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Burrowing Owl Survey Report

Version: 0

Black Rock, Elmore North, and Morton Bay Geothermal Projects
Black Rock Geothermal, LLC; Elmore North Geothermal, LLC; Morton Bay Geothermal, LLC

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Burrowing Owl Survey Report

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Acronyms and Abbreviations

°F	degree(s) Fahrenheit
BRGP	Black Rock Geothermal Project
BSA	Biological Study Area
BHER	BHE Renewables LLC
CDFW	California Department of Fish and Wildlife
ENGP	Elmore North Geothermal Project
gen-tie	generation interconnect
IID	Imperial Irrigation District
mph	mile(s) per hour
MBGP	Morton Bay Geothermal Project
MCV	Manual of California Vegetation
N/A	not applicable
TBD	to be determined
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1. Introduction and Background

Black Rock Geothermal LLC, Elmore North Geothermal LLC, and Morton Bay Geothermal LLC[1] have submitted Applications for Certification to the California Energy Commission to construct and operate three separate geothermal facilities in Imperial County, California: the Black Rock Geothermal Project (BRGP), the Elmore North Geothermal Project (ENGP), and the Morton Bay Geothermal Project (MBGP). Burrowing owl (*Athene cunicularia*) surveys were conducted concurrently for the three proposed projects which share temporary construction areas. Each proposed project has a separate Biological Study Area (BSA) which includes the extent of temporary and permanent disturbance areas (Figures 1, 2, and 3). For the purposes of the burrowing owl survey, the three BSA's and associated buffers were merged into one area (referred to as merged survey area) (Figure 4). This report summarizes the survey methods and the impact evaluation results of breeding season burrowing owl surveys conducted for all three proposed projects on June 5-9, July 10-12, and August 14-16, 2023.

1.1 Black Rock Geothermal Project

Black Rock Geothermal, LLC, proposes to construct and operate the BRGP (Figure 1). The BRGP BSA includes the site of the BRGP's power generating facilities, well fields for the BRGP, linear routes (including the gen-tie line), and the shared temporary construction areas.

1.2 Elmore North Geothermal Project

Elmore North Geothermal, LLC, proposes to construct and operate the ENGP (Figure 2). The ENGP BSA includes the site of the ENGP's power generating facilities, well fields for the ENGP, linear routes (including the gen-tie line), and the shared temporary construction areas.

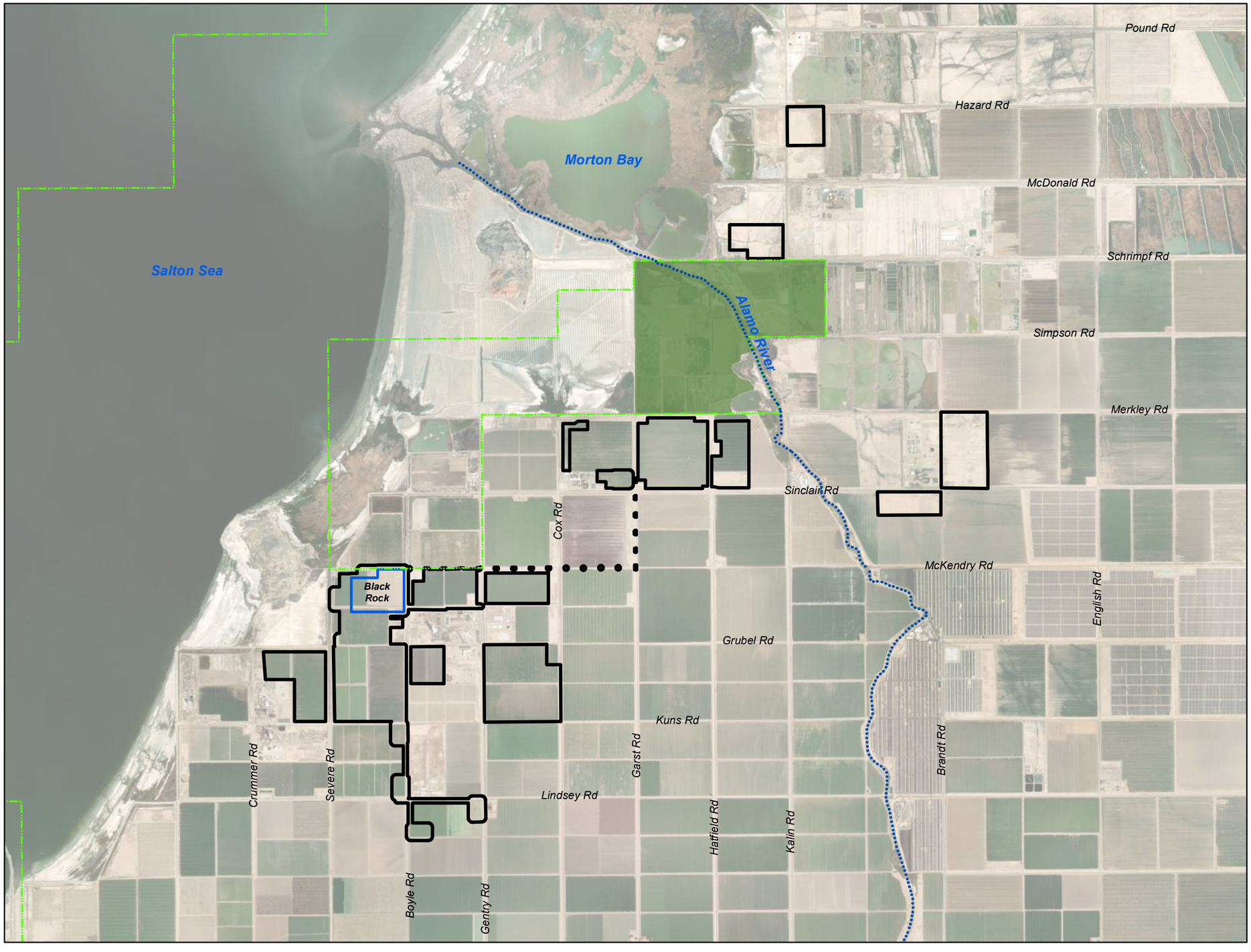
1.3 Morton Bay Geothermal Project

Morton Bay Geothermal, LLC, an indirect, wholly owned subsidiary of BHER proposes to construct and operate the MBGP (Figure 3). The MBGP BSA includes the site of the MBGP's power generating facilities, well fields for the MBGP, linear routes (including the gen-tie line), and the shared temporary construction areas.

1.4 Project Locations

The proposed BRGP, ENGP, and MBGP are in the Imperial Valley, southeast of the Salton Sea (Figures 1, 2, and 3). The Imperial Valley is in the southwest part of the Colorado Desert that merges northwest into the Coachella Valley near the northern shore of the Salton Sea. The three proposed projects are in a region of the Imperial Valley characterized mostly by agriculture and geothermal power production, with more recent additions of utility scale solar power plants. The area surrounding the proposed projects are primarily agricultural land. The three proposed projects span two U.S. Geological Survey (USGS) quadrangles, Niland and Obsidian Butte. These proposed projects are also in the proximity of the Alamo River, Imperial Wildlife Area, and Sonny Bono Salton Sea National Wildlife Refuge (Figure 4).

[1] Black Rock Geothermal LLC, Elmore North Geothermal LLC, and Morton Bay Geothermal LLC are all indirect, wholly owned subsidiaries of BHE Renewables, LLC (BHER).



Legend

- Sonny Bono Salton Sea National Wildlife Refuge
- Imperial Wildlife Area
- Plant
- Black Rock Geothermal Project Biological Study Area (BSA)

N

0 0.25 0.5 1
Miles

Figure 1
Black Rock Geothermal Project
Biological Study Area
Imperial County, California

Jacobs

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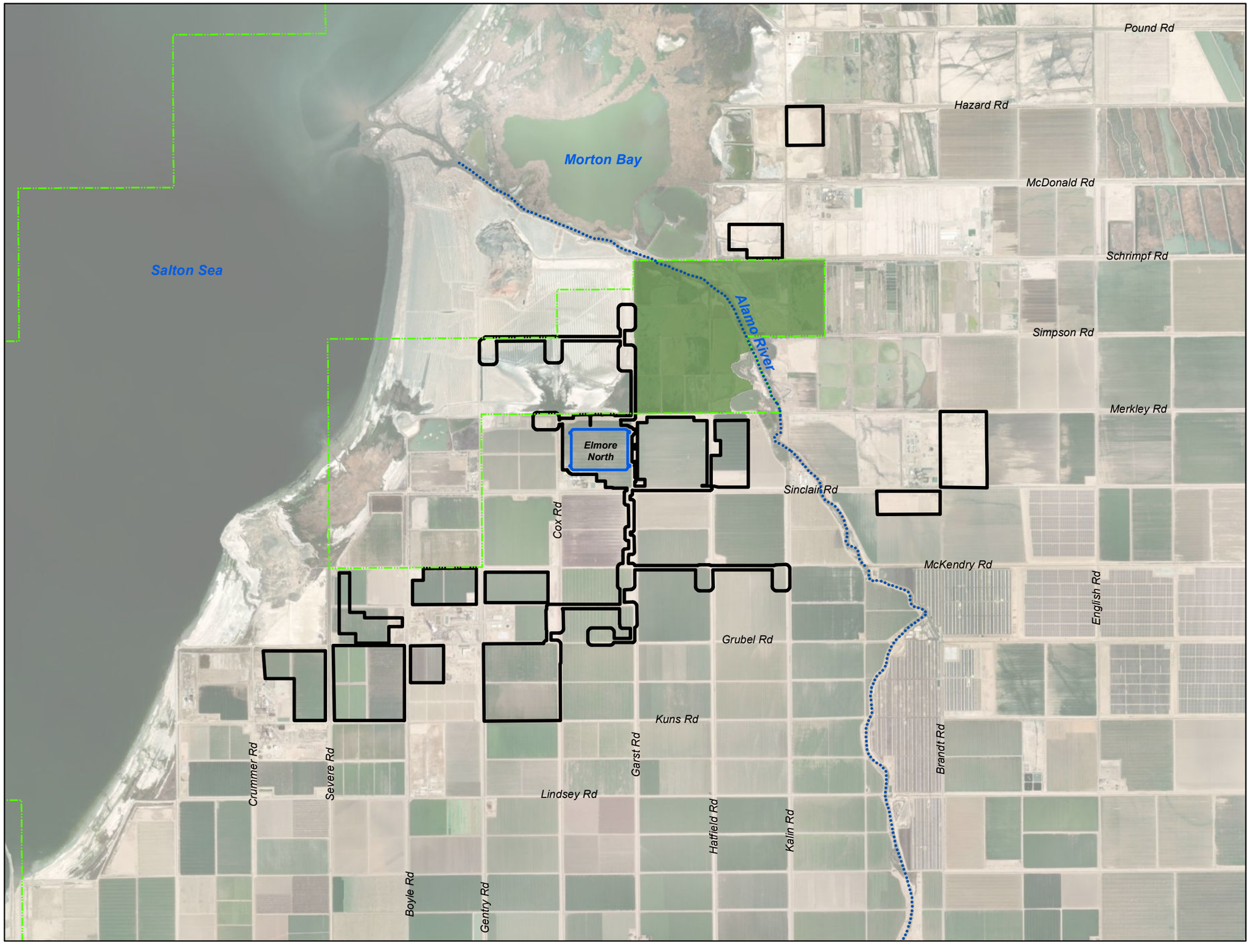

Legend

- Sonny Bono Salton Sea National Wildlife Refuge
- Imperial Wildlife Area
- Plant
- Elmore North Geothermal Project Biological Study Area (BSA)

N

0 0.25 0.5 1
Miles

Figure 2
Elmore North Geothermal Project
Biological Study Area
Imperial County, California

Jacobs

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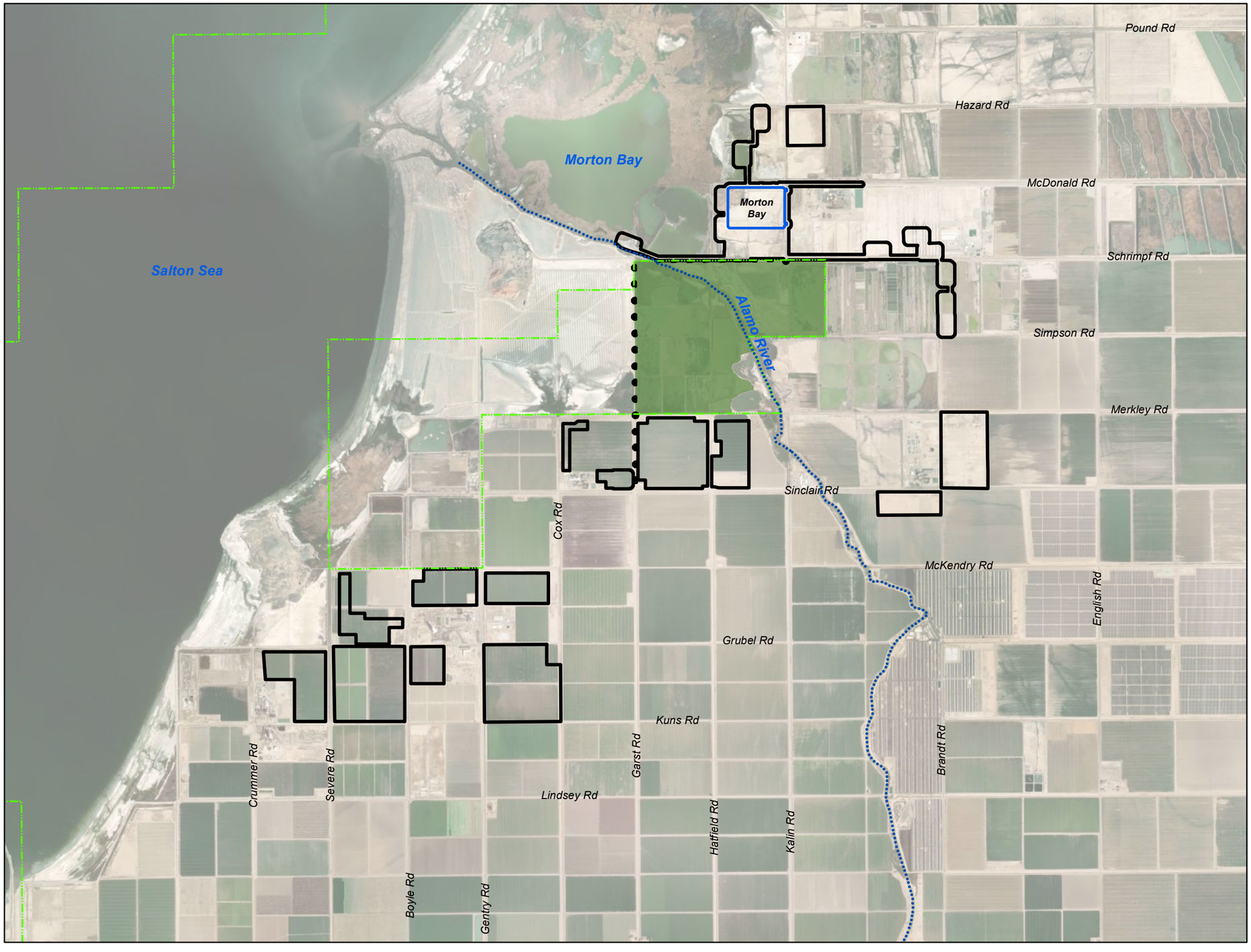

Legend

- Sonny Bono Salton Sea National Wildlife Refuge
- Imperial Wildlife Area
- Plant
- Morton Bay Geothermal Project Biological Study Area (BSA)

N

0 0.25 0.5 1
Miles

Figure 3
Morton Bay Geothermal Project
Biological Study Area
Imperial County, California

Jacobs

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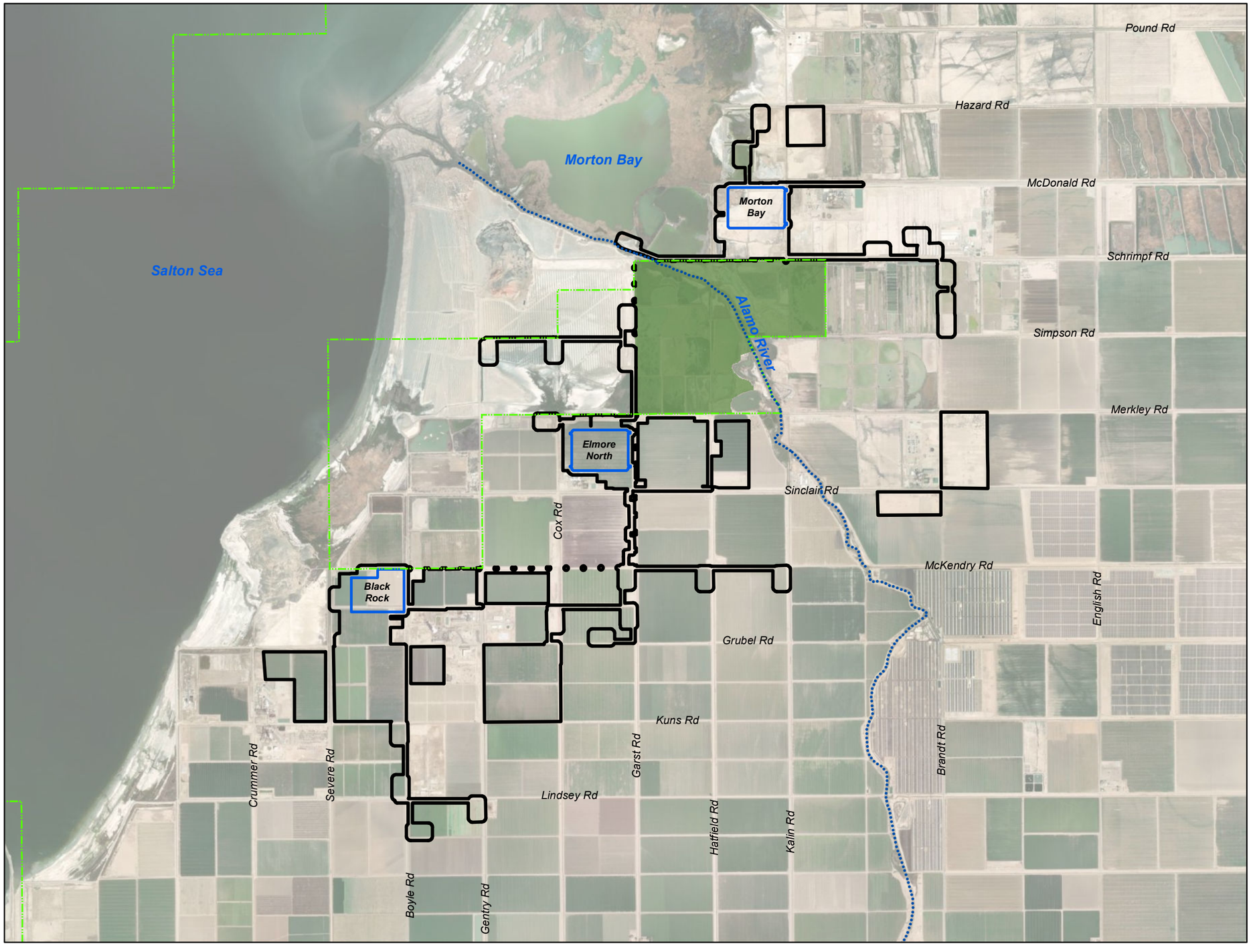

Legend

- Sonny Bono Salton Sea National Wildlife Refuge
- Imperial Wildlife Area
- Plant
- Merged Biological Study Area (BSA)

N

0 0.25 0.5 1
Miles

Figure 4
Merged Biological Study Area
Imperial County, California

Jacobs

\\dc1vs01\gisproj\B\BHE_Renewables\Imperial_Valley\MapFiles\Bio\BUOW\Figure_4_230801.mxd

1.5 Environmental Setting

1.5.1 Climate and Elevation

The three proposed projects are located in California's Imperial Valley. The region has a typical desert climate with hot, arid summers and cool, dry winters generating an average annual rainfall of two to four inches per year. Elevations within the BRGP, ENGP, and MBGP BSAs range between 232 to 213 feet below mean sea level.

1.5.2 Habitat Types

The three proposed projects are within an ecoregion known as the Salton Sink (CDFW 2022), which is defined by a low area surrounded by mountains with no outlet for flowing water. This area is highly disturbed by agriculture and geothermal development and does not contain high-quality natural habitat. Vegetation within the BRGP, ENGP, and MBGP BSAs were classified using vegetation and land cover descriptions following the *Landcover Descriptions for the Southwest Regional Gap Analysis Project* (NatureServe 2004) and A *Manual of California Vegetation, Second Edition* (MCV) (Sawyer et al. 2009). The Southwest Regional Gap Analysis Project classification system includes nonnatural land cover types, which are not found in the MCV including agriculture, developed, and disturbed land cover. Four natural vegetation and land cover types were recorded in the merged BSAs, Barren (this land cover type is devoid of vegetation and does not have a corresponding MCV alliance), Invasive Southwest Riparian Woodland and Shrubland corresponds to *Tamarix* spp. Shrubland Semi-Natural Alliance (Tamarisk thickets) in the MCV, North American Arid West Emergent Marsh corresponds to *Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance (cattail marsh) in the MCV, and North American Warm Desert Playa corresponds to the *Allenrolfea occidentalis* Shrubland Alliance (iodine bush scrub) in the MCV. BRGP, ENGP, and MBGP BSAs do not contain any California Department of Fish and Wildlife (CDFW) special-status habitats or U.S. Fish and Wildlife Service (USFWS)-designated critical habitat.

1.6 Burrowing Owl Life History

1.6.1 Status

Due to declines of suitable habitat and both localized and statewide population declines, the CDFW has designated burrowing owl as a Species of Special Concern and the USFWS has designated burrowing owl as a Bird of Conservation Concern.

