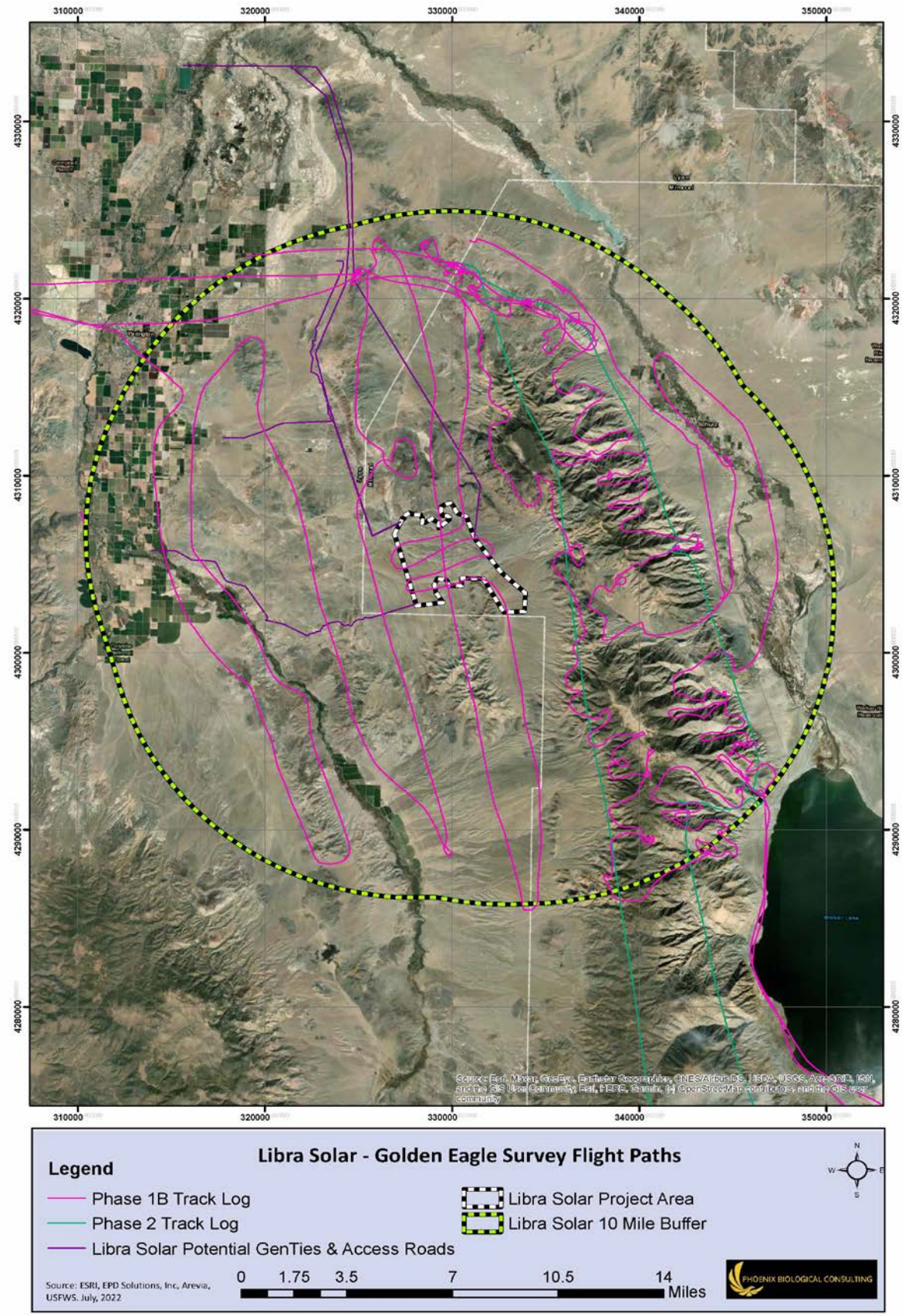