1.6.2 Habitat Requirements

Suitable habitat for burrowing owl can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zam1974). Most California populations are nonmigratory, and these habitat types serve breeding, foraging, and overwintering. Burrowing owls are known to tolerate landscapes that are highly altered by human activity or have a high level of ongoing human disturbance (Poulin et al. 2020; Shuford and Gardali 2008; Rosenberg and Haley 2004). Burrowing owls are well-adapted to agricultural landscapes, attaining the greatest densities ever recorded for the species within the Imperial Valley (Rosenberg et al. 1991; 2007). Burrowing owls breed and forage throughout the agricultural development in Imperial County,) and are habituated to ongoing agricultural activities and existing geothermal facilities in the vicinity (CDFW 2012). This species historically has used berms or elevated areas near existing geothermal facilities. Further, resident burrowing owls are widespread in irrigation canals and berms associated with the agricultural lands around the Salton Sea.

Required habitat characteristics include existing burrows for roosting and nesting, as well as relatively short vegetation with little to no shrubs or taller vegetation (Klute et al. 2003; Haug et al. 1993). Burrows are defined as cavities at or below ground level, either naturally occurring (e.g. previous mammal burrow) or artificial (e.g. manmade concrete structure), which provide protection and could be utilized by burrowing owls as a dwelling. Nest and roost burrows are most commonly dug by California ground squirrels (*Spermophilus beecheyi*) (Trulio 1997), but burrowing owls may use other mammal burrows or structures such as culverts, piles of concrete rubble, and pipes (Ronan 2002). Burrowing owl occupancy can be distinguished from mammal occupancy by the presence of feathers, pellets, prey remains, eggshell fragments, or excrement (whitewash) at the burrow entrance. Burrowing owls show strong fidelity to their nest site year after year, especially in an agricultural environment, such as that in Imperial Valley (Catlin 2004, Catlin et al. 2005). Owls tends to forage close to their burrows (Haug and Oliphant 1990, Gervais et al. 2003). In agricultural areas of the Imperial Valley, the majority of burrowing owl foraging behavior was observed within 1,968 feet (600 meters) from their nesting burrow (Gervais et al. 2003, Rosenberg and Haley 2004.)

1.6.3 Diet

The diet of burrowing owls in California includes a broad array of arthropods (e.g., centipedes, spiders, beetles, crickets, and grasshoppers), small rodents, birds, amphibians, reptiles, and carrion (Thompson and Anderson 1988; Plumpton and Lutz 1993; Gervais et al. 2000; York et al. 2002). In California, there is evidence that rodent populations, particularly those of California voles (*Microtus californicus*), may greatly influence survival and reproductive success of burrowing owls (Gervais and Anthony 2003; Gervais et al. 2006).

1.6.4 Reproduction

Per CDFW's *Staff Report on Burrowing Owl Mitigation*, the burrowing owl breeding season occurs between February 1 through August 31 (CDFW 2012). Egg incubation lasts 29 days, and juvenile owls will fledge their nests after 44 days. Burrowing owls typically lay between 4 to 12 eggs per clutch—sometimes up to 14 eggs (Haug et al. 1993).

1.6.5 Population Threats

Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial Valleys are the greatest threats to burrowing owls in California. Ongoing urbanization in coastal regions, changes in agricultural practices, and continuing eradication of ground squirrels are also serious threats to the species.

2. Methods

The burrowing owl survey methods were developed from discussions with CDFW and using applicable elements from the survey guidelines provided in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). CDFW staff recommended survey methods based on previous surveys and local understanding of the Imperial Valley burrowing owl population during a conference call on June 1, 2023[2]. Based on this call, Jacobs prepared a technical memorandum entitled *BHE Renewables Burrowing Owl Survey Summary* method which was a hybrid between the CDFW *Staff Report on Burrowing Owl Mitigation* guidelines and

[2] Rose Banks/CDFW, Magdalena Rodriguez/CDFW, Morgan King/Jacobs, Christy Payne/Jacobs, Jerry Salamy/Jacobs, and Lindsey Xayachack/Jacobs attended the June 1, 2023 call.

CDFW local expertise (Appendix A). CDFW approved these survey methods in an email dated June 16, 2023 (Banks, pers. comm. 20223) (Appendix B).

The *Staff Report on Burrowing Owl Mitigation* guidelines define three levels of analysis: habitat assessment, occupancy determination, and impact assessment (CDFW 2012). The first two portions of that analysis, habitat assessment and occupancy determination, were completed during surveys conducted by Jacobs biologists in 2022 for the California Energy Commission Application for Certification process. Preliminary results of the impact analysis conducted in summer 2023 is the purpose of this report.

2.1 Habitat Assessment and Occupancy Determination

Jacobs biologists conducted a reconnaissance-level wildlife survey of the BRGP, ENGP, and MBGP BSA in late February and March 2022 which satisfied the *Staff Report on Burrowing Owl Mitigation* survey steps of habitat assessment and determining occupancy (CDFW 2012). The primary focus of this survey was to assess potentially suitable wildlife habitat and record observed wildlife species in the vicinity, especially burrowing owls. Biologists recorded all wildlife observations and wildlife sign (such as burrows, tracks, scat, carcasses, and vocalizations). Notes were made on vegetation types providing potentially suitable wildlife habitat. Biologists conducted windshield surveys and pedestrian surveys when burrowing owl, burrows, or burrowing owl sign was observed, and recorded observations of burrowing owls. Biologists used binoculars when stopped or during pedestrian surveys.

Most of the BRGP, ENGP, and MBGP BSAs are highly manipulated by agriculture or degraded without vegetation (highly compacted soil). Burrowing owls forage in agriculture lands, but the active tilling and flood irrigating would preclude burrows in these areas. Active agriculture areas lack potentially suitable burrowing owl burrowing or nesting habitat. Biologists drove at approximately 10 mph through the entire BRGP, ENGP, and MBGP BSAs on all available access roads. Biologists drove both sides of each irrigation canal or drain so that both sides were visible to inspect for burrowing owl burrows, sign, or live owls. When areas were not accessible by vehicle, biologists walked in potentially suitable burrowing/nesting habitat. Biologists paid special attention to any elevated feature where burrowing owls could perch, road berms, soil mounds/piles, fences, buildings, and structures.

Results of the 2022 burrowing owl habitat assessment and occupancy determination are provided in Appendix A.

2.2 Impact Evaluation

The impact evaluation (also referred to as impact assessment) survey methods were a hybrid between recommendations in the *Staff Report on Burrowing Owl Mitigation* and from CDFW staff (CDFW 2012, Banks, pers. comm. 2023). CDFW approved four impact evaluation surveys, with three surveys to be conducted during the breeding season (between February 1 and August 31) and one survey to be conducted during the non-breeding season (September 1 through January 31). One of these surveys was to be conducted within the peak breeding season (between April 15 and July 15). The surveys would be led by biologists that have experience conducting impact evaluation burrowing owl surveys and would occur at least three weeks apart.

The survey area encompassed the BRGP, ENGP, and MBGP BSAs (the proposed project disturbance areas) that constitute potential burrowing owl breeding habitat plus a 656-foot (200-meter) buffer (Figure 5). The 656-foot (200-meter) buffer was recommended by CDFW to identify burrows that may require construction avoidance buffers that extend into the BSAs. The total survey acreage of the three merged BSAs and associated buffers is 4,904 acres (1,985 hectares) (Figure 5), which includes 3,165 acres

(1,280 hectares) for BRGP (Figure 6[3]); 3,631 acres (1,469 hectares) of ENGP (Figure 7); and 3,634 acres (1,471 hectares) of MBGP (Figure 8).

Surveys were performed by visually scanning the survey area, aided with scopes or binoculars and listening for burrowing owl vocalizations (when applicable). All roads adjacent to and within the proposed project BSA and associated buffers were surveyed from a vehicle driven at approximately 10 mph (16 kilometers per hour). Both sides of earthen Imperial Irrigation District (IID) canals and drains were driven so that both sides were observed. Biologists visually scanned the area and recorded the location of all burrowing owls seen or heard (all detections). Confirmed breeding burrows were recorded as such (occupied burrow), and all owls seen with no apparent affiliation to a burrow were recorded as an incidental burrowing owl observation. All canals, drains, berms, concrete pads, structures, and otherwise undisturbed land were investigated sufficiently to determine presence or absence of possible nesting burrowing owls, up to and including walking around features to gain visual verification of all sides of the feature. If the survey area extended more than 656 feet (200 meters) beyond the road, or if any part of the survey area was visually obstructed, the surveyors accessed the area on foot. Care was taken to avoid flushing or disturbing nesting burrowing owls especially when accessing lands on foot. All owls detected, even if beyond buffer distance, were recorded. Areas on private land where we were not granted access were viewed from the closest access point.

Lands that were not burrowing owl breeding habitat (for example, active agricultural lands) were not specifically surveyed, but all burrowing owls detected were recorded, regardless of habitat type. Agricultural lands that were being actively tilled (during the applicable year's breeding season) were not considered breeding habitat and were not walked. All potential features within active agricultural areas that might have provided suitable burrowing location were investigated on foot. All active agricultural lands (not foot accessed) were recorded for reference.

Surveys were limited to the following two daily survey windows: between morning twilight and 10:00 AM, and two hours before sunset and evening twilight. The purpose of using this survey window is to increase the probability of detection by capturing data during the hours that burrowing owls are most active.

[3] Figures 6, 7, and 8 are provided at a 1:24,000 scale in accordance with *Staff Report on Burrowing Owl Mitigation* guidelines (CDFW 2012).

Figures 5, 6a, 6b, 7a, 7b, 8a, and 8b have been provided under a request for confidentiality.

The survey methodology provided to CDFW for their approval included a stipulation that surveys during inclement weather, namely wind over 12 miles per hour (mph) (20 kilometers per hour), precipitation, or dense fog would have been delayed until conditions improved. If conditions improved during the survey window, surveys would have recommenced. However, surveyors did not experience inclement weather during the initial two surveys. Wind speed was determined using the Beaufort Wind Scale or handheld meter (https://www.spc.noaa.gov/faq/tornado/beaufort.html).

For large blocks of potentially suitable habitat, the biologists walked transects spaced approximately 66 feet (20 meters) apart. The biologists adjusted transect width based on conditions and confidence that the surveyors were able to detect owls within the full extent of the transect. Along the transects, the biologists scanned the entire visible area with binoculars at the start of each transect and, at least, every 330 feet (100 meters). Biologists modified transect configuration and search methods to avoid disturbing burrowing owls or other sensitive species, including nesting birds.

Due to the known resident populations of burrowing owls in Imperial County agriculture, biologists did not conduct point counts or use calls for surveys.

Digital data were collected on iOS or Android devices with the Field Maps application on the AGOL platform. Biologists recorded their name, time, location, and weather at start and end of surveys for each survey period (up to two per day). Occupied burrows are defined as locations where one or more burrowing owls were observed at a burrow or by the presence of burrowing owl sign such as feathers, whitewash, and pellets. For the purpose of this survey, occupied burrows observed during the nesting season are considered nesting sites. Occupied burrows were assigned unique identification numbers (ex: BUOW_00). Incidental observations are defined as live burrowing owls observed away from a burrow. Incidental observations were not given a unique identification number.

In accordance with the 2012 CDFW guidance, if at least one burrowing owl is observed at a burrow, the site should be considered occupied for three years. Incidental observations of burrowing owls do not constitute an occupied burrow location, and therefore these observations alone will not constitute considering the site occupied.

2.2.1 Potentially Impacted Burrows

All occupied burrowing owl burrows within the merged survey area were recorded. Depending on the location of the burrow, the respective projects (BRGP, ENGP, and MBGP) will have different potential impacts. Occupied burrowing owl burrows that are located within the 656-foot (200-meter) buffer or along IID canals or drains will not be permanently impacted (excavated or physically disturbed) by project activities. Burrows within the buffers and along IID features may have temporary impacts that can be managed by implementation of construction avoidance measures. Burrows located in the 656-foot (200-meter) buffer may have a construction avoidance buffer that extends into the proposed projects' BSA. Potential permanent impacts to occupied burrowing owl burrows are only within the respective projects' BSA and not associated with an IID feature. Potential permanent impacts would require excavation and physical disturbance to the occupied burrow.

3. Results

This section provides a summary of 2022 and 2023 burrowing owl survey results conducted for the proposed BRGP, ENGP, and MBGP.

3.1 Survey History

Table 1 provides a summary of burrowing owl surveys completed in 2022 including dates, survey level, and surveyors. Burrowing owl habitat assessment and occupancy determination were satisfied during surveys conducted between February and November 2022. Suitable nesting habitat is present along irrigation canals and berms, and foraging habitat is present in adjacent agricultural fields.

Table 1. 2022 Survey Dates, Level, and Surveyor Summary

Survey Date	Survey Level	Surveyors
February 28 - March 3, 2022	Habitat assessment and occupancy determination	Rachel Newton and Rebecca John
March 4-13, 2022	Habitat assessment and occupancy determination	Rachel Newton and Morgan King
March 15, 2022	Habitat assessment and occupancy determination	Rachel Newton and Eric Weis
November 4, 2022	Habitat assessment and occupancy determination	Robert Hernandez

3.2 Staff, Timing, and Weather Conditions

Jacobs biologists have completed three of the four impact evaluation burrowing owl surveys in 2023 (Table 2). Appendix A provides the resumes of the lead biologists with burrowing owl experience who conducted the June, July, and August surveys.

Table 2. 2023 Survey Dates, Level, and Surveyor Summary

Survey Date	Survey Level	Breeding or Non-Breeding Season	Surveyors
June 5-9, 2023	Impact assessment	Breeding season	Samantha Vaughan, Jill Harris, Leeann McDougall
July 10-12, 2023	Impact assessment	Breeding season	Scott Lindemann and Samantha Padilla
August 14-16, 2023	Impact assessment	Breeding season	Samantha Vaughan and Sean O'Neil
Between October and December 2023	Impact assessment	Non-breeding season	Samantha Vaughan and Sean O'Neil

Table 2 provides weather data and survey times. Early morning and evening survey times were in accordance with *Staff Report on Burrowing Owl Mitigation* guidelines which provides the highest detection probability (CDFW 2012).

Table 3. Weather and Survey Times

Survey Date	Start Time	End Time	Wind	Temperature	Cloud Cover	Precipitation	Visibility
June 5, 2023	4:52 AM	10:00 AM	0-5 mph	71°F	0-2%	0	100%
	4:45 PM	7:15 PM	10-20 mph	80°F	0%	0	80%
June 6, 2023	5:07 AM	10:00 AM	0-7 mph	64°F	0%	0	100%
	5:00 PM	7:30 PM	10-15 mph	90°F	0%	0	100%
June 7, 2023	5:06 AM	10:00 AM	0-7 mph	65°F	10%	0	100%
	4:51 PM	7:43 PM	0-5 mph	86°F	5%	0	100%
June 8, 2023	5:13 AM	10:00 AM	0-5 mph	69°F	10%	0	100%
	5:02 PM	7:32 PM	10-15 mph	85°F	0%	0	100%
July 10, 2023[a]	6:00 AM	10:00 AM	0-5 mph	75°F	0%	0	100%
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
July 11, 2023	6:04 AM	10:00 AM	0-5 mph	78°F	0%	0	100%
	6:25 PM	8:06 PM	0-5 mph	109°F	0%	0	100%
July 12, 2023[a]	5:41 AM	10:00 AM	0-5 mph	85°F	0%	0	100%
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
August 14, 2023[b]	6:00 AM	10:00 AM	0-5 mph	99°F	5%	0	100%
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
August 15, 2023[b]	6:00 AM	10:00 AM	0-5 mph	102°F	50%	0	100%
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
August 16, 2023[b]	6:00 AM	9:00 AM	0-5 mph	101°F	75%	0	100%
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

°F = degree(s) Fahrenheit
mph = miles per hour
N/A = not applicable
[a] Surveys were completed on the mornings of July 10 and 12, so no afternoon surveys were required.
[b] Surveys were completed on the mornings of August 14-16, so no afternoon surveys were required.

3.3 Occupied Burrows

Jacobs biologists documented a total of 64 occupied burrowing owl burrows in the merged survey area during the June, July, and August surveys (Figure 5). Table 3 provides a summary of occupied burrow observations separated by proposed project BSA and buffer (Appendix D, Table D-1; Figures 6, 7, and 8 respectively). Appendix D, Table D-2 provides details of occupied burrow observations, such as number of owls, number of burrows, unique markers, and behavior. Occupied burrow observations included groups, single adults, nesting pairs, and juveniles at or within direct proximity of a burrow. Burrows were identified as occupied by the presence of owls. Many of the burrows were located along and underneath the edges of concrete canals and soil drains. A variety of burrowing owl behaviors were observed during the surveys, including owls flushing from burrows when approached by surveyors, resting in or next to burrows,

hunting/foraging in agricultural fields, feeding at burrows, dust bathing at or next to burrows, and perching on nearby structures such as posts, fences, concrete or metal fixtures associated with agricultural or geothermal plant operations adjacent to burrows. No burrowing owl individual markers, such as bands (numbers and colors), transmitters, or unique natural identifying features were observed.

Table 4. Summary of Occupied Burrow Observation Locations per Proposed Project

Project	Number of Burrows in BSA	Number of Burrows in Buffer	Total Number of Burrows[a]
BRGP	13	29	42
ENGP	13	37	50
MBGP	3	26	29

BRGP = Black Rock Geothermal Project

BSA = Biological Study Area

ENGP = Elmore North Geothermal Project

MBGP = Morton Bay Geothermal Project

[a] The BSAs for BRGP, ENGP, and MBGP overlap each other. A single burrow could be recorded as present in multiple project BSAs. The total number of burrows column represents the total number of burrows within each project BSA. Some burrow points are triple represented in this table to account for their presence in all three project BSAs.

Biologists observed unoccupied burrows in the merged survey area. These burrows did not have live burrowing owls or associated sign. Unoccupied burrows were visited during every survey to confirm occupancy.

3.4 Incidental Observations

Biologists recorded 34 incidental observations of burrowing owls in the merged survey area (Figure 5). These observations included burrowing owls making general use of the area. Burrowing owls were observed flushing from an area when biologists passed with no apparent association with a burrow, engaged in activities such as hunting or foraging in adjacent fields, dust bathing, and perching on nearby structures such as stacks of hay bales, posts, fences, and concrete or metal fixtures associated with agricultural or geothermal plant operations. Appendix E includes representative survey photographs of burrowing owls and habitats in the merged survey area.

3.5 Limitations

A majority of the 656-foot (200-meter) merged buffer areas were located on private property that biologists did not have access to. Surveys of the 656-foot (200-meter) buffer were therefore primarily limited to public access roads. Biologists used binoculars and spotting scopes to survey areas of private property without access.

3.6 Predators

Burrowing owl predators, such as coyotes, were present within the merged survey area. There were multiple coyote sightings during surveys. Two burrow observations, BUOW_26 and BUOW_43, exhibited coyote predation such as excavated burrows (dug out), scattered eggshells, clumps of feathers, and coyote scat and tracks near burrows. A dead burrowing owl was observed at BUOW_58 during August survey.

4. Impact Evaluation

This impact evaluation section focuses on occupied burrowing owl burrows located within each proposed projects' BSA, BRGP, ENGP, and MBGP. Burrows that are located inside the BSA and are not within an IID-managed feature have the potential to be permanently impacted by project activities (e.g., excavated or otherwise physically disturbed). Burrows in or along IID features are protected by the presence of these features; therefore, these burrows will not be permanently impacted by project activities. However, these burrows will still require the implementation of construction avoidance measures. Table 5 provides a summary of occupied burrows within proposed projects' BSA and whether or not those burrows are expected to be permanently impacted by project activities. Appendix F, Tables F-1, F-2 and F-3 provide details of the potentially impacted occupied burrows within each proposed project. Appendix G provides representative photographs of occupied burrows that are within the proposed projects' BSA.

Table 5. Summary of Potential Permanent Impact to Occupied Burrows

Project	Potentially Permanently Impacted Burrows	Burrows Not Permanently Impacted	Total Number of Burrows in BSA[a]
BRGP	9	4	13
ENGP	11	2	13
MBGP	2	1	3

BRGP = Black Rock Geothermal Project

BSA = Biological Study Area

ENGP = Elmore North Geothermal Project

MBGP = Morton Bay Geothermal Project

[a] This table only includes occupied burrows within the BSA due to their potential to be permanently impacted by proposed project activities. Occupied burrows within the buffer are not included in this table.

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Appendix A
Burrowing Owl Survey Summary

Jacobs

BHE Renewables Burrowing Owl Survey Summary

Date: June 9, 2023
Attention: Magdalena Rodriguez/CDFW and Rose Banks/CDFW
Company: BHE Renewables
Prepared By: Morgan King/Jacobs and Christy Payne/Jacobs
Copies to: Jerry Salamy/Jacobs and Sarah Madams/Jacobs

Introduction

Jacobs biologists, under contract for BHE Renewables, conducted burrowing owl (*Athene cunicularia*) and general wildlife surveys in February and March 2022 at three proposed geothermal facilities, Black Rock Geothermal Project (BRGP), Elmore North Geothermal Project (ENGP), and Morton Bay Geothermal Project (MBGP) in Imperial County, California. This document provides a summary of methods and results of 2022 surveys as well as proposed methods for conducting breeding season surveys for burrowing owls in 2023 and 2024.

2022 Burrowing Owl Surveys

Table 1 provides the dates and biologists who conducted reconnaissance-level wildlife surveys for the three projects. Resumes for the four primary biologists are provided in Attachment 1. Surveys for all three projects were conducted concurrently because of overlapping project features and buffers (Figures provided at end of this document). Auxiliary features (laydown areas, construction camps, borrow pits) will be used by all three facilities and included in duplicate in all three Applications for Certification (AFC).

Table 1. Wildlife Survey Dates and Personnel

Dates	Biologists	Survey Description[a]
February 28 through March 3, 2022	Rachel Newton and Rebecca John	Reconnaissance-level wildlife survey
March 5 through 13, 2022	Rachel Newton and Morgan King	Reconnaissance-level wildlife survey
March 15, 2022	Rachel Newton and Eric Weis	Reconnaissance-level wildlife survey
November 4, 2022	Robert Hernandez	Reconnaissance-level biological survey

[a] Jacobs biologists were hired by the Applicant to conduct surveys for three separate BHER projects during the same field efforts: BRGP, ENGP and MBGP. These dates and descriptions were for all projects and surveys to account for overlapping project features and buffers. Auxiliary features will be used by all three facilities and included in duplicate in all permit applications.

Methods

Jacobs biologists conducted a reconnaissance-level wildlife survey of the Biological Study Area (BSA) for BRGP, ENGP, and MBGP in late February and March 2022 (Table 1, Figures provided at end of this document). The primary focus of this survey was to assess potentially suitable wildlife habitat and record observed wildlife species in the vicinity, especially burrowing owls. Biologists recorded all wildlife observations and wildlife sign (such as burrows, tracks, scat, carcasses, and vocalizations). Notes were made on vegetation types providing potentially suitable wildlife habitat. Biologists conducted windshield surveys and pedestrian surveys when burrowing owl, burrows, or burrowing owl sign was observed, and recorded observations of burrowing owls. Biologists used binoculars when stopped or during pedestrian surveys.

Most of the BRGP, ENGP, and MBGP are highly manipulated by agriculture or degraded without vegetation (highly compacted soil). Burrowing owls forage in agriculture lands, but the active tilling and flood irrigating would preclude burrows in these areas. Active agriculture lacks potentially suitable burrowing owl burrowing or nesting habitat. Biologists drove at 10-15 mph through the entire BRGP, ENGP, and MBGP projects on all available access roads. Biologists drove both sides of each irrigation canal or drain so that both sides were visible to inspect for burrowing owl burrows, sign, or live owls. When areas were not accessible by vehicle,

biologists walked in potentially suitable burrowing/nesting habitat. Biologists paid special attention to any elevated feature where burrowing owls could perch, road berms, soil mounds/piles, fences, buildings, and structures.

This survey methodology satisfied the California Department of Fish and Wildlife (formerly Game) 2012 *Staff Report on Burrowing Owl Mitigation* survey steps of habitat assessment and determining occupancy.

Results

Burrowing owls were observed within the BRGP, ENGP, and MBGP BSAs during the wildlife reconnaissance-level survey; this species is present throughout the vicinity. The Figures (provided at the end of this document) show the 35 live burrowing owls observed during surveys of three projects. Burrowing owls were observed in holes in earthen drains and under concrete canals adjacent to agricultural fields.

2023 Burrowing Owl Breeding Season Proposed Methods

This section provides the proposed methods for conducted breeding season surveys for burrowing owls at BRGP, ENGP, and MBGP.

Methods

Burrowing owl breeding season is defined as from February 1 through August 31, with peak breeding season April 15 through July 15 (CDFW 2012). Jacobs will conduct three breeding season surveys and one follow up non-breeding season survey. Surveys will be scheduled with a three-week lapse. Biologists will have experience conducting burrowing owl surveys. The proposed survey schedule is:

- The first survey was conducted June 5-9, 2023 (within peak breeding season)
- The second survey will be conducted July 5-15, 2023 (also within peak breeding season and in accordance with CDFW guidelines that one survey should take place between June 15 and July 15)
- The third survey will take place before August 31, 2023
- A fourth non-breeding season survey will take place between September 1, 2023 and January 31, 2024

The survey area will be all planned project disturbance areas that constitute potential burrowing owl breeding habitat plus a 330 foot (100 meter) buffer around those areas.

Lands that are not burrowing owl breeding habitat (for example, active agricultural lands) will not be specifically surveyed, but all burrowing owls detected will be recorded, regardless of habitat type. Agricultural lands that are being actively tilled (during the applicable year's breeding season) will not be considered breeding habitat and will not be walked. Any potential feature within the active agriculture that may provide suitable burrowing location will be investigated on foot. All active agricultural lands (not foot accessed) will be recorded for reference.

Surveys will be limited to the following 2 daily survey windows: between morning twilight and 10:00 AM, and 2 hours before sunset and evening twilight.

Surveys with inclement weather, namely wind over 12 miles per hour (mph) (20 kilometers per hour [kph]), precipitation, and/or dense fog will be cancelled until conditions improve. If conditions improve during the survey window, surveys will re-commence. Wind speed will be determined using the Beaufort Wind Scale or handheld meter (https://www.spc.noaa.gov/faq/tornado/beaufort.html).

Biologists will record their name, time, location, and weather at start and end of surveys for each survey period (up to 2 per day).

Surveys will be performed by visually scanning the survey area, aided with scopes and/or binoculars and listening for burrowing owl vocalizations (when applicable). All roads adjacent to and within the project disturbance footprint will be surveyed from a vehicle driven at approximately 10 mph (16 kph). Both sides of earthen Imperial Irrigation District (IID) canals and drains will be driven so both sides are observed. Biologists

will visually scan the area and record the location of all burrowing owls seen or heard (all detections). Confirmed breeding burrows will be recorded as such (occupied burrow), and all owls seen with no apparent affiliation to a burrow will be recorded as an incidental burrowing owl observation. All canals, drains, berms, concrete pads, structures, and otherwise undisturbed land will be investigated sufficiently to determine presence or absence of possible nesting burrowing owls, up to and including walking around features to gain visual verification of all sides of the feature. If the survey area extends more than 330 feet (100 meters) beyond the road, or if any part of the survey area is visually obstructed, the surveyor will access the area on foot. Care will be taken to avoid flushing or disturbing nesting burrowing owls especially when accessing lands on foot. All owls detected, even if beyond buffer distance, will be recorded. Areas on private land will be viewed from the closest project access point.

For large blocks of potentially suitable habitat, the biologist will walk transects spaced approximately 66 feet (20 meters) apart. The biologist may adjust transect width based on conditions and confidence that the surveyor is able to detect owls within the full extent of the transect. During transects, the biologist will scan the entire visible project area with binoculars at the start of each transect and, at least, every 330 feet (100 meters). Biologists may modify transect and search methods to avoid disturbing burrowing owls or other sensitive species, including nesting birds.

Care will be taken to avoid recording the same owl on multiple detections, especially when owls are flushed. Upon detecting an owl, the biologist will record location and breeding status if it can be determined. All owl bands will be recorded when detected. If young are detected, number and status (nestling, fledgling, etc.) will be recorded if determined.

Reporting

A Burrowing Owl Technical Report will be prepared in accordance with CDFW 2012 guidance upon completion of the two surveys. If more information is necessary to determine impact analysis, an additional non-breeding season survey will be conducted between September 1st 2023 and January 31st 2024.

Concurrence

Please provide concurrence that the proposed survey methodology will be acceptable to determine burrowing owl impact analysis.

Reference

California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game). 2012. Staff Report on Burrowing Owl Mitigation. March 7.

Figures - Confidential

Figures have been filed under a request for confidential designation

Attachment 1
Resumes

Morgan King

BIOLOGIST

Morgan serves as the technical lead on renewable energy projects and transmission line projects in California and the desert southwest. Client services include California Environmental Quality Act and National Environmental Policy Act compliance during pre-construction siting and licensing, construction, and operation of the facilities on private and federal lands.

Morgan is a U.S. Fish and Wildlife Service Authorized Biologist for clearance and handling of Mojave desert tortoise (*Gopherus agassizii*), a federally and California state threatened species. She has over 10,000 hours supervising and conducting monitoring and surveys for desert tortoise. She also has extensive survey, monitoring, and compliance experience with burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), desert kit fox (*Vulpes macrotis*), and birds protected by the Migratory Bird Treaty Act.

Morgan has led special-status plant and wildlife pre-construction surveys on thousands of acres in desert southwest. This includes project setup, execution in field, data management, and prompt reporting results to client and agencies. She has managed over 100 field staff on several projects.

Morgan is a qualified botanist for federally endangered Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) and federally and California state endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*). She has extensive botanical resource experience for special-status plants and noxious weeds. She has successfully implemented arid west revegetation efforts on short term disturbance.

Morgan is a biological and natural resource technical lead and project manager. She has writing experience with Biological Assessments, Biological Evaluations, Environmental Assessments, Application for Certification, and technical survey reports for habitat assessment and special-status plants and wildlife. Morgan has written compliance mitigation and monitoring plans for evaporation pond and avian mortality study. She also is technical lead for monthly and annual compliance reports submitted to California Energy Commission, Bureau of Land Management, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife Service

Areas of Expertise

- U.S. Fish and Wildlife Service Authorized Biologist for Mojave Desert Tortoise
- Endangered Species Act compliance
- Endangered species surveys and monitoring
- Protocol-level surveys for plants and wildlife in desert southwest
- Arid West Preliminary U.S. Army Corps of Engineers wetland and Ordinary High Water Mark determinations
- Habitat and Biological Resource Assessment
- Technical writing and research

EDUCATION/QUALIFICATIONS

B.S., Wildlife, Fish and Conservation Biology, University of California, Davis, CA, 2005

MEMBERSHIPS AND AFFILIATIONS

Desert Tortoise Council, 2013 through present

SPECIAL TRAININGS

40-Hour Basic Wetland Delineation, 2018

Site Safety Coordinator, Hazardous Waste, 2018

Site Safety Coordinator – Construction, 2011

Desert Tortoise Handling Workshop, Desert Tortoise Council 2010

40-Hour Hazardous Waste Emergency Response and Operations (HAZWOPER), 2006

OTHER

- Length of service in the profession: 17 years
- Year joined Jacobs: 2006
- Office location: Henderson, NV

Relevant Project Experience.

Ivanpah Solar Electric Generating System, Nipton, San Bernardino County, California

Client: BrightSource Energy (siting, licensing, and construction); NRG Energy (operations)

Title: Lead Biologist and Project Manager

Start/End Dates: 2007 - Current

Scope/Description: Ivanpah Solar Electric Generating System (ISEGS) is a 3,600 acre solar electrical generating facility (concentrated solar power) with a combined net capacity of 377 megawatts (MW) located on Bureau of Land Management (BLM) land in San Bernardino County, California. The lead agency is California Energy Commission (CEC). Jacobs, formerly CH2M, has had over $25 million dollars' worth of contracts on the $2.2 billion-dollar project.

Responsibilities: Morgan has provided environmental compliance support at ISEGS for 15 years during siting, licensing, construction, and operations for two clients. BrightSource Energy was client during permitting from 2007 through 2010 and construction 2010 through 2013. NRG Energy took over operations of site in 2013 and is the current client.

Siting and Licensing (BrightSource Energy: 2007 through 2010): National Environmental Policy Act (NEPA) and California Environmental Quality Act CEQA permitting for ISEGS required both Environmental Impact Statement (BLM) and Application for Certification (CEC). Between 2007 and 2010, Morgan was the lead field biologist for pre-construction surveys of 3,600-acre site including linear project components such as transmission lines and access roads. In 2007, she conducted protocol-level floristic surveys of area. Due to inadequate levels of rainfall in 2007, surveys had to be repeated in 2008. Surveys were conducted in accordance with the U.S. Fish and Wildlife Services (USFWS) 1996 botanical inventories guidelines, California Department of Fish and Wildlife (CDFW) 2000 guidelines, as well as California Native Plant Societies (CNPS) 2001 survey guidelines. In addition to floristic surveys, Morgan conducted California Desert Native Plant Act (CDNPA) inventory of cacti and yucca and habitat assessment of the one mile buffer of the project site. Field lead tasks included developing project instructions, overseeing 40 botanists, managing GPS/GIS data, analyzing results and preparing reports supporting AFC and EIS. During AFC preparation, she was supported Data Responses regarding botanical, wildlife, invasive weed, barrel cactus, storm water runoff and waters of the U.S. inquiries. The Final EIS was published in July 2010 and the Commission Decision was finalized in September 2010.

Construction (BrightSource Energy: 2010 through 2013): During construction, Morgan was Jacobs (formerly CH2M) on-site representative providing BrightSource with environmental compliance support. Morgan assisted implementation of Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP), which included standalone permits such as

the USFWS's issued Biological Opinion for Mojave desert tortoise and other species specific avoidance and monitoring plans. She was also involved with environmental compliance with mitigation requirements, such as habitat acquisition, unauthorized route closure, and desert tortoise exclusion fence permitting and installation. Morgan prepared biological sections of eight Environmental Assessments (EA) required during construction.

Mojave Desert Tortoise: Over the course of ISEGS construction, the project encountered approximately 300 Mojave desert tortoise requiring over 150 full-time biological monitors. In April 2011, the project met the Mojave desert tortoise take limit which resulted in the reinitiation of the October 2010 Biological Opinion. The revised Biological Opinion was issued in June 2011. During this time, Morgan was approved by USFWS and BLM as Mojave desert tortoise Authorized Biologist to handle and conduct clearance surveys. She acquired approximately 5,000 hours of construction monitoring, presence/absence and clearance survey experience and observed at least 100 tortoises in wild. She assisted with radio-tracking, transmitter and iButton application.

Morgan conducted fieldwork, prepared documents, consulted with agencies, and implemented several desert tortoise mitigation requirements: habitat acquisition, closure 50-unauthorized BLM routes, and 50-miles of desert tortoise exclusion fence. This required preparing EAs, California Department of Transportation Natural Environmental Study minimal impact (NESmi), and Biological Assessment for formal Section 7 consultation.

Special-status Plants and Noxious Weeds: Morgan implemented and managed project specific botanical compliance plans. This included tasks such as establishing and maintaining environmentally sensitive areas for rare plants in solar field and mitigation areas, nursery maintenance, annual survivorship monitoring, weed surveys, seed collection, and rare plant and noxious weed surveys. In addition, she supported mitigation habitat acquisition and permitting.

Revegetation: Morgan managed and implemented the site-specific *Closure, Revegetation and Rehabilitation Plan*. She has successfully implemented 50 acres of arid west revegetation. She conducts native seed collection and revegetation compliance monitoring. Revegetation monitoring requires quantitative vegetation assessments using belt transects and relevé plots. Data collection includes perennial plant cover, richness, density, diversity, and survivorship to assess success criteria. During construction she prepared Monthly Compliance Reports and Annual Compliance Reports.

Safety: During construction, Morgan was Jacobs onsite safety representative overseeing health and safety requirements for 180 subconsultant biologists.

Operations (NRG Energy: 2013 through present): During operations phase of ISEGS, Morgan was approved as Qualified Botanist and took over management of all botanical related compliance tasks, special-status plants, weeds, and revegetation. She currently conducts annual compliance monitoring and prepares Annual Compliance Reports. 2021 will be her 15th year supporting ISEGS and she provides our client with valuable project history and records. In 2021 she took over project management of this program.

Added Value (Challenges overcome): The project had significantly more tortoises than the 2010 USFWS Biological Opinion anticipated (300 versus 30), which resulted in a 2/3 construction halt. In less than 2.5 months, Jacobs reinitated formal consultation and had another Biological Opinion in place to continue construction. The number of tortoises required need of unanticipated husbandry program. Many gravid female tortoises were required to lay and hatch eggs in captivity which resulted in 150 hatchlings. These tortoises needed to be reared in captivity until adequate release size.

The CH2M subconsultants and lead Designated Biologists were terminated in 2012 upon discovery of falsifying data, illegally handling tortoise, and transporting tortoise across state-lines against agency direction. We were able to get agency approval and replacement Designated Biologists in place overnight.

During pre-construction surveys, botanists identified over 100 small and cryptic special-status cactus, desert pincushion (*Coryphantha chlorantha*). During desert tortoise clearance surveys (conducted at much narrower transect width and up to 7-times over an area), an additional 600 desert pincushion were located. This required use of adaptive management to salvage additional cactus according to common succulent regulations not laborious and costly special-status plant salvage requirements. A new long-term transplant nursery was established to house the additional cacti.

Three Confidential Geothermal Projects, Imperial County, California

Client: Confidential Client

Title: Lead Biologist

Start/End Dates: 2022 - Current

Scope/Description: A confidential client plans to develop three new geothermal power plants in Imperial County, California. The proposed sites are located adjacent to the Salton Sea. Client hired Jacobs to prepare California Energy Commission Application for Certification (AFC) for construction and operation for each of the three geothermal units, totaling 350 megawatts in compliance with CEQA. Additional biological permits for client include Incidental take permit and biological assessment/biological opinion.

Responsibilities: Morgan is the subject matter expert for biology. She preformed protocol-level botanical surveys on project features and performmed reconnasissance level wildlfie biological surveys. She mapped 17,000 acres of vegetation and land cover types to accommodate changes in project area and alternative alignments of transmission line and auxillary features. She is the lead author of the AFC biological resources section and associated biolgoical techincal reports. Species of concern include western burrowing owl and Yuma Ridgway's rail (*Rallus obsoletus*).

Reid Gardner Generating Station, Moapa, Clark County, Nevada

Client: NV Energy

Title: Lead Biologist

Start/End Dates: 2022

Scope/Description: NV Energy hired Jacobs to support the conceptual site model for the Reid Gardner Generating Station. In support of the ecological risk assessment, Jacobs conducted a reconnaissance-level biological resources survey of source area groups and areas of potential exposure pathways for contaminants of concern from source area groups to receptors.

Responsibilities: Morgan conducted reconnaissance-level biological survey of the 907-acre site focusing on land-cover and vegetation mapping and assessment of potentially suitable wildlife habitat. Surveys included all species identified during Nevada Natural Heritage Program query and potentially BLM-sensitive occurring species. Results were included in the conceptual site model.

Red Rock Canyon National Conservation Area Trail and Road Intersections Improvements Project, Clark County, Nevada

Client: Federal Highway Administration, Central Federal Lands Highway Division

Title: Botanist

Start/End Dates: 2020 through 2022

Scope/Description: The proposed 6-mile multi-use trail would connect trails in the City of Summerlin with the Red Rock Canyon National Conservation Area (RRCNCA). In 2020, biological surveys included two potential alignments for review during the Environmental Assessment and Biological Assessment submitted to BLM. The Biological Opinion and Environmental Assessment were issued in 2021 and geotechnical analysis was performed shortly thereafter.

Responsibilities: Morgan supported pre-construction permitting surveys and conducted biological monitoring for the geotechncial analysis. In 2020, Morgan conducted special-status plant surveys of the two-proposed alignments (417 acres). The only rare plant observed was yellow twotone beardtongue (*Penstemon bicolor* ssp. *bicolor*). Surveys included inventory of cacti and yucca and noxious weeds within the disturbance area. Mojave desert tortoise surveys occurred concurrently with rare plant surveys. Morgan recorded three off-transect observations of live individual tortoise to support wildlife surveys.

In 2021, Morgan was approved as BLM's Field Contact Representative (FCR) and lead biological monitor for geotechnical analysis. She was approved by USFWS as Authorized Biologist for desert tortoise and was issued a Special Purpose Permit for desert tortoise and Gila monster (*Heloderma suspectum*) by the Nevada Department of Wildlife.

Confidential Project, Steptoe Slough Ely, White Pine County, Nevada

Client: Confidential

Title: Lead Biologist

Start/End Dates: 2021 through present

Scope/Description: Confidential Steptoe Slough site is 6,6,70 acre site in

Great Basin Desert of White Pine County, Nevada. This is a former mill site for mineral (copper) extraction and processing, including a tailings storage facility.

Responsibilities: Morgan is Jacobs lead biologist conducting *Checklist for Ecological Assessment* to support Environmental Protection Agency's (EPA) ecological risk assessment/investigation process. This checklist compiles information on the physical and biological aspects of the site including, environmental setting, land use, potential contaminants, receptors and exposure pathways, special-status species, vegetation classification, and invasive species. Species of concern were relict dace (*Relictus solitarius*), greater sage-grouse (*Centrocercus urophasianus*), and several invertebrates endemic to the fresh water springs in Steptoe Valley.

R-42 Potable Water Storage Tank, Henderson, Clark County, Nevada

Client: City of Henderson

Title: Lead Biologist

Start/End Dates: 2021

Scope/Description: The City of Henderson selected Jacobs to design proposed new potable water storage tank designated as R-42 and a connection to the Las Vegas Valley Water District facilities in the west Henderson area. This project is located on Bureau of Land Management (BLM) property in Clark County. Biological support will be provided to City of Henderson to inform necessary permitting.

Responsibilities: Morgan conducted protocol-level plant and wildlife surveys on approximately 20 acres of BLM. Fieldwork included Mojave desert tortoise presence-absence, burrowing owl, and special-status plants surveys. Surveys included all species identified during Nevada Natural Heritage Program query and potentially BLM-sensitive occurring species.

Confidential Solar Project, Mojave, Kern County, California

Client: Confidential

Title: Lead Biologist

Start/End Dates: 2020 - Current

Scope/Description: Confidential client proposes to construct an approximately 2,200-acre, 1,000 megawatts (MW) (pending), photovoltaic (PV) solar and energy storage facility in Kern County, California. Jacobs was contracted to provide CEQA siting and licensing support.

Responsibilities: Morgan is the lead biologist for Solar Project. She conducts fieldwork and leads CEQA biological compliance. In fall 2020, CDFW accepted western Joshua tree (*Yucca brevifolia*) as candidate for listing under California Endangered Species Act. Morgan led reconnaissance-level Joshua tree survey to inform mitigation requirements for client. She also led protocol-level Mojave desert tortoise surveys and assessed habitat for Swainson's hawk (*Buteo swainsoni;* State Threatened [ST]), Mojave ground squirrel (*Spermophilus mohavensis,* ST) and other special-status species. Survey results will inform preparation of Incidental Take Permit (ITP) and Environmental Impact Report (EIR).

Sagebrush Solar Storage Project, Willow Springs, Kern County, California

Client: Sagebrush Solar, LLC (Terra-Gen Power)

Title: Lead Biologist

Start/End Dates: 2020 - 2021

Scope/Description: Sagebrush Solar, LLC a subsidiary of Terra-Gen Power proposes to construct an 800-acre, 200 megawatts (MW), photovoltaic (PV) solar and energy storage facility in Kern County, California. Jacobs was contracted to provide CEQA siting and licensing support.