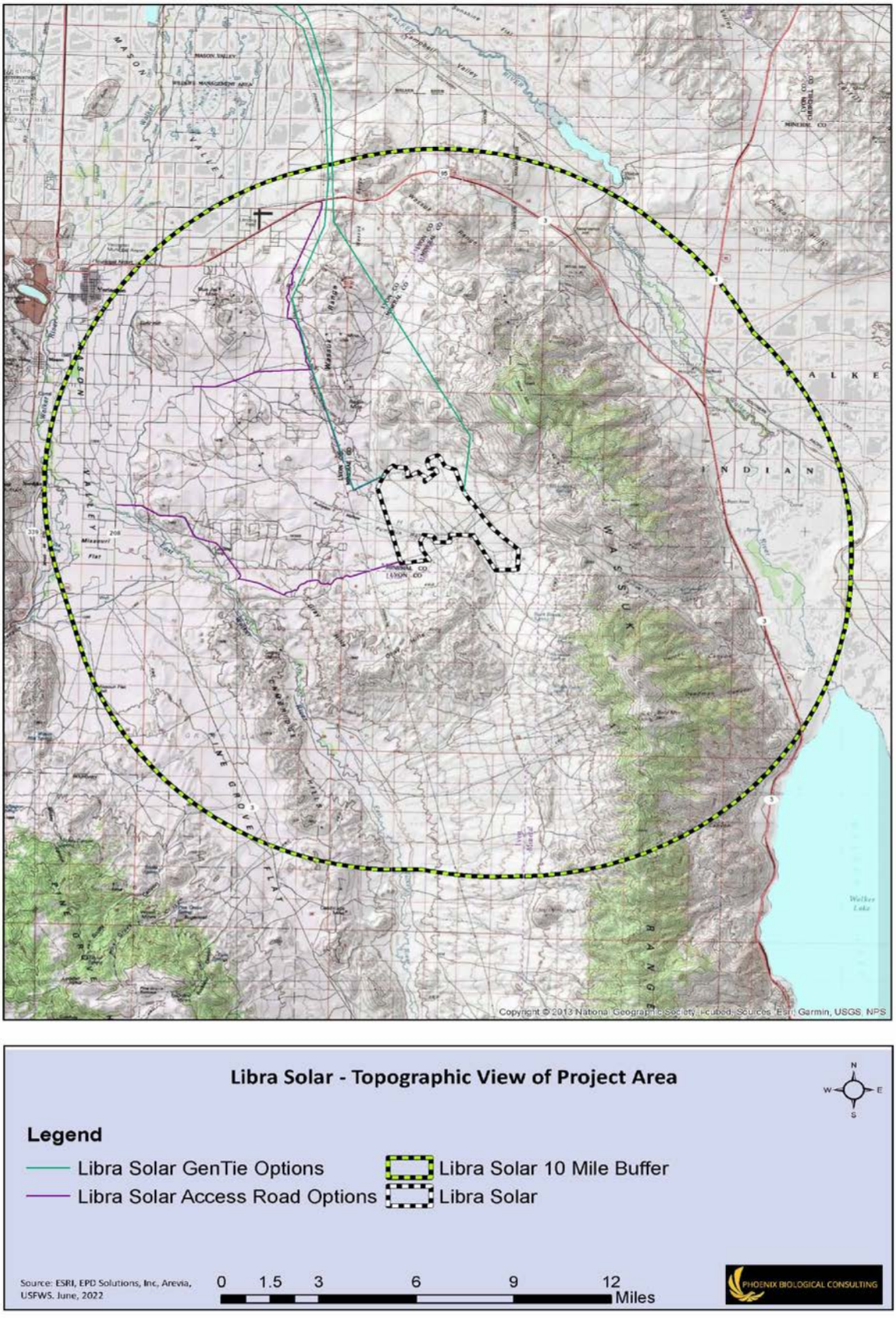