Responsibilities: Morgan is the lead biologist for Sagebrush Solar Storage Project. She conducts fieldwork and leads CEQA biological compliance. In fall 2020, CDFW accepted western Joshua tree (*Yucca brevifolia*) as candidate for listing under California Endangered Species Act. Morgan led CDFW protocol-level Joshua tree surveys to inform mitigation requirements for client. She also led protocol-level Mojave desert tortoise surveys and assessed habitat for Swainson's hawk (*Buteo swainsoni;* State Threatened [ST]) and other special-status species. Survey results were intended to inform preparation of Incidental Take Permit (ITP) and Environmental Impact Report (EIR).

Due to Swainson's hawk nests in vicinity, the client is no longer pursuing development of Sagebrush Solar Project.

Sanborn 2.0 Solar Project, Mojave, Kern County, California

Client: Sanborn Solar, LLC (Terra-Gen Power)

Title: Lead Biologist

Start/End Dates: 2020 - 2022

Scope/Description: Sanborn Expansion Solar, LLC a subsidiary of Terra-Gen Power proposes to construct a 1,200-acre, 220 megawatts (MW), photovoltaic (PV) solar and energy storage facility in Kern County, California. Jacobs was contracted to provide CEQA siting and licensing support.

Responsibilities: Morgan is the lead biologist for Sanborn Expansion Solar Project. She conducts fieldwork and leads CEQA biological compliance. In fall 2020, CDFW accepted western Joshua tree (*Yucca brevifolia*) as candidate for listing under California Endangered Species Act. Morgan led reconnaissance-level Joshua tree survey to inform mitigation requirements for client. She also led protocol-level botanical surveys and Mojave desert tortoise surveys and assessed habitat for Swainson's hawk (*Buteo swainsoni;* State Threatened [ST]), Mojave ground squirrel (*Spermophilus mohavensis,* ST) and other special-status species. Survey results will inform preparation of Incidental Take Permit (ITP) and Environmental Impact Report (EIR) Addendum to existing Sanborn Solar Project.

U.S. Navy, Naval Air Weapons Station China Lake, Ridgecrest, Kern and San Bernardino Counties, California

Client: U.S. Navy

Title: Lead Biologist

Start/End Dates: 2018 - Current

Scope/Description: NAWS China Lake is a 1.1-million-acre installation located in Western Mojave Desert. This installation provides facilities that develop and test weapons systems.

Responsibilities: Morgan is Jacobs lead biologist supporting various programs at NAWS China Lake. She has strong working relationship with base natural resources specialists and was approved by U.S. Fish and Wildlife (USFWS) as Mojave desert tortoise Authorized Biologist under 2019 Biological Opinion. She provides natural resources support of Environmental Protection Agency (EPA) investigation of early stage and late stage landfill sites (600 acres), completing numerous *Checklist for Ecological Assessment*. In addition, she provides oversight of natural resource compliance of Military Construction (MILCON) Earthquake Recovery Project (25 sites throughout installation). Compliance tasks includes protocol-level desert tortoise presence absence and clearance surveys, protocol-level burrowing owl surveys, Mohave ground squirrel (*Xerospermophilus mohavensis;* State Threatened [ST]) habitat assessment, and other wildlife and plant surveys.

U.S. Army National Training Center Fort Irwin, San Bernardino County, California

Client: U.S. Army

Title: Lead Biologist

Start/End Dates: 2017 – Current

Scope/Description: National Training Center Fort Irwin (Fort Irwin) is the U.S. Army's premier Combat Training Center, located in California's Mojave Desert (742,000 acres).

Responsibilities: Morgan is Jacobs lead National Environmental Policy Act (NEPA) biologist supporting various projects at Fort Irwin. She has strong working relationship with base natural resources specialists and environmental compliance staff.

Project: Dense Urban Terrain: Morgan was natural resource compliance and field lead for 1,400-acre survey focused on eight species of concern: desert tortoise, Mohave ground squirrel [ST]), burrowing owl, Lane Mountain milkvetch (Astragalus jaegerianus; FE), Barstow woolly sunflower (Eriophyllum mohavense), Clokey's cryptantha (Cryptantha clokeyi), desert cymopterus (Cymopterus deserticola), and Mojave monkeyflower (Diplacus [=Mimulus] mohavensis). The report was submitted to USFWS and used to inform the Environmental Assessment.

Project: Multi-Purpose Range Complex: Morgan was the natural resource lead for survey of the 2,899-acre complex.

Morgan was natural resource compliance and field lead for 2,899-acre survey focused on eight species of concern: desert tortoise, Mohave ground squirrel (ST), burrowing owl, Lane Mountain milkvetch (FE), Barstow woolly sunflower, Clokey's cryptantha, desert cymopterus, and Mojave

monkeyflower. The report was submitted to USFWS and used to inform the Environmental Assessment.

Southwest Gas (in partnership with Ameresco) located on U.S. Army National Training Center Fort Irwin, San Bernardino County, California

Client: Ameresco

Title: Natural Resource Project Lead

Start/End Dates: 2019 – 2020

Scope/Description: Southwest Gas, in partnership with Ameresco, identified a set of beneficial energy security and energy conservation measures to be implemented by the U.S. Army. A 6-inch (15-centimeter)-diameter steel pipeline would be installed to transport natural gas from an existing Kern River natural gas transmission line at the southeastern boundary of Fort Irwin into the cantonment area, where it would be metered by Southwest Gas. The pipeline alignment is 22 miles. The gas line would be entirely contained within Department of Defense land, with the exception of approximately 75 feet of pipeline that would extend across an existing BLM designated utility corridor from the Kern River transmission line to the boundary of Fort Irwin. Morgan was the lead biologist for natural resource surveys of 315-acres along the proposed pipeline.

Responsibilities: Morgan was field lead for California Environmental Quality Act (CEQA) plant and wildlife surveys. Biologists conducted protocol level desert tortoise (ST, FT) surveys, protocol level floristic surveys, and camera trapping for Mohave ground squirrel (ST). Other species included in surveys but not limited to included burrowing owl and desert kit fox. Morgan also ensured compliance with Desert Renewable Energy Conservation Plan (DRECP) requirements. The report was submitted to U.S. Army, BLM and USFWS and used to inform the Environmental Assessment.

Northern Corridor, St. George, Washington County, Utah.

Client: Utah Department of Transportation and Washington County

Title: Botanist

Start/End Dates: 2020

Scope/Description: The Northern Corridor is proposed roadway in St. George, Washington County, Utah through BLM's Red Cliffs National Conservation Area (Red Cliffs Desert Reserve). Biological surveys of three alternatives supported preparation of Environmental Impact Statement (EIS).

Responsibilities: Morgan, BLM approved botanist, used BLM's Assessment, Inventory, and Monitoring (AIM) protocols to conduct vegetation inventory at long-term monitoring plots (46 total). Sampling methods included floristic identification to species, richness, point-line intercept, height classifications, and soils. Data was collected in BLM specific program, Database for Inventory, Monitoring and Assessment (DIMA). Survey results were used to inform EIS.

Concurrently with AIM surveys, Jacobs biologists also conducted protocol-level Mojave desert tortoise surveys. Morgan provided incidental off-transect observations of tortoise and sign to support surveys.

Verde Connect, Cottonwood to Camp Verde, Yavapai County, Arizona

Client: Yavapai County and Federal Highway Administration

Role: Botanist

Start/End Dates: 2020

Scope/Description: Verde Connect is proposed roadway in Verde Valley from SR-260 to Cornville Road, between Cottonwood and Camp Verde, Yavapai County, Arizona. Biological surveys were used to inform Biological Assessment and Biological Evaluation.

Virgin River Bridge #1 Reconstruction, Beaver Dam to Littlefield, Mohave County, Arizona

Client: Arizona Department of Transportation and Federal Highways Administration

Title: Botanist

Start/End Dates: 2020

Scope/Description: Arizona Department of Transportation (ADOT) plants to rehabilitate Virgin River Bridge #1 to better accommodate truck volume and traffic on Interstate 15. Wetland fieldwork is to support update to 404 Permit and Mitigation Plan.

Responsibilities: Morgan conducted wetland and upland vegetation mapping to account for flooding changes that occurred after jurisdictional delineation was submitted. This data informed jurisdictional delineation revision, 404 permit, and riparian mitigation monitoring plan.

Added Value: Jacobs was able to reduce ADOT's liable wetland impact costs by providing current vegetation conditions.

Freeport Four Corners Uranium Federal Lands Project, Utah and Colorado

Client: Freeport Minerals Corporation

Title: Project Biologist

Start/End Dates: 2019 - Current

Scope/Description: The Freeport Four Corners Uranium Federal Lands Project supports the Historic Mine Opening Safety Program throughout the Four Corners area on the Colorado Plateau. Tasks include researching historic mining claims, investigating habitat at historic mining locations, reporting to client and BLM/U.S. Forest Service (USFS), and permitting the mine closures. Annual budget approximately $3.5 million.

Responsibilities: During the initial historic mine field investigation, Morgan conducted biological resource and waters surveys. She assessed potentially suitable habitat and recorded incidental observations of species listed by Endangered Species Act, BLM-Sensitive species, USFS Sensitive species, and other special-status species as necessary. Prior to mine closure

construction, she supported protocol-level rare plant surveys.

Added Value: Field surveys were conducted in extremely remote locations and in challenging terrain. Field team has an exemplary safety record. At end of 2019 (5 years), there were no recordable incidents, 75,000 safe hours worked, and nearly 300,000 safe miles driven.

Four Corners Uranium Project – Tribal Lands, New Mexico and Arizona

Client: Cyprus Amax Minerals Company (Freeport McMoran Inc.)

Title: Lead Biologist

Start/End Dates: 2018 – Current

Scope/Description: The Four Corners Uranium Project - Tribal Lands is a Site Remediation Initial Investigation project at 94 abandoned uranium mines (approximately 600 acres) on Navajo Nation in Arizona and New Mexico. Navajo Nation and Cyprus Amax Minerals Company entered into a Consent Decree. The initial phase of the project is to submit Remedial Site Evaluations to U.S. Environmental Protection Agency (EPA) and Navajo Nation EPA to direct further remediation actions. The annual budget is approximately $4 million.

Responsibilities: Morgan is lead biologist for Four Corners Uranium Project Tribal Lands. Prior to Remedial Site Evaluations, she performs habitat assessments for biological resources such as, species listed by Navajo Endangered Species List, species listed by federal Endangered Species Act, birds protected by Migratory Bird Treaty Act and other biological resources as necessary. Morgan ensures compliance with Navajo Nation Department of Fish and Wildlife Service and holds active Biological Investigation Permit valid throughout Navajo Nation. Morgan conducts fieldwork and monitoring for plant and wildlife species, such as Mexican Spotted Owl (*Strix occidentalis lucida*; FT), Mesa Verde cactus (*Sclerocactus mesae-verde*; FT), and golden eagle (*Aquila chrysaetos)*. This includes formal consultation with Navajo Nation Department of Fish and Wildlife.

Ruby Pipeline, Wyoming, Utah, Nevada and Oregon

Client: Kinder Morgan

Title: Lead Field Biologist

Start/End Dates: April 2012 and August 2018

Scope/Description: Ruby Pipeline is a 42-inch diameter natural gas pipeline owned and operated by Kinder Morgan. The 680-mile pipeline spans four states; Wyoming, Utah, Nevada, and Oregon.

Responsibilities: Morgan was the field team lead botanist for restoration vegetation monitoring along Nevada sections of the pipeline right-of-way during two seasons.

Siskiyou Telephone Happy Camp to Somes Bar Fiber Connectivity Project, Siskiyou County, California

Client: Siskiyou Telephone Company

Title: Biologist

Start/End Dates: 2019

Scope/Description: Siskiyou Telephone Company received authorization to construct the 17-mile fiber optic broadband facility cable along State Highway 96 in Siskiyou County, California by the California Public Utilities Commission (CPUC). The California Department of Fish and Wildlife (CDFW) issued a Streambed Alteration Agreement (SAA) requiring biological monitoring support during construction.

Responsibilities: Morgan, CPUC approved biological monitor, conducted surveys, monitoring, and reporting to comply with SAA and approved Mitigation and Monitoring Plan. Biological compliance included providing worker environmental training, delineating environmentally sensitive areas, nesting bird surveys, monitoring and avoidance, and weekly and monthly reporting. Biologists also ensured compliance with U.S. Forest Service Klamath National Forest biological requirements with oversight from Happy Camp Oak-Knoll Ranger District. Active oprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*) nests were avoided and monitored. Biological monitors implemented avoidance measures to Northern Spotted Owl (*Strix occidentalis caurina*) Core areas in Klamath National Forest.

Aquatic Resources Delineation on State Highway 75, Ketchum, Blaine County, Idaho

Client: Idaho Department of Transportation

Title: Biologist

Start/End Dates: 2019

Scope/Description: Idaho Transportation Department is proposing to repair deficient pavement and replace culverts on a 7-mile segment of State Highway 75 from Ketchum north to the North Fork Campground in Blaine County, Idaho. Fieldwork was conducted to support Aquatic Delineation Report for submittal to U.S. Army Corps of Engineers, Walla Walla District.

Responsibilities: Morgan conducted fieldwork under a lead Wetland Scientist to identify aquatic resources and conduct jurisdictional delineation of survey area.

Sevenmile Creek Wetland Mitigation, Fishlake National Forest, Sevier County, Utah

Client: Federal Highway Administration, Central Federal Lands Highway Division (CFLHD)

Title: Botanist

Start/End Dates: 2018-2019

Scope/Description: The CFLHD established a mitigation site along Sevenmile Creek to compensate for impacts to wetlands and waters from reconstruction of Utah Forest Highway 39. Sevier County on the Fishlake National Forest. Mitigation monitoring satisfies requirements in the Section 404 permit.

Responsibilities: Morgan conducted vegetation and hydrological mitigation monitoring for two seasons at Sevenmile Creek Wetland Mitigation area. Monitoring including transects and Daubenmire plots to assess percent cover for woody and herbaceous vegetation. In addition, protocol requires inventory of woody vegetation survival, presence of noxious weeds, and hydrological monitoring.

Needles 3MT Railroad Improvement, Needles to Goffs, San Bernardino County, California

Client: Burlington Northern Santa Fe Railroad Company (BNSF)

Title: Biologist

Start/End Dates: 2018

Scope/Description: The Needles 3MT project was to improve approximately 30 miles of existing BNSF railway.

Responsibilities: Morgan conducted protocol-level desert tortoise presence absence surveys using linear project protocol over approximately 30 miles of existing railway.

Equipment Concentration Site on Marine Corps Logistics Base Barstow, Yermo Annex, San Bernardino County, California

Client: U.S. Army Reserve

Title: Biologist

Start/End Dates: 2018

Scope/Description: The Marine Corps Logistcs Base in Barstow is a supply and maintenance installation occupying 2,400 acres in San Bernardino County, California. The U.S. Army Reserve proposed to construct and operate an Equipment Concentration Site.

Responsibilities: Morgan conducted protocol-level desert tortoise presence absence survey on 46-acre site. Her biological report was used to inform a Biological Evaluation and Environmental Assessment.

U.S. Air Force, Nellis Air Force Base, Las Vegas, Nevada

Client: U.S. Air Force

Title: Natural Resource Project Manager

Start/End Dates: 2017

Scope/Description: Fence to Fence contract implemented between 2016 and 2020 for Nellis Air Force Base (AFB).

Responsibilities: Morgan is the natural resources project manager for the Fence to Fence contract implemented between 2016 and 2020 for Nellis AFB. This includes revisions to the Integrated Natural Resource Management Plan (INRMP), and tasks applying to federally threatened desert tortoise, special-status plants and weeds as the Natural Resource Manager directs.

Doble 33-kilovolt Distribution Line Rebuild Project, San Bernardino County, California

Client: Southern California Edison

Title: NEPA Biological Resources Lead

Start/End Dates: 2016 - 2017

Scope/Description: Doble 33-kilovolt (kV) Distribution Line Rebuild is a replacement of a 15-mile transmission line that spans from Lucerne Valley to Holcomb Valley in San Bernardino County, CA. Currently in permitting phase.

Responsibilities: Morgan is the lead NEPA biologist for this project. Work includes coordination with lead agency, U.S. Forest Service, in preparation of EA and Biological Assessment/Biological Evaluation. A portion of this project goes through BLM land which is under Desert Renewable Energy Conservation Plan (DRECP) requirements. Morgan prepared DRECP checklist and ensured project compliance with DRECP regulations.

Morgan was also involved with both the desert tortoise and botanical surveys in support of these documents. This project occurs on two sensitive natural communities, Carbonate Soils and Pebble Plains which provide habitat for several federally listed plant species: Cushenbury oxytheca (*Acanthoscyphus parishhii var. goodmaniana;* Federally Endangered [FE]), Cushenbury milkvetch (*Astragalus albens*; FE), Ash-grey paintbrush (Castilleja cinerea; federally threatened [FT]), Bear Valley sandwort (*Eremogone ursina*; FT), Parish's daisy (Erigeron parishii; FT), Southern mountain wild buckwheat (*Eriogonum kennedyi var. austromontanum*; FT), Cushenbury buckwheat (*Eriogonum ovalifolium var. vineum*; FE), California taraxacum (*Taraxacum californicum*; FE), and San Bernardino bluegrass (*Poa atropurpurea*; FE). Other listed or sensitive wildlife species that occur in project vicinity include Mojave desert tortoise (FT and ST), Golden Eagle (*Aquilla chrysaetos*), California spotted owl (*Strix occidentalis occidentalis*), and Nelson's bighorn sheep (*Ovis canadensis nelsoni*).

Environmental Compliance for Union Pacific Railroad, various locations in western U.S.

Client: Union Pacific Railroad

Title: Project Manager and Biologist

Start/End Dates: 2014 - Current

Scope/Description: Union Pacific Railroad (UPRR) operates over 32,000 route miles over 23 western states. Jacobs has a Master Services Agreement to provide environmental compliance support, as necessary.

Responsibilities: Since 2014, Morgan has provided UPRR program with environmental compliance support in California and Wyoming.

BLM Reclamation Plan (Wyoming): Morgan is the Project Management to prepare Reclamation Plans for BLMs Rawlins Field Office under BLM and UPRR Right-of-Way grants.

Mud Pot (Yuma Substation, Niland, Imperial County, California): In 2018, a moving geothermal anomaly, "mud pot," threatened to impact UPRR's east-west mainline railway for Port of Los Angelos. Morgan was called in to support State of California Emergency status. Jacobs provided

environmental compliance and other permitting support during this emergency response. Compliance support included assessing permitting constraints (404, 401, 402) and biological and aquatic resources. In record time, Jacobs secured U.S. Army Corps of Engineers 404 permit, Imperial Irrigation District encroachment permit, Regional Water Quality Control Board 401 and surface water discharge permits and Imperial County boring and well permits. Morgan was integral in setting up real-time photo logs that could be exported to client daily. UPRR commended Morgan in her emergency response role. UPRR requested that Morgan manage all agency communication and escorts at field site.

Between 2018 and 2020, the mud pot slowly migrated through and past UPRRs mainline railway. The mud pot has also impacted Kinder Morgan pipeline and Caltrans emergency services highway.

Special-status Species Compliance (Yuma Substation, Palm Springs, Riverside County, California): UPRR follows avoidance and minimization guidance in the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). Morgan conducts surveys to avoid impacts to Coachella Valley milkvetch (*Astragalus lentiginosus* var. *coachellae*; FE), Coachella Valley fringe-toed lizard (*Uma inornata*; FT, SE), and Mojave desert tortoise.

Desert tortoise and Migratory Bird Treaty Act Compliance (Riverside and San Bernardino counties, California): Morgan provides UPRR with as-needed biological monitoring and training support in southern California. In desert tortoise habitat, she provides required Worker Environmental Awareness Program. She provides monitoring support when maintenance or emergency work is conducted in desert tortoise habitat. She performs nest surveys for species protected by Migratory Bird Treaty Act.

U.S. Air Force, Edwards Air Force Base, Rosamond, Kern County, California

Client: U.S. Air Force

Title: Biologist

Start/End Dates: January 2016-September 2017

Scope/Description: Edwards Air Force Base is 250,000 acre installation home to the Air Force Test Center, Test Pilot School, and National Aeronautics and Space Administration's (NASA) Armstrong Flight Research Center.

Responsibilities: Morgan supported the natural resources staff as USFWS Authorized Biologist for Mojave desert tortoise. She provided fieldwork in support of various ground disturbing activities.

Mojave Solar Project, Hinkley, San Bernardino County, California

Client: Abengoa Solar

Title: Designated Biologist

Start/End Dates: 2013 –2015

Scope/Description: The 1,800-acre Mojave Solar Project is a solar-thermal electric generating facility (solar trough) with a combined gross electrical output of 280 MW. Annual budget $1.5 million.

Responsibilities: Morgan served as the CEC's lead Designated Biologist which required that she was also permitted as a USFWS Authorized Biologist for desert tortoise. The Designated Biologist acts as the liaison between the CEQA and NEPA agencies and client for compliance with biological resource permits. This required daily interactions with client and agencies. The lead CEQA agency was the CEC followed by the CDFW and the lead NEPA agency was Department of Energy. This included overseeing biological compliance for several species; Mojave Desert tortoise (FT, ST), Mojave ground squirrel (ST), federally and state protected western burrowing owl, and several state protected special-status plants. She also managed and ensured project compliance with other biological resource requirements including invasive weed plan, common raven plan, evaporation pond plan, avian mortality study, and the Biological Resource plan, Biological resource Mitigation Implementation and Monitoring Plan (BRMIMP). She acted as the technical lead for Evaporation Pond Monitoring and Adaptive Management Plan and Bird Monitoring Study (as part of the USFWS Bird and Bat Conservation Strategy) looking at impacts to species protected under the Migratory Bird Treaty Act. She also maintained the USFWS MBTA special-purpose utility permit (SPUT) for collecting and managing carcasses and partial remains of birds protected by the MBTA.

During these tasks, she also oversaw a team of 30 biological monitors which requires training on all applicable biological resource compliance plans. Morgan was Jacobs (formerly CH2M's) onsite health and safety program representative.

Added Value (Challenging overcome): Our client, Abengoa, was a Spanish based company that staffed with Spain individuals. Spain does not have rigorous environmental regulations. Jacobs was hired to provide third-party oversight to their environmental compliance permits. The role of Designated Biologist was defined to report directly to agencies. It was extremely challenging to work with a company that has cultural biases against following environmental regulations. Abengoa has contracted several different consultants because their resistance to following required environmental permits. Out of 5 known consultants to support this client, Jacobs lasted the longest at 3-years. When Jacobs was replaced, Abengoa had to hire 5 individuals to replace Morgan alone.

Our client point-of-contact was fired in 2014 for sexual harassment claims against several Jacobs employees and subconsultants.

Topock Compressor Station, Needles, San Bernardino County, California

Client: Pacific Gas & Electric

Title: Lead Botanist

Start/End Dates: January 2011-December 2012

Scope/Description: Topock Compressor Station is a Pacific Gas & Electric (PG&E) operated natural gas compressor station.

Responsibilities: Morgan performed summer/fall floristic surveys with a focus on potential for special-status plants, indigenous plants, and mature vegetation.

Pit River 3, 4, 5, Burney and Big Bend, Shasta County, California

Client: Pacific Gas & Electric

Title: Co-Botany Lead

Start/End Dates: January 2010-December 2010

Scope/Description: Pit 3, 4, 5 is a hydroelectric system including four dams, four reservoirs, three powerhouses, and other associated features. Combined normal operated capacity is 325 MW.

Responsibilities: Morgan conducted 2010 botanical resource monitoring for compliance with Federal Energy Regulatory Commission's (FERC) requirements. Pit 3, 4, 5 is located on both private and Shasta Trinity National Forest lands. She was a co-leader in the botanical surveys of Pit River along Dams 3, 4, 5 which included Lake Britton. Surveys covered approximately 4,000 acres over 37 miles between elevations 1,400 and 2,800 feet. She assisted in preparing the Botanical Resource report (including special-status species and invasive weeds) and the Vegetation Management Strategies for Invasive Weeds report.

Alta Infill, Alta Phase 2, and Sun Creek, Kern County, California

Client: Terra-Gen Power

Title: Lead Botanist

Start/End Dates: January 2010-December 2010

Scope/Description: Terra-Gen operates eleven wind power facilities for a 1,248 MW capacity on approximately 3,000 acres.

Responsibilities: Morgan performed spring and summer botanical surveys on the Alta Infill, Alta Phase 2, and Sun Creek project areas between Mojave and Tehachapi. These surveys used the California Native Plant Society (CNPS) and USFWS's 1996 protocols for conducting floristic inventories. During the Infill surveys, she was the field leader and managed crews of 40 field staff. She was also responsible for botanical resource survey report for Alta Infill. She also conducted protocol level botanical surveys for federally and state endangered Bakersfield cactus (Opuntia basilaris var. treleasei), and is a qualified botanist. Reports included vegetation mapping, invasive weed analysis, Joshua tree mapping and occurrences of special-status plants.

Devers-Palo Verde No. 2 Transmission Line, Riverside County, California

Client: Southern California Edison

Title: Biological Field Lead

Start/End Dates: January 2010 - December 2010

Scope/Description: Southern California Edison (SCE) constructed and operates the 500 kV Devers to Palo Verde No. 2 (DPV2) transmission line. The transmission line is 150 miles long and crosses, BLM and private land.

Responsibilities: Morgan analyzed locations for permanent and temporary construction locations as pertains to state or federally listed plants and wildlife, sensitive vegetation communities, and waters of the U.S. She

compiled and prepared technical report of the Devers-Colorado section of DPV2 line including reconnaissance level plant, wildlife, California Desert Native Plant Act (CDNPA), weed, vegetation mapping, and habitat assessments for pre-identified target species. She was also approved by USFWS as a qualified botanist for federally endangered Coachella Valley milk-vetch (Astragalus lentiginosus var. coachellae). She also assisted in preparing the project's Coachella Valley Milk-vetch Mitigation and Monitoring Plan, which included protection and salvage guidelines.

Black Rock Energy, Imperial County, California

Client: CE Obsidian Energy LLC

Title: Biologist

Start/End Dates: 2009- 2010

Scope/Description: Black Rock Energy is a geothermal generating facility with a 159 MW net generating capacity located on 80 acres.

Responsibilities: Morgan preformed floristic-level survey focusing on special-status species occurrences, burrowing owl surveys, and one mile buffer reconnaissance-level survey for CEQA compliance. This task also included updating vegetation mapping performed in 2009 due to land use changes. She also prepared sections of the AFC for submittal to the CEC and compliance with CEQA.

Trilobite Solar Electric Generating Project, Amboy, San Bernardino County, California

Client: Pacific Gas & Electric

Title: Biological Field Lead

Start/End Dates: January 2009-December 2009

Scope/Description: Pacific Gas & Electric (PG&E) began permitting phase of 5,300-acre Trilobite solar electric generating project on BLM lands. The project was never constructed after permitted phase.

Responsibilities: Morgan was the crew leader for 40 staff conducting floristic surveys in accordance with the USFWS's 1996 botanical inventories guidelines, CDFW's 2000 guidelines, as well as CNPS's 2001 survey guidelines. These surveys were used for CEQA required AFC preparation for submittal to the CEC. These surveys included rare plants, invasive weed, identify cactus for salvage, and a habitat assessment of the one-mile buffer of the project site. She was also responsible for training staff to use and managing data collected on Trimble Global Positioning System (GPS).

Broadwell Solar Energy, Barstow, San Bernardino County, California

Client: BrightSource Energy

Title: Lead Biologist

Start/End Dates: January 2009 - December 2009

Scope/Description: The Broadwell solar electric generating project was proposed on 8,600 acres. The project was never constructed after permitted phase.

Responsibilities: Morgan organized the field effort for this project through developing project instructions, GPS/Global Information System (GIS) protocol, and field schedules.

Solar Facilities, Clark County, Nevada

Client: Renewable Energy Systems

Title: Lead Biologist

Start/End Dates: January 2009 - December 2009

Scope/Description: Renewable Energy Systems (RES) performed initial scoping of three potential solar facilities in Clark County, 300 acres. None were ever permitted or constructed.

Responsibilities: Morgan was involved with the biological constraint analysis of three potential solar facilities in the Ivanpah Valley and the Amargosa Valley, Nevada.

Cadiz Solar Electric Generating Projects and Imperial Valley Solar Electric Generating Project, Imperial County, California

Client: Iberderola/PPM

Title: Lead Biologist

Start/End Dates: January 2009 - December 2009

Scope/Description: The proposed Cadiz and Imperial solar electric generating projects were combined 13,300 acres.

Responsibilities: Morgan organized the field effort for three rare plant surveys, two in the Cadiz Valley and one in Imperial Valley. This included organizing crews through developing project instructions, GPS/GIS protocol, and field schedules. Due to early special status plant blooming periods, PPM decided to survey in 2010 instead of 2009 and did not hire Jacobs formerly CH2M to conduct these surveys.

Travis Air Force Base Tree Inventory, Fairfield, California

Client: U.S. Air Force

Title: Lead Botanist

Start/End Dates: January 2009 – December 2009

Scope/Description: Jacobs formerly CH2M provides natural resource support to Travis AFB staff as necessary

Responsibilities: Morgan conducted initial tree surveys for the Resource Management Plan. This data was used to scope the effort needed to conduct a tree inventory of the base. She also prepared a photographic guide to all the ~350 species present on the base.

Mormon Mesa Solar Energy Generating System, Overton, Clark County, Nevada

Client: BrightSource Energy

Title: Lead Botanist

Start/End Dates: January 2008 – December 2008

Scope/Description: BrightSource proposed to build the 800 MW Mormon Mesa solar electric generating facility (concentrated solar power) on 10,000 acres. The project never went to construction after permitting phase.

Responsibilities: Morgan conducted protocol level floristic surveys in accordance with USFWS's 1996 botanical inventory guidelines. She was also responsible for managing 40 field staff through developing project instructions, GPS/GIS protocol, schedules, managing crews in the field, analyzing data, and preparing the Rare Plant Report. The requirements for surveying BLM land in Nevada involved mapping barrel cactus for salvage, invasive weed inventory, habitat assessment of the one-mile buffer of the site and the rare plant survey. Morgan was also involved with transmission line and road surveys that access the site.

Potential Solar Facilities, California and Nevada

Client: Solar Millennium

Title: Lead Biologist

Start/End Dates: January 2008 – December 2008

Scope/Description: Solar Millennium was analyzing constraints for six potential solar power facility locations in desert southwest. One went through permitting phase, but has not been constructed.

Responsibilities: Morgan performed six reconnaissance-level surveys on potential solar facility locations to analyze the potential for constraints from special status plants, special status wildlife and waters of the U.S. During each survey, Morgan worked with botanical and wildlife specialists to analyze the potential species or issues that could affect permitting or construction. Each location had different constraints ranging from a desert dry lake, large drainages (30 feet deep), BLM sensitive communities, migration corridors, restrictions on water rights, etc.

Potential Solar Facilities, Arizona, New Mexico, Nevada

Client: Iberderola Energy/PPM

Title: Lead Biologist

Start/End Dates: January 2008 – December 2008

Scope/Description: Iberderola/PPM was analyzing constraints for seven potential solar power facility locations in desert southwest.

Responsibilities: Morgan performed seven reconnaissance-level surveys for PPM to analyze biological constraints for potential solar facility locations. Biological constraints included special status plants, special status wildlife, and waters of the U.S. During each survey, she worked with a botanical and wildlife specialist to analyze the potential species or issues that could affect permitting or construction. Each location had different constraints ranging from 100-year flood plain, desert wildlife management area, BLM sensitive species, migration corridors, cactus salvage, etc.

Potential Solar Facilities, Nevada

Client: Ausra Solar

Title: Lead Biologist

Start/End Dates: January 2008 – December 2008

Scope/Description: Ausra Solar was analyzing constraints for two potential solar power facility locations in Nevada.

Responsibilities: Morgan performed two reconnaissance-level surveys to analyze the potential for constraints from special status plants, special status wildlife and waters of the U.S. on development of solar facilities and respective transmission lines. Morgan worked with botanical and wildlife specialists to analyze the potential species or issues that could affect permitting or construction.

Santa Susan Field Laboratory, Simi Hills, California

Client: U.S. Department of Energy, Boeing, National Aeronautics and Space Administration

Title: Hazardous Waste Survey Lead

Start/End Dates: January 2008 – December 2009

Scope/Description: According to the CEQA, Department of Toxic Substances Control, Jacobs formerly CH2M was hired for the environmental investigation and cleanup of chemical contamination at the Santa Susana Field Laboratory.

Responsibilities: Morgan was involved with a hazardous waste survey over the 2,850 acre mountainous sandstone terrain. This involved walking transects spaced 50 feet apart and documenting potentially contaminated waste with a Trimble GPS.

Geothermal Incorporated Landfill, Middletown, California

Client: Pacific Gas & Electric (PG&E)

Title: Biologist

Start/End Dates: January 2006 – December 2008

Scope/Description: Provide an overview of the project, including project type, completion status, size and cost

Responsibilities: Morgan was involved with the five year vegetation monitoring of mitigation wetlands including fieldwork and preparing Wetland Vegetation Monitoring Reports. Fieldwork included percent coverage of vegetation in wetland and upland plots. According to Army Corps of Engineers permit, she also performed and documented an Informal Wetland Delineation.

California Department of Transportation State Routes, North and South Bay Area, California

Client: California Department of Transportation (Caltrans)

Title: Biologist

Start/End Dates: January 2006 – December 2007; January 2009

Scope/Description: Caltrans State Routes (SR) biological and water support in North and South Bay Area

Responsibilities: Morgan was involved with botanical, wetland and waters of the U.S. fieldwork and document preparation as pertains to Caltrans projects in the North and South Bay area. Project specific tasks included;

- **Jameson Canyon SR 12/29 Interchange** Participated in several projects on the Jameson Canyon 12/29 Interchange including fieldwork, data analysis and preparation of the Natural Environmental Study, Biological Assessment, Rare Plant Report, Tree survey, and Wetland Delineation. The tree survey verified and corrected data collected by Caltrans on over 2000 trees along eight miles of SR 12/29. This included an inventory and mapped location of the tree locations within the Right of Way using a Trimble GPS.
- **Caldecott Tunnel Hwy 24** Assisted in preparation of the Natural Environmental Study and Tree survey.
- **Sonoma Hwy 116** Involvement with the fieldwork and preparation of habitat assessment, Habitat Quality Evaluation, Biological Assessment, and Rare Plant Report.
- **Hemet SR 79** Contributed to the Rare Plant Report, habitat assessment, and Wetland Delineation Report.
- **Sonoma Hwy 12** Participated in Rare Plant Report and Wetland Delineation verification.
- **Stagegulch SR 121** Preformed the Wetland Delineation verification and the 401 and 404 permit applications.
- **Duhig SR 121** Involved in the Wetland Delineation, 401 and 404 permit applications.
- **SR 121** Reconnaissance-level habitat assessment for Biological Assessment. Morgan surveyed two bridge expansion projects along SR 121 in preparation for the Biological Assessment for Section 7 consultation. This effort involved a constraints analysis for special status plants and wildlife.

Lompoc Wind Energy Project, Santa Barbara County, California

Client: Acciona Wind Energy USA LLC

Title: Lead Botanist

Start/End Dates: 2006

Scope/Description: Lompoc Wind Energy is a proposed 120 MW output wind farm.

Responsibilities: Morgan preformed a species specific rare plant survey along proposed transmission line and wind turbine locations for the federally and state endangered Gaviota Tarplant (*Deinandra increscens* ssp. *villosa*). She also verified habitat suitability for other special status plant species that could not be identified due to the timing of survey.

Publications

King, M., and M. Walsh. 2008. Environmental Bibliography of Muscongus Bay. Quebec Labrador Foundation, Atlantic Center for the Environment.

Ipswich, MA. Accessed at:
http://www.qlf.org/publication_files/MBP_Bibliogaphy_%2008.pdf

Robert Hernandez

Biologist

Profile

Mr. Hernandez is a project biologist in Jacob's Southern California office. He has more than 23 years' experience conducting a variety of wildlife surveys and wetland delineation throughout California, Nevada, Arizona, and Utah. He has experience with identifying Northern and Southern California flora and fauna. He has conducted focused surveys for desert tortoise, least Bell's vireo, western snowy plover, burrowing owl, northern spotted owl, northern goshawk, Del Norte salamander, and terrestrial mollusks. He is experienced in remote sensing such as photogrammetry, topographic map interpretation, radio telemetry, photographic bait stations, sooted track-plates, geographic information systems (GIS), and use of global positioning systems (GPS) with sub-meter accuracy. Mr. Hernandez is also well versed in environmental regulations and policies and in the preparation of state and federal permit application process for the U.S. Army Corps of Engineers, Regional Water Quality Control Board, and California Department of Fish and Wildlife. Mr. Hernandez has several years of experience serving as an environmental compliance monitor on large scale construction projects.

Key skills | Areas of expertise	▪ Field team lead, ornithology, jurisdictional waters delineation.
Education | Qualifications	▪ B.S., Wildlife Management; Minor in Natural Resources, Humboldt State University, 2000
Years of Experience	▪ 23
Year Joined Jacobs	▪ 2001
Specialized Computer Skills	▪ ArcGis 9.1 ▪ Arview 3.2 ▪ Pathfinder 3.10
Training	▪ Utah Prairie Dog Survey Protocol Training – Utah Division of Wildlife/BLM, 2009 ▪ Advanced Jurisdictional Wetland Hydrology – Wetland Training Institute, 2006 ▪ Advanced Hydric Soils - Wetland Training Institute, 2005 ▪ Bat Ecology and Field Techniques – The Wildlife Society, 2005 ▪ Surveying, Monitoring, and Handling Techniques Workshop – The Desert Tortoise Council, 2004 ▪ Southwestern Willow Flycatcher Workshop – Friends of the Kern River Preserve 2004 ▪ Wetland Delineation Training - Wetland Training Institute, 2004 ▪ Marbled Murrelet Survey Workshop – Mad River Biologist, 1998, 1999, 2000 ▪ Western Snowy Plover Survey Workshop – Mad River Biologist, 1999
Languages	▪ Fluency in Spanish

Relevant Project Experience

West of Devers Upgrade Project, Riverside and San Bernardino Counties, California, April 2018 – Current

Client: Southern California Edison / Barnard Construction

Role: Field Contact Representative (FCR), Biological Construction Monitor, Environmental Compliance Lead.

Responsibilities: As the FCR for Segments 1, 2, 3, and 4 of the West of Devers Upgrade Project, Mr. Hernandez was tasked with scheduling biological construction monitors for compliance with the biological mitigation measures, applicant proposed measures, and other federal, state, and local permit conditions. He facilitated compliance through communication and coordination with client, construction, and environmental resource personnel. Mr. Hernandez tracked construction progress and reported compliance issues via daily reporting and in accordance with the client communication plan. He also helped to refine the general monitoring approach for all segments of the project and trained additional monitors as the project progressed. In addition, other tasks included identifying new active nests and updating nest status, establishing an environmentally sensitive area and buffers, providing Worker Environmental Awareness Program (WEAP) training, conducting pre-construction surveys and riparian bird surveys.

Scope/Description: The project includes new and upgraded transmission line infrastructure along 47.5 miles of existing transmission line corridor extending south from the San Bernardino Substation in San Bernardino County, east of Vista Substation in Riverside County, and west of Devers Substation in San Bernardino County.

Avian Pre-Construction Surveys, North of Magunden Project, California; March 2017 – April 2018

Client: Kern and Tulare Counties

Role: Lead Biological Construction Monitor

Responsibilities: As the Lead Biological Construction Monitor for Segments 1 and 2 of the North of Magunden Project, Mr. Hernandez was tasked with scheduling biological construction monitors for compliance with the biological mitigation measures, applicant proposed measures, and other federal, state, and local permit conditions. He facilitated compliance through communication and coordination with client, construction, and environmental resource personnel. Mr. Hernandez tracked construction progress and reported compliance issues via daily reporting and in accordance with the client communication plan. He also helped to refine the general monitoring approach for all segments of the project, and trained additional monitors as the project progressed. In addition, other tasks included identifying new active nests and updating nest status, establishing an environmentally sensitive area and buffers.

Scope/Description: The project includes new and upgraded transmission line infrastructure along 65 miles of existing transmission line corridor extending south from the Rector Substation in southern Tulare County to Magunden Substation in Southern Kern County.

Biological Construction Monitoring Remedial Investigation, Installation Restoration Program Site 6, South Ravine, San Pedro, California; August 2017 – October 2017

Client: Department of the Navy Defense Fuel Support Point San Pedro

Role: Lead Field Biologist

Responsibilities: As the Lead Field Biologist, Mr. Hernandez was tasked to identify and protect host plants and construction monitoring for the endangered Palos Verdes Blue Butterfly and suitable habitat for the Coastal California Gnatcatcher occurring at the project site. Other tasks included biological construction monitoring of vegetation mowing, monitoring investigation activities such as trenching and drilling, and supporting sampling activities.

Scope/Description: The project involved remedial investigation at Installation Restoration Program Site 6, South Ravine at Defense Fuel Support Point for the Department of the Navy for the presence of semivolatile organic compounds and metals in soil at concentrations above applicable screening criteria.

Biological Pre-Construction Surveys, Antelope to Magunden Project, Kern and Los Angeles Counties, California; August 2017

Client: Southern California Edison

Role: Lead Field Biologist

Responsibilities: As the Lead Field Biologist for Segment 3, Mr. Hernandez was tasked with leading a general biological pre-construction survey of proposed work areas and buffers which included identifying new bird nests, updating nest status on existing nests, and establishing an environmentally sensitive area for jurisdictional surface waters and sensitive vegetation communities.

Scope/Description: The project includes new and upgraded transmission line infrastructure along 59 miles of existing transmission line corridor extending south from the Magunden Substation in southern Kern County to Antelope Substation in northern Los Angeles County.

Jurisdictional Waters Delineations, Chiquita Canyon Landfill, Valencia, California; July 2002 – Current

Client: Republic Services Inc.

Role: Biologist

Responsibilities: Conducted jurisdictional waters and wetland delineation of the 592-acre Chiquita Canyon Landfill. Other responsibilities include habitat mapping, vegetation sampling, literature review, and report writing.

Scope: The project would extend the waste footprint of the landfill, better utilize the landfill's remaining and potential disposal capacity, and allow for the disposal of all non-hazardous wastes acceptable at a Class III solid waste disposal landfill.

Tehachapi Renewable Transmission Line Project (TRTP), Los Angeles, San Bernardino, and Kern Counties, California; July 2010 to November 2016

Client: Southern California Edison

Role: Environmental Compliance Monitor

Responsibilities: As the Environmental Compliance Monitor for Segments 6, 7, 8, and 11 of TRTP, Mr. Hernandez monitored construction activities for compliance with the general environmental mitigation measures, applicant proposed measures, and other federal, State, and Local permit conditions. He facilitated compliance through communication and coordination with client, construction, regulatory, and environmental resource personnel. Among other matters within his purview, Mr. Hernandez worked closely with construction staff to improve the stormwater pollution prevention plan best management practices implemented during what was a significant rainy season, and provided oversight of project stormwater pollution prevention plan logs. Mr.

Hernandez tracked construction progress and reported compliance issues via daily reporting and in accordance with the client communication plan. He also helped to refine the general monitoring approach for all segments of the project, and trained additional monitors as the project progressed.

In addition to environmental compliance monitoring, Mr. Hernandez also conducted 4 days of protocol-level desert tortoise surveys and burrowing owl surveys on Segment 6B.