Exhibit 3. Nests located during Phase 1 occupancy aerial survey (December 21, 2020)

**Image redacted from public document to protect sensitive sites.**

Exhibit 4: Topographic View of Project Area



# PHOTOGRAPHS

Photograph 1. Inactive golden eagle nest observed during the Phase 2 survey in the northern foothills of the Wassuk Range. (Nest GOEA #7a; Table 2).

Photograph 2. Inactive golden eagle nest observed during the Phase 2 survey in the northern foothills of the Wassuk Range. (Nest GOEA #10a; Table 2).

Photograph 3. Inactive golden eagle nest observed during the Phase 2 survey on the eastern slopes of the Wassuk Range. (Nest GOEA #26; Table 2).

Photograph 4. Adult female golden eagle observed at Nest #7 during the Phase 1 aerial survey (#7, Table 3).

Photograph 5. Adult male golden eagle observed on the eastern slopes of the Wassuk Range during the Phase 1 aerial survey (#14, Table 3).

EXHIBIT 5– Summary of Golden Eagle Surveyors Experience

Eric Dugan, PhD

Dr. Dugan is the founder of Dugan Biological Services, LLC and has worked extensively with raptors in various capacities over the past 20 years. Specifically, he has led protocol-level ground and aerial helicopter surveys for cliff-dwelling raptors and golden eagles (*Aquila chrysaetos*) at various sites across southern California and southern Nevada. His field efforts have focused on identifying golden eagle nesting territories, assessing nest success and productivity, and detailing nest ecology at active golden eagle nest sites in California and Nevada. Dr. Dugan has conducted the USFWS protocol golden eagle aerial and ground surveys for Southern California Edison's West of Devers Project in 2016, 2017 and 2018. Additionally, he spent several breeding seasons collecting reproductive data from historical peregrine falcon (*Falco peregrinus*) breeding territories, manning raptor point count stations, and monitoring active raptor nests in California. Dr. Dugan's has first-hand experience with many raptor species, including golden eagle, Cooper's hawk (*Accipiter cooperii*), burrowing owl (*Athene cunicularia*), great-horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*B. lineatus*), American kestrel (*F. sparverius*), and barn owl (*Tyto alba*) during his involvement with mitigation management on natural gas pipeline, renewable energy and transmission line projects. Since 2005, he has served as an agency-approved raptor and avian biologist on projects throughout southern California. Dr. Dugan received his bachelor of arts in Environmental Studies from Pitzer College (Claremont Colleges) in 2000, and his PhD in Biology from Loma Linda University in 2011. He has an extensive publication record, including several book chapters and numerous scientific journal articles on topics ranging from rattlesnake niche partitioning and diets, to special status lizard biology and conservation. He is actively involved in scientific research, with current projects in both southern California and the Baja Peninsula, Mexico.

Dave Lohr

Mr. Lohr is full-time senior biologist, with over 15 years devoted to the environmental industry. His experiences are highlighted by extensive work on the conservation of herpetofauna and avian species across the southwestern United States and northern Mexico. Mr. Lohr has served as an instrumental component on various research and energy projects ranging from rattlesnake radio-telemetry to avian biology and raptor conservation during the construction of transmission line projects. Mr. Lohr has conducted the USFWS protocol golden eagle (*Aquila chrysaetos*) aerial and ground surveys for Southern California Edison's West of Devers Project, and served as survey photographer and data recorder for numerous other aerial golden eagle and wildlife surveys. He has served as a field lead on numerous projects, and has conducted thousands of hours of focused surveys for sensitive species, including golden eagle, bighorn sheep (*Ovis canadensis nelson*), burrowing owl (*Athene cunicularia*), desert tortoise, barefoot gecko (*Coleonyx switaki*) and nesting birds. His consulting portfolio also includes 15 years of implementing compliance and mitigation monitoring programs. Mr. Lohr is an accomplished avian biologist proficient in species identification, handling, data collection, photography and reporting. He served as an avian biologist most recently on LADWP, SCE, and SCG projects across the southwest U.S.