Scope: TRTP includes new and upgraded transmission line infrastructure along 173 miles of new and existing transmission line corridor extending south from the Tehachapi Wind Resource Area in southern Kern County,

through the Angeles National Forest, to substations in Los Angeles and San Bernardino Counties. In addition to upgrading the existing transmission infrastructure, TRTP serves to increase transmission capacity to accommodate transmission of renewable energy from the Tehachapi Wind Resource Area in support of the California Renewable Portfolio Standards.

U.S. Environmental Protection Agency HALACO Superfund Site, Oxnard, California; May 2010 and 2011

Client: U.S. Environmental Protection Agency

Role: Principal Biologist

Responsibilities: Responsibilities included pre-activity nesting bird survey, rare plant survey, tidewater goby sampling; and monitoring of soil/sediment sampling activities within occupied western snowy plover habitat. Other activities included GPS/GIS mapping, and report writing.

Scope: The project included characterization of large quantity of solid and liquid wastes, which consisted of residual metals, salts added during the smelting process, and other materials Halaco produced during its 40 years of operation.

Terra Genn ALTA Wind, Mohave, California; October 2009 – December 2010

Client: Terra Genn

Role: Principal Biologist

Responsibilities: Responsibilities included construction monitoring, jurisdictional waters delineation, Section 1600 permitting, construction monitoring, habitat assessment and mapping, GPS/GIS mapping, and report writing.

Scope: The project involved the construction and operation of a wind energy generation facility on approximately 9,300 acres in the Mohave Desert.

PG&E, Trilobite, California; April 2009 – May 2009

Client: Pacific Gas and Electric Company

Role: Field Biologist/Site Safety Coordinator

Responsibilities: Conducted protocol-level desert tortoise surveys, bird surveys, special-status wildlife and rare plant species surveys. Responsibilities also included being the project site safety coordinator and GPS mapping. Twenty-six days project-related field experience surveying for desert tortoise.

Scope: Bright Source Energy Inc. had proposed an approximately 5,130 acre 500-megawatt solar power-generation project near Broadwell Lake, but withdrew the proposal in 2009.

Hinkley Project, San Bernardino County, California; August 2002 and October 2003

Client: Pacific Gas and Electric Company

Role: Field Biologist

Responsibilities: Conducted focused protocol-level surveys for desert tortoise and other sensitive and special-status wildlife and plant species. Responsibilities also included report writing. Three days project-related field experience surveying for desert tortoise.

Scope: The project involved addressed chromium in groundwater in the community of Hinckley under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) through well installation, pipeline installation, and treatment facility installation.

Topock IM3 Project, San Bernardino County, California; November 2003 – Current

Client: Pacific Gas and Electric Company

Role: Field Biologist

Responsibilities: Conducted focused protocol level surveys for desert tortoise and other sensitive and special-status wildlife species. Responsibilities also included southwestern willow flycatcher clearance surveys, jurisdictional waters and wetland delineation, environmental construction monitoring, biological sensitivity training, and report writing. Fifty days project related field experience surveying and construction monitoring for desert tortoise.

Scope: The project involved addressed chromium in groundwater at the Topock Compressor Station under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) through well installation, pipeline installation, treatment facility installation, Colorado River sampling, and road maintenance.

Santa Susana Field Laboratory, Santa Susana, California; February 2008– February 2009

Client: Boeing/NASA

Role: Field Lead Biologist

Responsibilities: Conducted field surveys and environmental sampling at Field Laboratory using GPS units with sub-meter accuracy. Responsibilities also included, reconnaissance level biological surveys and quality assurance/quality control of lab samples.

Scope: The project involved characterization of contamination in groundwater and soil at the 2,600 acre Santa Susana Field Lab under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) through soil sampling, vapor probe sampling, groundwater sampling, and facility demolition.

Utah Forest Highway 29 Northern Goshawk Survey, Beaver, Utah; July 2004, 2005, 2006, 2008, 2010, and 2012

Client: Federal Highways Administration

Role: Principal Biologist

Responsibilities: Conducted protocol level surveys for northern goshawk along Highway 29 for road improvements. Other responsibilities include habitat mapping, wetland delineation, and report writing.

Scope: The project involved highway improvements along Beaver to Junction Forest Highway (FH) 29/Utah Department of Transportation (UDOT) State Route 153 (SR 153),

Bright Source Energy, Morman Mesa, Nevada; April 2008

Client: Bright Source Energy

Role: Field Biologist

Responsibilities: Conducted biological surveys for special-status plants. Responsibilities also included habitat mapping, GPS/GIS mapping.

Scope: Bright Source Energy Inc. had proposed an approximately 2,400 acre 400-megawatt solar power-generation project in Clark County Nevada, but withdrew the proposal.

Bright Source Energy Biological Surveys, Ivanpah Valley, California; December 2006, May 2007, May 2008

Client: Bright Source Energy

Role: Field Biologist

Responsibilities: Conducted biological surveys for sensitive and special- status wildlife species, including desert tortoise, burrowing owl and rare plants. Responsibilities also included jurisdictional waters delineation, habitat mapping, GPS/GIS mapping and report writing. Ten days project- related field experience surveying for desert tortoise.

Scope: Bright Source Energy Inc. proposed an approximately 2,400 acre 400-megawatt solar power-generation project in Clark County Nevada, but withdrew the proposal.

United Engineering Group, Jurisdictional Waters Delineations, Mohave Desert; November 2005 – August 2007

Client: United Engineering Group Inc.

Role: Principal Biologist

Responsibilities: Conducted jurisdictional waters and wetland delineation of four large sites within the Mojave Desert for future development. Other responsibilities include GIS/GPS mapping, literature review, report writing and client coordination.

Scope: United Engineering Group and McRae Properties proposed a master-plan featuring a mix of residential densities. The purpose of the survey was to determine the limits of any waters of the U.S., including wetlands, that may fall under the jurisdiction of the United States Army Corp of Engineers (USACE) under Section 404 of the CleanWater Act and California Department of Fish and Game (CDFG) under Section 1600 et seq. of the California Fish and Game Code.

Sun Valley Energy Center Project, Romoland, California; April 2006 – January 2007

Client: Valle del Sol Energy, LLC

Role: Field Biologist

Responsibilities: Conducted focused protocol level burrowing owl surveys of the proposed power plant project study area. Responsibilities also include authoring reports and GPS/GIS mapping.

Scope: Valle del Sol Energy, LLC (VSE), a wholly-owned subsidiary of Edison Mission Energy, proposed to construct, own, and operate an electrical generating plant near the unincorporated community of Romoland, Riverside County, California. The Sun Valley Energy Project (SVEP) is a natural gas-fired, simple-cycle electrical generating facility rated at a nominal net generating capacity of 500 megawatts (MW) on 20-acres.

Whittier Narrows Operable Unit Remedial Action, Los Angeles County, California; July 2001 – April 2006

Client: U.S. Environmental Protection Agency

Role: Principal Biologist

Responsibilities: Conducted preconstruction surveys and construction monitoring for least Bell's vireo, California gnatcatcher and other sensitive species in South El Monte for a groundwater remediation project for Environmental Protection Agency. Mr. Hernandez's other tasks include environmental oversight of construction activities in environmentally sensitive habitats, and environmental mitigation monitoring of construction practices, and preparation of revegetation and exotic plant species eradication plans.

Scope: The U.S. Environmental Protection Agency (EPA) implemented a groundwater cleanup remedial action in the Whittier Narrows Operable Unit (OU) of the San Gabriel Superfund Site. The remedial action constructed a groundwater treatment plant and associated pipelines on land located within and adjacent to

Whittier Narrows Nature Center and Wildlife Refuge (WNNC), located in South El Monte, County of Los Angles, California.

California City Prison Project, California City, California; July 2006

Client: Correction Corporation of America

Role: Field Biologist

Responsibilities: Conducted protocol level surveys for sensitive and special-status wildlife species, including desert tortoise, Mojave ground squirrel, and burrowing owl. Responsibilities also included habitat mapping, GPS/GIS mapping and report writing. Two days project-related field experience surveying for desert tortoise.

Scope: Corrections Corporation of America proposed to design, construct, and operate a 550-bed stand-alone secure prison facility on approximately 35 acres of a 320-acre site in the City of California City in response to California Department of Corrections and Rehabilitation Male Bed Expansion Request for Proposal (RFP) in the City of California City, Kern County, California, directly south of the existing California City Correctional Facility.

State Route 79, Riverside County, California; February 2005 – June 2006

Client: Riverside County Transportation Commission

Role: Field Biologist

Responsibilities: Conducted jurisdictional waters and wetland delineation and rare plant surveys of the approximately 15,000-acre project study area. Other responsibilities include, use of GPS technology to map sensitive resources such as wetlands, vernal pools, rare plant populations, and sensitive wildlife observations.

Scope: The Riverside County Transportation Commission (RCTC), in cooperation with the California Department of Transportation (Caltrans or Department) District 8, the Federal Highway Administration (FHWA), the County of Riverside, the City of San Jacinto, and the City of Hemet, initiated a study for the improvement of State Route (SR) 79 (Project) in the vicinity of the Cities of Hemet and San Jacinto within the County of Riverside, California. The improvement proposed to occur between Newport Road and Gilman Springs Road, a distance of approximately 30 kilometers (km) (19 miles [mi]).

U.S. Air Force Plant 42 Biological Surveys, Palmdale, California; May 2006

Client: U.S. Air Force

Role: Field Biologist

Responsibilities: Conducted focused protocol level surveys for desert tortoise and other sensitive and special-status wildlife species including Mojave ground squirrel, and burrowing owl. Responsibilities also included habitat mapping, GPS/GIS mapping and report writing. Three-day project related field experience surveying for desert tortoise.

Scope: Based on the former skeet area operations at Plant 42, soil may be impacted by metals from the gun shot and polynuclear aromatic hydrocarbons (PAHs) from the skeet targets, also called clay pigeons. Various constituents may be present in soil at the areas of empty cans, because the former contents of these containers are not known. The primary objective of the field investigation is to assess whether shallow soil in and around the skeet area and empty cans at Area of Concern (AOC) 3 has been impacted. Soil samples were collected and data used to evaluate potential health risks while ensuring compliance with the Federal Endangered Species Act (FESA) and other applicable regulations.

On-Call Biological Support, San Diego County; February 2005 – February 2006.

Client: County of San Diego Department of Public Works

Role: Principal Biologist

Responsibilities: Conducted preconstruction surveys for sensitive and special-status wildlife species on an on-call basis. Responsibilities also included jurisdictional waters and wetland delineation, habitat mapping, GPS/GIS mapping and report writing.

Scope: On-call support included the preparation of a wetland delineation and biological technical report for the preparation of a Mitigated Negative Declaration (MND), 401, 404, and 1602 permit applications.

State Route 39 Bighorn Sheep Study, Los Angeles County, California; April – December 2005

Client: California Department of Transportation

Role: Principal Field Biologist

Responsibilities: Conducted field surveys for bighorn sheep along closed portion of State Route 39 during preconstruction phase. Responsibilities also include data management and reporting.

Scope: The California Department of Transportation (Caltrans) proposed improvements for State Route (SR) 39 that include reopening the highway to the public and constructing cross drains with larger pipe capacity, down drains and rock slope protection for the major slide located along the highway. The portion of SR 39 between Crystal Lake and the Angeles Crest Highway (SR 2) has been restricted to vehicular traffic by the public for over 20 years. It was necessary that a wildlife corridor study be conducted along this segment of roadway because this segment of SR 39 is used by Nelson bighorn sheep (Ovis canadensis nelsoni).

Fairmont Wind Project, Fairmont, California; June 2002 – May 2005

Client: Pacificorp Power Marketing Energy

Role: Field Biologist

Responsibilities: Conducted field surveys of a proposed wind farm project study area for biological resources, including surveys for avian species, burrowing owl, and vegetation characterization. Responsibilities also include mapping, database management, literature review, report writing.

Scope: Pacificorp Power Marketing Energy, Inc. proposed to develop a wind energy facility located in the vicinity of Fairmont, California. The proposed project would include installing approximately 63 wind turbines, underground cables, transmission line corridors, and turbine access roads.

Camp Pendleton Delineations, Oceanside, California; October 2004 – February 2005

Client: U.S. Marine Corps

Role: Field biologist

Responsibilities: Conducted jurisdictional waters and wetland delineation of Red-Beach and Las Flores Creek. Other responsibilities include, use of GPS technology to map sensitive resources such as wetlands, vernal pools, and sensitive wildlife observations.

Scope: Provide an overview of the project, including project type, completion status, size and cost

Clinton Keith Road Project, Murrieta, California; November 2002 – March 2006

Client: Riverside County Transportation Department

Role: Field Biologist

Responsibilities: Conducted focused protocol level burrowing owl surveys, California gnatcatcher clearance surveys, jurisdictional waters delineation, habitat mapping, and environmental construction monitoring of the proposed road expansion project study area.

Scope: The Riverside County Transportation Department, in cooperation with the City of Murrieta, proposed construction of a six-lane urban arterial in the City of Murrieta and unincorporated Riverside County. The proposed Clinton Keith Road Extension Project needed to provide an east-west urban arterial between Antelope Road, near Interstate (I)-215, and State Route (SR) 79.

Lockheed Martin Plant 10 Biological Surveys, Palmdale, California; May 2004

Client: Lockheed Martin

Role: Field Biologist

Responsibilities: Conducted biological surveys for sensitive and special- status wildlife species, including desert tortoise, Mojave ground squirrel, and burrowing owl. Responsibilities also included habitat mapping, GPS/GIS mapping and report writing. Three days project-related field experience surveying for desert tortoise.

Scope: The objective of the biological resources survey of Plant 10 was to identify and document endangered, threatened, and special-status plant and wildlife species and sensitive habitats. The goal was to ensure compliance with the Federal Endangered Species Act (ESA), Lockheed Martin Aero company requirements, and other applicable regulations. As required by the ESA, federal agencies and their contractors must ensure that their activities do not jeopardize the continued existence of endangered or threatened flora and fauna.

Burbank Trunk Line, Encino, California; August – December 2001

Client: Los Angeles Department of Water and Power

Role: Field Biologist

Responsibilities: Conducted preconstruction surveys for sensitive and special-status wildlife species on a proposed pipeline replacement route in Los Angeles County for the Los Angeles Department of Water and Power. Responsibilities included breeding bird surveys, seine-netting for sensitive fish, night eye-shine surveys for special-status amphibians, and environmental monitoring during construction phase.

Scope: The Burbank Boulevard Trunk line Project was conducted to replace the existing Ventura Trunk Line with a new trunk line under Burbank Boulevard and other area streets. The replacement trunk line consisted of a 54-inch-diameter pipeline to connect the Encino Reservoir service area with the Stone Canyon Reservoir Inlet Line.

West Mojave Plan, Bureau of Land Management, Imperial Sand Dunes; July – August 2001

Client: Bureau of Land Management

Role: Field Biologist

Responsibilities: Conducted GIS analyses on potential route closure designation as they pertain to environmentally sensitive habitats.

Scope: Analyses for potential route closure designation as they pertain to environmentally sensitive habitats at the Imperial Sand Dunes for the U.S. Department of the Interior's Bureau of Land Management (BLM).

Experience Prior to Jacobs

Bureau of Land Management, Arcata Field Office, Arcata, California; 1998 – 2000

Client: Bureau of Land Management

Role: Field Biologist

Responsibilities: Responsibilities included conducting protocol level surveys for threatened and endangered species such as marbled murrelet, northern spotted owl, western snowy plover, northern goshawk,

Swainson's hawk, Pacific fisher/Humboldt marten, Del Norte salamander, and terrestrial mollusks in addition to general biological and botanical surveys.

Scope: Regulatory agency internship, providing support for special status species protocol level surveys, development of EIR/EIS, Biological Opinions, and Permits.

California Department of Fish and Game, Eureka, California; 1997

Client: California Department of Fish and Game

Role: Field Biologist

Responsibilities: Responsibilities included conducting nest searches for osprey, heron and egret and monitoring to determining nesting success.

Scope: Regulatory agency internship, providing support for special status species protocol level surveys and general wildlife surveys.

Rebecca John

Biologist

Personal Details

Length of service in the profession: 12 years

Year joined Jacobs: July 2018

Jacobs office location: Colorado Springs, Colorado

Summary Biography

Rebecca is a versatile biologist with over 12 years experience with environmental/biological consulting, biological surveys, and habitat assessments. Rebecca has experience teaching field classes, organizing outreach programs, and conducting research at accredited Universities. At Jacobs, Rebecca has served as a Biological/Environmental Monitor and Field Lead for transmission line, railroad, mining, pipeline, solar, and transportation projects. Rebecca is familiar with and understands project mitigation/compliance for wildlife species including but not limited to: desert tortoise, Coachella Valley fringe-toed lizard, Coachella Valley milk-vetch, Flat-tailed horned lizard, California red-legged frog, Western pond turtle, California tiger salamander, Arroyo Toad, Bats, and Nesting Birds (Migratory Bird Treaty Act). Rebecca has conducted research on herpetofauna, bats, botany, small mammals, passerines and raptors, fish, and large mammals. She has experience analyzing data, publishing peer reviewed articles, and presenting research at national and regional conferences.

Rebecca is highly independent and has travelled regularly for work. She understands the complexities of field work and the need to be flexible. Rebecca learns quickly, is organized, and reliable. She has a strong work ethic and aims to provide quality products and good working relationships.

Key Skills and Areas of Expertise

- Provide Endangered Species Act Section 7 and Section 10 compliance consultations and perform mitigation actions as necessary.
- Oversee daily project activities and manage logistic to ensure the activities and staffing levels are in accordance with biological opinions.
- Work directly with the contractor to find appropriate solutions to project problems and the strategies to implement the solutions.
- Participate in desert tortoise clearances and surveys as USFWS Authorized Desert Tortoise Biologist.
- Perform biological surveys for threatened, endangered and sensitive species (federal and state-listed species of concern), including botanical surveys, nesting birds, and protected cactus species.
- Provide Migratory Bird Treaty Act compliance consultations and perform mitigation actions as necessary.
- Provide compliance management and designated biologist activities in accordance with the Incidental Take Permit and Mitigation Measures.

Education and Qualifications

- Master of Science, Wildlife Sciences, Auburn University, 2017
- Bachelor of Arts, Environmental Science and Biology, University of California, Santa Cruz, 2010

Registrations and Certifications

- Wilderness First Responder, NOLS, 2022, Expires Sept 2024
- Wetland Identification and Delineations, Richard Chinn Environmental, 2022
- MSHA 24 hour New Surface Miner Training, A&M Safety and Environment, 2022, Expires June 2023
- HAZWOPER, Compliance Solutions, 2021, Expires July 2023
- Qualified Preparer of Storm Water Pollution Prevention Plans and Qualified Compliance Inspector of

Stormwater, Stormwater One, 2014, Expired 2018
- California ATV Institute Certification Program, ATV Safety Institute, 2011
- ESRI Geoprocessing Certificate: ArcGIS, University of California, Santa Cruz, 2010

Additional Trainings

- Amphibian and Reptile Workshop Baja California, Fauna Del Noroeste, 2023
- Safety Liaison (Construction and HAZWOPER), Jacobs, 2021
- California Environmental Quality Act, UCLA, 2020
- Reptiles and Amphibians of the Sierra Nevada Workshop, Sierra Nevada Field Campus, 2019
- Arroyo Toad Workshop, The Wildlife Society, 2019
- Bat Rehabilitation, Long Beach Animal Hospital, 2018
- Venomous Snake Handling Workshop, Jacobs, 2018
- Water Bacteriological Sampling Workshop, Alabama Water Watch, 2017
- Alabama Bee Identification Workshop, Auburn University, 2016
- Modelling Patterns and Dynamics of Species Occurrence Workshop, South Dakota State University, 2015
- Hunting Awareness and Conservation Education, Conservation Leaders for Tomorrow, 2015
- Field Survey Techniques Workshop, Bat Conservation and Management, 2014
- Rare Pond Species Survey Workshop, Leguna de Santa Rosa Foundation, 2014
- Bird Banding of Passerines and Near Passerines Workshops: Beginning and Advanced courses, Star Ranch Bird Observatory, 2014
- Flat-tailed Horned Lizard Workshop, Southwest Partners in Amphibian and Reptile Conservation, 2013
- Desert Flora, University of California, Riverside extension program, 2012
- Desert Tortoise Council Surveying, Monitoring, and Handling Techniques Workshop, Desert Tortoise Council, 2011

Selected Project Experience

Various Projects, Boardman, Arlington, and Grass Valley, OR (March 2023 to June 2023)

Client: Confidential

Role on project: Avian Biologist/WGS Biologist/Field Team Lead/Safety Liaison

Responsibilities: Rebecca leads field team efforts and conducts protocol preconstruction surveys for an Oregon State Endangered species (Washington Ground Squirrels, WGS; Federal candidate) and raptors in addition to habitat assessments of the work areas.

Scope: Several projects solar projects and a wind project are constructing new facilities and transmission lines in northeast Oregon.

Second Creek Interceptor Project, Commerce City, CO (Jan 2023 to April 2023)

Client: HDR/Garvey Construction

Role on project: Avian Biologist

Responsibilities: Rebecca monitors crews for biological and environmental compliance based on project mitigation measures (understands and communicates biological protocols with client as needed), conducts biological avian monitoring, and completes daily monitoring reports.

Scope: Garvey is constructing a Metro Wastewater Reclamation District project, constructing a new 17.5 mile long sanitation sewer from Denver to Commerce City, CO.

PFAS Site Inspection, Fallbrook, CA (December 2022)

Client: Naval Facilities Engineering Systems Command

Role on project: Small Mammal and Avian Qualified Biologist

Responsibilities: Rebecca attended tailboards, conducted avian and small mammal preconstruction surveys

for Federally endangered and threatened species in habitat, monitored crews for biological and environmental compliance based on project mitigation measures (understood and communicated biological protocols with client), provided required environmental training to all personnel on site, conducted avian and small mammal monitoring for Federally endangered and threatened species during construction, and completed daily monitoring reports.

Scope: The U.S. Navy contracted MR Drilling and Jacobs to inspect site locations for harmful Per- and Polyflouroalkyl substances on the Naval Weapons Station Seal Beach Fallbrook Detachment in Fallbrook, CA.

Newmont Cripple Creek & Victor (CC&V) Gold Mine Stormwater Review, Cripple Creek, CO (June to October 2022)

Client: Newmont Corporation

Role on project: Ecological Assessor

Responsibilities: On site visit to collect data on root depth, plant composition, and restoration progress of about 106 acres of CC&V restoration sites. Wrote ecological assessment for sites. Rebecca is MSHA surface mining trained.

Scope: Jacobs was tasked with determining most likely erosion causes on CC&V restoration sites and recommending best management practices to eliminate further erosion risk.

Third Main Track, Needles, CA (January 2022 to present)

Client: Burlington Northern Santa Fe (BNSF)

Role on project: Biological Surveyor/Authorized Desert Tortoise Biologist

Responsibilities: Rebecca attends tailboards, provides clarification of protocols and mitigation measures, conducts biological USFWS protocol preconstruction surveys, conducts clearance sweeps of yards and work areas, monitors crews for biological and environmental compliance based on project mitigation measures, and completes daily monitoring reports. Rebecca also excavates possible desert tortoise burrows, relocates desert tortoises as needed, and constructs artificial burrows for relocations.

Scope: BNSF contracted HDR and Granite Construction to construct a third rail track along approximately 29 miles of existing BNSF rail corridor from west of Needles to Goff, CA. Part of the construction requires 91 structures built, including 52 new bridges, 36 culvert extensions, and three arch structure extensions.

Four Corners Uranium Project, Grand Junction, CO (July 2021 to present)

Client: Freeport McMoran

Role on project: Biologist/Group Lead/Safety Liaison/Wilderness First Responder

Responsibilities: Conducting mining claims investigation, gamma mapping and soil sampling, claim verification, biological surveys (habitat assessments, NEPA nesting bird and bat surveys, waterbody gamma mapping), cultural survey oversight, physical hazard closure oversite, and annual closure monitoring. Rebecca has HAZWOPER, Wilderness First Responder, MSHA, Safety Liaison (Construction and HAZWOPER) training. She also trains annually for safe UTV operating and trailer hauling. Rebecca has also assisted with reviewing SOPs for claims research, field investigation, data collection and management, field verification activities, and report writing. Rebecca was also tasked as Group Lead and Field Team Lead (of multiple groups) for field efforts.

Scope: Freeport McMoran is tasked with assessing public hazard (physical and radiological) from historical uranium mining claims. The project supports the Historic Mine Opening Safety Program throughout the Four Corners area on the Colorado Plateau. The Jacobs team research historic mining claims and maps them in ArcGIS, investigates habitat and locations of historic mines in the field, reports to client and BLM, pursues permitting the closure of mines and works with BLM to determine required pre-construction surveys and implemented survey efforts. Jacobs serves as a liaison between client and BLM, and large-scale planning with an annual budget that averaged $3.5 million through 2019.

Enterprise Solar and Sanborn 2.0 Solar Projects, Mojave, CA (April 2021 to April 2022)

Client: Confidential

Role on project: Biologist

Responsibilities: Rebecca and team were tasked with conducting Desert Tortoise and rare plant preconstruction surveys. Desert tortoise data was collected and recorded via standard USFWS protocol. Rebecca wrote the wildlife report for April 2021 surveys.

Scope: Confidential client proposes to construct two photovoltaic (PV) solar and energy storage facility in Kern County, California totally approximately 9,000 acres. Jacobs was contracted to provide CEQA siting and licensing support.

Eldorado-Lugo-Mohave Upgrade Project, Hesperia, CA (October 2020 to April 2022)

Client: Barnard Construction (Southern California Edison)

Role on project: Field Contact Representative/Biological and Environmental monitor/Authorized desert tortoise biologist

Responsibilities: Rebecca managed monitors for biological, cultural, and environmental compliance throughout the project as well as third party monitored additional environmental contractors. Rebecca attended tailboards, coordinated between clients and biological monitors, coordinated between clients and agency personnel, provided clarification of protocols and mitigation measures, scheduled resource appropriate monitors (biologists, environmentalists, palaeontologists, tribal monitors, cultural monitors), conducted USFWS protocol preconstruction surveys for desert tortoise and other sensitive species, clearance sweeps of yards and work areas, monitored crews for compliance based on project mitigation measures, created and updated biological resources in FRED database and AGOL maps, completed and edited daily monitoring reports in FRED.

Scope: Barnard Construction was tasked by SCE to replace OPGW line on existing 500 kV transmission lines about 180 miles from Lugo Substation (Hesperia, CA) to Mohave Substation (Laughlin, NV). Scope was completed on time within budget.

West of Devers Upgrade Project, Redlands, CA (July 2018 to July 2022)

Client: Barnard Construction (Southern California Edison)

Role on project: Field Contact Representative/Biological and Environmental monitor

Responsibilities: Rebecca managed monitors for biological, cultural, and environmental compliance throughout the project. Rebecca attended tailboards, coordinated between clients and biological monitors, coordinated between clients and agency personnel, provided clarification of protocols and mitigation measures, scheduled resource appropriate monitors (biologists, environmentalists, palaeontologists, tribal monitors, cultural monitors), conducted USFWS protocol preconstruction surveys for desert tortoise and other sensitive species, clearance sweeps of yards and work areas, monitored crews for compliance based on project mitigation measures, created and updating biological resources in FRED database and AGOL maps, completed and edited daily monitoring reports in FRED.

Scope: Barnard Construction was tasked by SCE to remove existing four 12 kV and 66 kV transmission lines and build two new 250 kV transmission lines about 45 miles from Devers Substation (Palm Springs, CA) to San Bernardino Substation (San Bernardino, CA) and Vista Substation (Grand Terrace, CA). Scope completed ahead of time within budget.

Upper Corridor Project, St. George, UT (March 2020)

Client: Utah Department of Transportation

Role on project: Biological Surveyor

Responsibilities: Rebecca was a biologist conducting vegetation community surveys and Desert Tortoise presence/absence preconstruction surveys in the Red Cliffs National Conservation Area. Data was collected and recorded via standard USFWS protocol.

Scope: Project proposes a four mile highway through the Red Hills Conservation Area in St. George, Utah.

Fort Irwin Dense Urban Training, Fort Irwin, CA (November 2019)

Client: Fort Irwin US Army Garrison

Role on project: Desert Tortoise biologist

Responsibilities: Rebecca was a biologist conducting Desert Tortoise preconstruction surveys at Fort Irwin. Data was collected and recorded via standard USFWS protocol.

Scope: Fort Irwin plans to expand military training facilities area.

Devers-Colorado River Substation No. 1 500-kilovolt Transmission Line Rating Remediation Project, Palm Springs, CA (September 2018 to February 2019)

Client: Southern California Edison

Role on project: Construction Lead Monitor/Biological and Environmental monitor

Responsibilities: Rebecca managed biologists and cultural monitors, attended tailboards, facilitated coordination between clients and biological monitors, provided clarification of protocols and mitigation measures, scheduled resource appropriate monitors (biologists, environmentalists, tribal, and cultural monitors), conducted USFWS protocol preconstruction surveys for desert tortoise, Coachella Valley Fringe-toed lizards and other sensitive species, conducted clearance sweeps of yards and work areas, monitored crews for compliance based on project mitigation measures, created and updated biological resources in FRED data base, completed and edited daily monitoring reports in FRED.

Scope: The SCE project completed construction to reconductor approximately 111 miles of existing 550-Kv electrical transmission line and replace the hardware on 374 existing structures within timeframe and budget.

El Cajon Pass OPGW Upgrade project, Cajon, CA (March 2019 to April 2019)

Client: Southern California Edison

Role on project: Construction Lead Monitor/Biological and Environmental monitor

Responsibilities: Rebecca attended tailboards, provided coordination between clients and construction, clarification of protocols and mitigation measures, conducted biological USFWS protocol preconstruction surveys for Arroyo Toad, conducted clearance sweeps of helicopter landing zones and work areas, monitored crews for compliance based on project mitigation measures, and completed daily monitoring reports.

Scope: SCE required OPGW upgrade between 2 miles of existing 500 kV transmission line over Hwy 15 and BNSF railroad in the El Cajon Pass.

*Mountain View Acres and Amethyst Basin Projects, Victorville, CA (October 2013 to May 2014)

Client: San Bernardino County Flood Control District

Role on project: Biological and Environmental monitor

Responsibilities: Rebecca attended tailboards, provided clarification of protocols and mitigation measures, monitored for desert tortoise, conducted clearance sweeps of work areas, monitored crews for compliance based on project mitigation measures, and completed daily monitoring reports.

Scope: San Bernardino County Flood Control District updated several storm drains from residential into surrounding environment.

*Cochran Solar Project, Cochran, CA (May 2014)

Client: Kings County

Role on project: Biological surveyor

Responsibilities: Rebecca conducted biological assessments for western pond turtle habitat, completed daily reports, and updated biological resources. Rebecca conducted USFWS protocol surveys for western pond

turtles and burrowing owl.

*Devers to Palo Verde-2, Palm Springs, CA (November 2011 to June 2013)

Client: Southern California Edison

Role on project: Field Contact Representative/Biological and Environmental monitor

Responsibilities: Rebecca managed biological and environmental monitors, attended tailboards, provided coordination between clients and biological monitors, clarification of protocols and mitigation measures, conducted USFWS protocol preconstruction surveys for desert tortoise, Coachella Valley Fringe-toed lizards and other sensitive species, conducted clearance sweeps of yards and work areas, monitored crews for compliance based on project mitigation measures, created and updated biological resources in FRED data base, and completed daily monitoring reports in FRED.

Scope: The DPV2 Project funded by SCE included a new 230-mile 500 kV line from the Harquahala Substation (in Arizona, near the Palo Verde nuclear power plant) to SCE's Devers Substation (in North Palm Springs, California). The 500 kV portion follows the existing SCE 500 kV transmission line, Devers–Palo Verde No. 1 (DPV1).

*Line 3000 pipeline repair, Needles, CA (April 2011 to October 2011)

Client: PG&E

Role on project: Biological monitor

Responsibilities: Rebecca attended tailboards, provided clarification of protocols and mitigation measures, conducted USFWS protocol preconstruction surveys for desert tortoise and other sensitive species, conducted clearance sweeps of yards and work areas, monitored crews for compliance based on project mitigation measures, GPS tracking of work, completed daily monitoring reports. UTV use and training required. Rebecca was tasked with relocating desert tortoise as required for the project with supervision of authorized biologists.

Rachel E. Newton

Botanist and Wetland Scientist

Profile

Rachel Newton is a botanist and wetland scientist with Jacobs Engineering, Inc., in Boise, Idaho. She has over 15 years of experience in botanical studies, including rare plant and noxious and invasive weed surveys; vegetation monitoring design and implementation; habitat mapping; environmental assessment documentation; and wetland delineation. She has worked in upland and wetland plant communities across the West, including the Rocky Mountains, the Great Basin, the Central California Coast, and the Mojave Desert. She has delineated wetlands and other waters of the US using the following USACE regional supplements: Alaska; Arid West; Great Plains; Midwest; and Western Mountains, Valleys, and Coasts. Rachel has assisted the U.S. Forest Service and the Bureau of Land Management with special status plant management by conducting pre- and post-treatment monitoring and formulating recommendations based on results. Rachel's comprehensive background in landscape and vegetation ecology and monitoring protocols ensures efficient, targeted data collection, accurate results, and thorough analysis.

Key skills | Areas of expertise	▪ Evaluates project-related impacts to federally and state-listed sensitive species and other biological resources in support of Endangered Species Act consultation ▪ Delineates aquatic resources in support of Clean Water Act consultation ▪ Surveys and monitors sensitive and invasive plant species throughout the Intermountain West, Desert Southwest, Pacific Northwest, and Great Plains ▪ Develops planting and monitoring plans for restoration efforts ▪ Analyzes monitoring data to inform adaptive management recommendations
Education | Qualifications	▪ M.S., Botany, University of Wyoming, 2008

Relevant Project Experience

Red Rock Canyon Trail and Intersections Improvements Project; Red Rock Canyon National Conservation Area, Las Vegas, Nevada; March 2020 to 2021

Client: Federal Highway Administration – Central Federal Lands Highway Division (FHWA – CFLHD)

Role: Botanist and Wetland Scientist

Responsibilities: Delineated desert washes waters of the U.S. within the 615.18-acre study area in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), the ordinary high water mark (OHWM) Regulatory Guidance Letter No. 05-05 (USACE 2005), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0 (USACE, 2008), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley, 2008), and the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Curtis and Lichvar, 2010). Prepared aquatic resources delineation report (ARDR) following the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports and Updated Map and Drawing Standards for the

South Pacific Division Regulatory Program, prepared by the U.S. Army Corps of Engineers (USACE)-Sacramento District (2016). Performed cactus and yucca species inventory and noxious weed survey within potential impact area boundary. Surveyed for Bureau of Land Management (BLM) – sensitive species yellow two-tone beardtongue (Penstemon bicolor ssp. bicolor) and Blue Diamond cholla (Cylindropuntia multigeniculata) within area of potential effect (APE).

Wild Rivers Back Country Byway Entrance Road and Loop Road Projects; Taos County, New Mexico; May 2020 to 2023

Client: Federal Highway Administration – Central Federal Lands Highway Division (FHWA – CFLHD)

Role: Wetland Scientist

Responsibilities: Delineated potential wetlands and other waters of the U.S. within the 178.42-acre study area in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), the ordinary high water mark (OHWM) Regulatory Guidance Letter No. 05-05 (USACE 2005), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0 (USACE 2010), A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States (Mersel and Lichvar 2014), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0 (USACE, 2008), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley 2008), and the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Curtis and Lichvar 2010). Prepared aquatic resources delineation report (ARDR) following the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports and Updated Map and Drawing Standards for the South Pacific Division Regulatory Program, prepared by the U.S. Army Corps of Engineers (USACE)–Sacramento District (2016).

Muir Woods Road and Bridge Replacement; Marin County, California; April 2020 to 2023

Client: Federal Highway Administration – Central Federal Lands Highway Division (FHWA – CFLHD)

Role: Wetland Scientist

Responsibilities: Delineated potential wetlands, other waters of the U.S., and waters of the state within the 16.19-acre study area in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), the ordinary high water mark (OHWM) Regulatory Guidance Letter No. 05-05 (USACE 2005), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0 (USACE, 2008), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley, 2008), the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Curtis and Lichvar, 2010), and State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (State Water Resources Control Board, 2019). Prepared aquatic resources delineation report (ARDR) following the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports and Updated Map and Drawing Standards for the South Pacific Division Regulatory Program, prepared by the U.S. Army Corps of Engineers (USACE)–Sacramento District (2016).

Pierce Point Road Project; Point Reyes National Seashore, Marin County, California; December 2019 to ongoing

Client: Federal Highway Administration – Central Federal Lands Highway Division (FHWA – CFLHD)

Role: Wetland Scientist

Responsibilities: Delineated potential wetlands, other waters of the U.S., and waters of the state within the 113.13-acre study area in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), the ordinary high water mark (OHWM) Regulatory Guidance Letter No. 05-05 (USACE 2005), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0 (USACE, 2008), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Lichvar and McColley, 2008), the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Curtis and Lichvar, 2010), and State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (State Water Resources Control Board, 2019). Prepared aquatic resources delineation report (ARDR) following the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports and Updated Map and Drawing Standards for the South Pacific Division Regulatory Program, prepared by the U.S. Army Corps of Engineers (USACE)–Sacramento District (2016).

Pastoria Solar Project; Kern County, California; May 2019 to September 2019

Client: Pastoria Solar Energy Company, LLC

Role: Botanist

Responsibilities: Performed literature and desktop reviews to determine likelihood of ESA-listed and California Endangered Species Act (CESA)-listed plant species, California Department of Fish and Wildlife (CDFW) sensitive plant species, and California Rare Plant Rank (CRPR) Rank 1 or 2 species to occur on 650-acre study site. Led protocol-level surveys in accordance with California Native Plant Society Botanical Survey Guidelines (CNPS 2001) and Protocols for Surveying and Evaluating Impacts to Special Status Native Populations and Sensitive Natural Communities (CDFW 2018). Described the potential for encountering botanical resources and potential impacts to them during construction and operation of the proposed Pastoria Solar Project in botanical resources survey report.

Fort Irwin Multi-Purpose Range Complex Desert Tortoise and Rare Plant Survey, Fort Irwin, California; 2017

Client: Department of Defense, California

Role: Botanist

Responsibilities: Conducted floristic inventory of proposed range complex. Surveyed for desert tortoise (Gopherus agassizii), Mohave ground squirrel (Xerospermophilus mohavensis), burrowing owl (Athene cunicularia), Lane Mountain milkvetch (Astragalus jaegerianus), Barstow woolly sunflower (Eriophyllum mohavense), Clokey's cryptantha (Cryptantha clokeyi), desert cymopterus (Cymopterus deserticola), and Mojave monkeyflower (Diplacus [=Mimulus] mohavensis).

Doble 33kV Line Replacement Draft Environmental Impact Statement; California; 2017

Client: Southern California Edison

Role: Botanist

Responsibilities: Provided QA/QC support for special status plant species occurrence probability table. Surveyed for federally and state-listed status carbonate soil endemic species Cushenbury oxytheca (Acanthoscyphus parishii var. goodmaniana), Cushenbury milk-vetch (Astragalus albens), purplenerve springparsley (Cymopterus multinervatus), Parish's daisy (Erigeron parishii), Cushenbury buckwheat (Eriogonum ovalifolium var. vineum), San Bernardino mountains bladderpod (Physaria kingii ssp. bernardina), and Latimer's woodland gilia (Saltugilia latimeri) in support of draft environmental impact statement. Surveyed for cactus and yucca species within proposed construction footprint.

Yellow Twotone Beardtongue (Penstemon bicolor ssp. bicolor) Survey at Red Rocks Canyon Natural Conservation Area; Nevada; 2015

Client: Bureau of Land Management

Role: Botanist

Responsibilities: Conducted roadside surveys for yellow twotone beardtongue (Penstemon bicolor ssp. bicolor) in areas affected by proposed road improvements and expansion.

Technical Lead, Field Team Lead, Report Coauthor; Ruby Pipeline Post-Restoration Monitoring; Nevada, Utah, and Wyoming; 2012 to Ongoing

Client: Kinder Morgan INC

Role: Botanist

Responsibilities: Negotiating protocol changes and developing recommendations with client and federal land agencies. Monitoring revegetation plots and surveying for noxious weeds along right-of-way and access roads. Analyzing current year's results and synthesizing with previous year's results from more than 450 monitoring sites for preparation of spring, fall, and annual reports for client, agencies (BLM, USFS, and USFWS), and Federal Energy Regulatory Commission (FERC).

Sevier Playa Project; Utah; 2013, 2015

Client: Peak Minerals

Role: Botanist

Responsibilities: Surveyed for giant four-wing saltbush (Atriplex canescens var. gigantea), Neese narrowleaf penstemon (Penstemon angustifolius var. dulcis), and sand-loving buckwheat (Eriogonum nummulare var. ammophilum) in project area. Performed desktop analysis of vegetation and rare plants within project area. Ground-truthed Southwest Regional Gap (SWReGAP) analysis of vegetation community.

Saylor Creek and Juniper Butte Range Monitoring; 2012 to 2013

Client: Mountain Home Air Force Base

Role: Botanist; Task Lead, Project Manager

Responsibilities: Conducted field inventories of slickspots and Federally Threatened slickspot peppergrass (Lepidium papilliferum), and monitored surrounding habitat at Juniper Butte Range. Developed and implemented long-term vegetation monitoring plan to assess efficacy of post-fire rehabilitation efforts at Saylor Creek Range, and recommending further actions to the client based on the results. Monitored long-term plots at Juniper Butte Range to evaluate range condition.

Washington Pipeline Expansion; 2012 to 2013

Client: Williams Northwest Pipeline GP

Role: Botanist

Responsibilities: Provided desktop analysis of vegetation and rare plants potentially impacted by proposed pipeline expansion. Prepared vegetation impact and mitigation sections of Resource Report 3 for FERC filing. Prepared discussion of potentially affected federally listed plant species, conservation measures, and potential mitigation for Biological Assessment.

Kyle Canyon Highway Expansion; Federal Highway Administration, Nevada; 2012

Client: Bureau of Land Management, and United States Forest Service

Role: Botanist

Responsibilities: Conducted roadside surveys for rare plants, noxious weeds, and cactus and yucca species in area affected by proposed highway expansion. Developed restoration plan for affected area.

Appendix B
Email Approval from California Department of Fish and Wildlife Regarding Survey Proposal

From: Banks, Rose@Wildlife
To: King, Morgan; Rodriguez, Magdalena@Wildlife
Subject: [EXTERNAL] RE: BHER - BUOW Technical Memorandum
Date: Friday, June 16, 2023 9:35:34 AM

Hi Morgan,

Thanks for incorporating those revisions. CDFW has no further comments or edits on the proposed plans.

Rose

Rose Banks
California Department of Fish and Wildlife
(760) 218-0022 cell

From: King, Morgan <Morgan.King10@jacobs.com>
Sent: Friday, June 9, 2023 1:26 PM
To: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Subject: RE: BHER - BUOW Technical Memorandum

Hello Magdalena,

I revised the attached technical memorandum based on your comments/questions.

Thank you,
Morgan

Morgan King | Jacobs | Biologist | M: +1.916.335.9141

From: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>
Sent: Wednesday, June 7, 2023 4:00 PM
To: King, Morgan <Morgan.King10@jacobs.com>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Subject: [EXTERNAL] RE: BHER - BUOW Technical Memorandum

Morgan,

Attached are my comments/questions.

Thank You,

Magdalena

From: King, Morgan <Morgan.King10@jacobs.com>
Sent: Wednesday, June 7, 2023 6:13 AM
To: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Subject: RE: BHER - BUOW Technical Memorandum

Thank you Magdalena!

An update to BUOW breeding season survey:

1. Biologists are *already* conducting BHER breeding season surveys this week. It's going great and they are documenting lots of young!
2. After a three week window – we have a second survey scheduled before July 15.
3. We have a third survey scheduled before August 31.

Thank you,
Morgan

Morgan King | Jacobs | Biologist | M: +1.916.335.9141

From: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>
Sent: Tuesday, June 6, 2023 4:02 PM
To: King, Morgan <Morgan.King10@jacobs.com>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Subject: [EXTERNAL] RE: BHER - BUOW Technical Memorandum

Morgan,

Thanks for the reminder. I will get you our comments or edits tomorrow.

Magdalena Rodriguez

From: King, Morgan <Morgan.King10@jacobs.com>
Sent: Tuesday, June 6, 2023 9:59 AM
To: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Subject: BHER - BUOW Technical Memorandum

Hello Magdalena,

I apologize for being a bother, but have you had a chance to review the attached burrowing owl information?

Thank you,
Morgan

Morgan King | Jacobs | Biologist | M: +1.916.335.9141

From: King, Morgan
Sent: Friday, June 2, 2023 9:49 AM
To: Xayachack, Lindsey <Lindsey.Xayachack@jacobs.com>; Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Cc: Salamy, Jerry <jerry.salamy@jacobs.com>; Payne, Christy <Christy.Payne@jacobs.com>
Subject: BHER - BUOW Technical Memorandum

Hello Magdalena,

Per your request, here is a short technical memorandum describing the burrowing owl methods and results of the 2022 surveys and the proposed methodology for 2023-2024 breeding season surveys. This memo includes figures of the three sites as well as resumes of the primary biologists who conducted the surveys.

Thank you for your consideration,
Morgan

Morgan King | Jacobs | Biologist | Federal & Environmental Solutions | M: +1.916.335.9141 | morgan.king10@jacobs.com

-----Original Appointment-----
From: Xayachack, Lindsey <Lindsey.Xayachack@jacobs.com>
Sent: Friday, May 26, 2023 10:55 AM
To: Xayachack, Lindsey; Rodriguez, Magdalena@Wildlife; Banks, Rose@Wildlife
Cc: King, Morgan; Salamy, Jerry; Payne, Christy; Santolo, Gary
Subject: BUOW Discussion
When: Thursday, June 1, 2023 9:30 AM-10:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

Hi All,

Updated this time to accommodate schedule conflicts – as mentioned below, an agenda will be provided prior to this meeting.

Best,

Lindsey Xayachack | Jacobs | Scientist
M:+ 530.262.9732| lindsey.xayachack@jacobs.com
2525 Airpark Drive | Redding, CA 96001 | USA

Microsoft Teams meeting

Join on your computer, mobile app or room device
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Video Conference ID: 111 080 524 8
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From: Xayachack, Lindsey
Sent: Friday, May 26, 2023 10:48 AM
To: Rodriguez, Magdalena@Wildlife <Magdalena.Rodriguez@wildlife.ca.gov>; Banks, Rose@Wildlife <Rose.Banks@wildlife.ca.gov>
Cc: King, Morgan <Morgan.King10@jacobs.com>; Salamy, Jerry <jerry.salamy@jacobs.com>; Payne, Christy <Christy.Payne@jacobs.com>; Santolo, Gary <gary.santolo@jacobs.com>
Subject: RE: BUOW Discussion

Hi Magdalena,

Thank you for the prompt response!

We'll send out a MS Teams invite for Thursday, June 1st @ 12:00pm-1:00pm, and will provide an agenda prior to the call.

Appendix C
Biologist Resumes

Jill R. Harris

Biologist/Sr. Environmental Planner

Summary biography

Jill has over 25 years of experience as a wildlife biologist in the field, including species determinations and surveying; research and monitoring of endangered species; preparing Biological Assessments (BAs), Biological Evaluations (BEs), Environmental Impact Statements (EISs), and monitoring reports; conducting special-status species habitat assessments and surveys; conducting wildlife inventories; and consulting with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act (ESA). She is permitted by the Arizona Game & Fish Department (AZGFD) to conduct surveys for state sensitive species. Jill's professional experience includes conducting presence/absence surveys according to species-specific survey protocols for special-status species, including southwestern willow flycatcher, yellow-billed cuckoo, desert tortoise, and northern spotted owl. Additional professional experience in the field includes conducting preconstruction nesting bird surveys for water pipeline developments, avian and mammal surveys for military land assessments, preconstruction burrowing owl surveys for transportation and water pipeline developments, preconstruction large- and small-bird surveys for transportation corridor developments, small plane and ground-based nest surveys for pheasants, surveys for bats using mist nets, and tracking transmittered animals (e.g., pheasants) using radio telemetry equipment. She often coordinates and consults with various local, state, Tribal, and federal agencies, including the U.S. Forest Service (USFS), USFWS, Federal Highway Administration (FHWA), Federal Aviation Administration (FAA), California Department of Fish and Wildlife, Massachusetts Fish and Game, and AZGFD on biological components of projects.

Jill has also been in the planning profession for almost 30 years. Jill is currently serving as a Sr. Environmental Planner and Biologist with Jacobs Engineering Group, Inc., in the Environmental Planning Group. Jill has completed environmental projects throughout Arizona since 1997 and currently serves as Project Manager for transportation-related projects throughout the southwest. She has worked on a variety of projects with National Environmental Policy Act (NEPA) compliance, ranging from Categorical Exclusions to EISs. She has worked with federal agencies including the USFS, USFWS, U.S. National Park Service, FHWA, FAA, U.S. Air Force and Marine Corps, Bureau of Land Management, and Tribal entities. Notably, Jill was involved in collaboration with FHWA and Arizona Department of Transportation to develop a streamlined checklist for their environmental permitting process. Her specialties include project coordination for environmental permitting (NEPA, California Environmental Quality Act [CEQA]), project review, database development, and extensive document production.

Key skills and areas of expertise

- NEPA analysis
- Technical writing and research
- ESA compliance
- BA/BE and analysis

Education and qualifications

- M.S. Environmental Resources, Arizona State University
- M.S. Environmental Planning, Arizona State University
- B.S. Wildlife & Fisheries Biology and Management, University of California, Davis Registrations and certifications

Training

- USFWS Northern Spotted Owl Protocol Survey training, 2023

- FAA Qualified Airport Wildlife Biologist Training, 2020
- USFWS Southwestern Willow Flycatcher Protocol Survey, 2019
- USFWS Yellow-billed Cuckoo Protocol Survey, 2019
- AZGFD, Burrowing Owl Protocol Certification, 2018
- Introduction to Desert Tortoises and Field Techniques, Desert Tortoise Council, 2014

Project experience

On-call Environmental Planning, Phoenix, AZ, 2006-2008, 2010-ongoing

Client: Arizona Department of Transportation

Role on project: Project Manager/Sr. Environmental Planner/Biologist

Responsibilities: Preparing environmental clearances for roadway projects. Task order projects may encompass a variety of actions including pavement preservation, transportation enhancement, bridge scour retrofits, bridge deck repair and replacement, roadway widening, safety improvements, turn lanes, medians, Intelligent Transportation Systems, and more. Projects include preparation of technical documents and preparation of the environmental clearance and supporting documentation. Environmental Project Manager; manage budgets, schedules, technical documents, and interface with client. Biologist for environmental clearance of projects located around the state. Evaluate ESA-listed species, state, federal, and Tribal sensitive species impacts as well as physical impacts. Coordinate with Tribal, federal, state, local officials. Draft BEs, BAs, EISs, and Environmental Assessments to provide clearance.

Maricopa County Department of Transportation Migratory Bird Treaty Act Surveys and Burrowing Owl Surveys and Monitoring, AZ. Maricopa County, AZ

Client: Maricopa County Department of Transportation

Role on project: Biologist

Responsibilities: Biologist for preconstruction Migratory Bird Treaty Act surveys including burrowing owls throughout Maricopa County, AZ as part of an on-call contract. Conducted over 20 surveys for nests, burrows, and owls during the 3 year contract.

Mojave Desert Tortoise Surveys. Twentynine Palms and Needles, CA

Client: BNSF Railroad

Role on project: Biologist

Responsibilities: Biologist for environmental clearance of rail expansion project located near Amboy and Needles, California. Perform protocol surveys of ESA-listed tortoise species to determine presence and manage for species conservation. Drafted biological reports to provide clearance for the project.

Los Angeles Regional Interoperable Communications System Authority Land Mobile Radio and Long-term Evolution Telecommunication Projects, Los Angeles, CA

Client: Federal Emergency Management Agency

Role on project: Biologist

Responsibilities: Biological documentation and field monitoring for telecommunication project with CEQA compliance. Supporting author on the preparation of a biological resources report assessing ESA-listed species, 3 supplemental reports, a USFS BA on 11 ESA-listed species, and a BE assessing an additional 11 USFS sensitive species. Onsite monitoring of ESA-listed species during construction of telecommunication towers and equipment

at Malibu and Catalina Island, California. Species included California condor, Catalina kit fox, special-status plants, and protected amphibians.

Rio Salado Safe Harbor Agreement Surveys. Tempe, AZ.

Client: City of Tempe

Responsibilities: General bird surveys along with marsh-bird and southwestern willow flycatcher protocol surveys in accordance with the Rio Salado Safe Harbor Agreement. Conducted multiple years of surveys including general bird point surveys, marsh-bird, and southwestern willow flycatcher protocol surveys along and within the spill way of Tempe Town Lake.

Verde Connect Protocol Surveys and Acoustic Monitoring. Cottonwood, AZ.

Client: Yavapai County

Responsibilities: This project involved surveying along the Verde River in Cottonwood, Arizona to document yellow-billed cuckoo, southwestern willow flycatcher, and Arizona Toad. Conducted project-specific western yellow-billed cuckoo and southwestern willow flycatcher survey surveys during the 2019 and 2020 breeding seasons to determine presence/absence along the Verde River in Camp Verde. Acoustic monitoring was conducted for Arizona Toad.

Goodyear Water Treatment Facility and Pipelines Migratory Bird Treaty Act Surveys and Burrowing Owl Monitoring, AZ. Goodyear, AZ.

Client: City of Goodyear

Role on project: Biologist

Responsibilities: Biologist for Migratory Bird Treaty Act surveys for water treatment facility in Goodyear, AZ. Performed monthly surveys along 7-mile corridor. Performed monitoring of western burrowing owls during geotechnical and construction activities.

Barry M. Goldwater Range Expansion Land Project Gila Bend, AZ.

Client: U.S. Air Force, Luke Air Force

Responsibilities: Assist U.S. Air Force with preparing environmental documents for including additional lands into the range as part of an expansion project for increased air/land safety. Project included evaluating over 3,000 acres for biological resources. Biologist performing field assessments of project site to evaluate ESA-listed species, state, federal, and Tribal sensitive species impacts as well as physical impacts. Draft biological reports including vegetation, mammal, avian species, sensitive plant and animal species, and reptiles. Technical assistant for biological components of legislative EIS for the project.

Mojave Desert Tortoise Monitoring and Survey, US 93/Garnet Interchange. Las Vegas, NV

Client: Nevada Department of Transportation

Responsibilities: Assist Nevada Department of Transportation with biological monitoring for reconfiguration of Interstate 15 on- and off-ramps, expansion of US 93, and realignment of North Las Vegas Boulevard, for the realignment of FRCL07 (North Las Vegas Boulevard) and additional right-of-way for the I-15/Garnet Interchange and US 93 Improvements (Garnet Interchange) Project. Performed protocol surveys, preconstruction surveys, and tortoise monitoring. Protocol surveys for additional lands adjacent to US 93. Monitoring occurred along both sides of US 93 for 5.5 miles while new right-of-way/tortoise fencing was erected. Conducted worker environmental awareness training for onsite personnel.

Former Naval Auxiliary Air Station, Holtville CEQA Documentation Imperial County, Holtville, CA

Client: U.S. Army Corps of Engineers

Responsibilities: Preparation of an Initial Study and a Mitigated Negative Declaration as required under CEQA for removal of underground fuel storage tanks. Project included preparation of technical documents and preparation of the environmental clearance and supporting documentation. Environmental Planner that prepared and coordinated the evaluation of impacts to biological, cultural, socioeconomic, and other physical resources, schedules, and technical documents.

Utah Replacement Airport Environmental Impact Statement. Saint George, UT

Client: City of Saint George, FAA

Responsibilities: Assisted City of Saint George/FAA with preparation of an EIS to evaluate the impacts of the development of a replacement airport within the development of the region. Coordinated the preparation of an EIS. Managed the evaluation of biological and cultural components as well as visual resource, and socioeconomic impacts for the new airport.

Avian Distribution in Desert Wash Corridors, Environmental Resources, Tempe, AZ

Client: Arizona State University

Responsibilities: Determine the extent and dimension that wildlife (primarily avian species) utilize dry desert wash habitats. Planned and developed research model using knowledge of statistical and physical science concepts. Prepared graphs, charts and statistical models from synthesized inventory data. Performed geographic information system on data using Arcview/Arcinfo and Spatial Analyst systems.

Spotted Owl and Goshawk Monitoring, South Lake Tahoe National Forest.

Client: U.S. Forest Service

Role on project: Team Leader

Responsibilities: Team leader in monitoring of endangered species to determine forest viability and species abundance. Conducted protocol northern spotted owl surveys at South Lake Tahoe, California to determine presence/absence during breeding season (approximately 160 hours). Work conducted as part of the USFS, Lake Tahoe Basin Management Unit monitoring studies.

Published papers

- Frederick Steiner, Laurel McSherry, Jill Cohen (Harris) (2000), Land suitability analysis for the upper Gila River watershed, Landscape and Urban Planning.

Scott Lindemann

Biologist

Personal details

Length of service in the profession: 7 Years

Year joined Jacobs: 2019

Jacobs office location: Oakland, CA

Summary biography

Scott is a well-rounded terrestrial wildlife biologist with a Master of Wildlife Conservation degree and over 7 years of professional biological experience. He has experience leading teams, managing projects, and working independently to survey and collect biological field data across Northern California. Scott has provided biological consulting and permitting support for multiple energy-sector and transportation-sector projects. His professional skillset includes project management, field team leadership, special-status species surveys and handling, field data collection and habitat assessments, permitting, scientific and popular writing, data analysis, geographic information system software, and public speaking.

Key skills and areas of expertise

- **Scientific Collecting Permit:** Authorized Individual under the Jacobs Engineering General Use Scientific Collecting Permit, GW-183240001-18324-002, Scott Lindemann: SC-191020009.
- **Permitting Experience:** Wrote a wide variety of permit applications and status reports for California Department of Fish and Wildlife, U.S. Army Corps of Engineers (USACE), United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service, California Energy Commission (CEC), Regional Water Quality Control Boards, and California Coastal Commission. Led agency field visits for client projects to plan permitting strategy.
- **Scientific Writing Experience:** Prepared 120+ biological reports for client projects across Northern California. Published six scholarly journal articles.
- **Field Experience:** Conducted habitat and vegetation assessments, pre-activity surveys, and 120+ nesting bird surveys in a variety of North American ecosystems, with emphasis on California. Ensured permit compliance on 55+ project sites and monitored construction of a wetland mitigation site. Monitored in sites with high potential for California red-legged frog (CRLF), California tiger salamander (CTS), western pond turtle (WPT), California Ridgway's rail, California black rail (CBR), and salt-marsh harvest mouse.

Education and qualifications

- Certified Wildlife Biologist, 2022, The Wildlife Society
- Master of Wildlife Conservation, 2018, University of Maine, Orono
- Environmental Studies, B.A., 2013, University of Southern California

Training

- Biological Skills:
  - USACE 40-hour Wetland Delineation and Waters of the U.S. Training: Richard Chin Environmental Training (February 2014); Endangered Species Regulation: UC Davis Extension (February 2014); Introduction to Geographic Information Systems: Elkhorn Slough Coastal Training Program and UC Santa Cruz (May 2015), CITI

Program: Working with Amphibians in Research Settings (2017), CITI Program: Working with the Institutional Animal Care and Use Committee, Investigators, Staff and Students (2017).

- Safety-Related:
  - 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste and Emergency Response: Compliance Solutions (May 2020, Recertified Annually); 8-Hour OSHA Supervisor Training (April 2023); Jacobs 8-Hour Safety Liaison Training (April 2023); 10-Hour OSHA Construction Safety Training: ClickSafety (March 2023); Pipeline Construction Safety Training: BuildForce Canada/Northern Regional Construction Association (August 2019); 8-Hour Wilderness First Aid Class: Primary Care Consultants (April 2018); 16-Hour Wilderness First Aid Class: Foster Calm First Aid (February 2014); Bear Awareness Safety Course: Energy Safety Canada (August 2019); Energy Sector Driver Training: Fleet Safety International (July 2019); Workplace Hazardous Materials Information System Training: Danatec Educational Services Ltd. (August 2019).

Wildlife experience by Taxa

Amphibian Experience

California Tiger Salamander (CTS)

- Attended Elkhorn Slough Coastal Training Program California Tiger Salamander Workshop (2015).
- Dipnetted and handled 579 CTS larvae and handled 8 CTS juvenile/adults (2014-2023):
  - In 2023 with Dave Cook at 171 pools across five preserves in Santa Rosa, Sonoma County, over 5 days of aquatic surveying. Additionally, observed a total of 6,147 larvae captured over the 5 days by other group members.
  - In 2020-2021 with Daniel Weinberg and Brian Lee on the Summit Wind Repowering Project in Livermore, Alameda County.
  - In 2016-2017 with Brett Hanshew in Solano County.
  - In 2014 with Joseph DiDonato at Ohlone Preserve Conservation Bank in Sunol, Alameda County.
  - In 2015 at Elkhorn Slough Coastal Training Program California Tiger Salamander Workshop in Monterey County.
- Assisted in drift fence and pitfall trapping for CTS (60 hours, 2016-2017):
  - In 2016-2017 with Brett Hanshew on a drift fence array in Solano County.

California Red-legged Frog (CRLF)

- Attended Alameda County Conservation Partnership and Los Vaqueros Reservoir and Watershed Workshop on the Biology and Management of the California Red-Legged Frog (2014).
- Dipnetted and handled 96 CRLF tadpoles and 4 adults (2014-2021):
  - In 2023 with Will McCall at Point Reyes, Marin County.
  - In 2021 with Daniel Weinberg on the Summit Wind Repowering Project in Livermore, Alameda County.
  - In 2014 at Alameda County Conservation Partnership and Los Vaqueros Reservoir and Watershed Workshop on the Biology and Management of the California Red-Legged Frog.
- Assisted in protocol-level eyeshine surveys for CRLF at three locations, positive detections at two locations (2014-2016). Observed 16 CRLF adults:
  - In 2016 with Jessica Purificato on East Bay Municipal Utility District property in Contra Costa County.
  - In 2015 with Kaia Colestock on a project in Santa Cruz County.
  - In 2014 at Alameda County Conservation Partnership and Los Vaqueros Reservoir and Watershed CRLF Workshop.

- Observed seven additional CRLF adults and metamorphs froglets in situ:
  - In 2023 with Will McCall at Point Reyes, Marin County, three adults.
  - In 2022 on the Summit Wind Repowering Project in Livermore, Alameda County, with Sean O'Neil, two metamorphs.
  - In 2022 with Daniel Weinberg at Point Reyes, Marin County, one adult.
  - In 2017 in Henry W. Coe State Park, Santa Clara County, one adult.
  - In 2016 at Devil's Slide in coastal San Mateo County with Patrick Koberius, two adults.

Foothill Yellow-legged Frog (FYLF)

- Assisted in protocol-level stream surveys for FYLF, observed four subadults, one egg mass, and 200+ tadpoles (2020-2021):
  - In 2021 with Eric Britt at Capell Creek in Napa County.
  - In 2019 with Jason Minton at Capell Creek in Napa County.
- Observed FYLF in situ in Cache Creek Wilderness, Lake County (2019).

Santa Cruz Long-toed Salamander (SCLTS)

- Participated in pitfall trapping and relocation of SCLTS. Handled two SCLTS juveniles and one SCLTS adult (2020). Approved to handle SCLTS by USFWS under a regional Habitat Conservation Plan on May 21, 2021:
  - With Mark Allaback, Chad Steiner, and Dave Laabs in Santa Cruz County.

Other Amphibian Experience

- During herpetology-focused master's degree with Maine Department of Inland Fisheries and Wildlife, handled over 200 amphibian individuals from 13 amphibian species, performed or directly supervised over 600 hours of herpetofauna survey and handling (2018).
- Published two scholarly journal articles on the geographic range of frogs in Herpetological Review and published two articles in Canadian Field Naturalist on frog mutations (2019-2020).
- Over 7 years of professional experience surveying and construction monitoring in areas with high potential for CRLF, CTS, and other amphibian species (2014-2017, 2019-2022).
- Additional special-status amphibian in situ observations: observed one adult California giant salamander (CGS) in Occidental, Sonoma County (2021), 10 larval CGS in Sonoma County (2022), one larval CGS in Napa County (2021) and one larval CGS in Marin County (2019); observed 15 Cascades frog in Trinity Alps Wilderness, Trinity County (2019).

Reptile Experience

Western Pond Turtle (WPT)

- Handled two WPT adults (2019-2023):
  - In 2019, with Steve Foreman at McCune Creek in Solano County.
  - In 2023 with Dave Cook and John Cleckler at Horn 4 Preserve in Santa Rosa, Sonoma County.
- Additional WPT in situ observations: 40+ adults and 1 juvenile in Yuki Wilderness, Mendocino County (2021), 6 adults at McCune Creek in Solano County (2021), 1 adult at Putah Creek in Solano County (2021), 1 road killed adult in Sutter County (2023).

Giant Garter Snake

- Detected and photographed three giant garter snake individuals over three site visits:
  - In 2022 with Sean O'Neil in Colusa County.

Other Reptile Experience

- During herpetology-focused master's degree with Maine Department of Inland Fisheries and Wildlife, handled over 75 reptile individuals from five reptile species, performed or directly supervised over 600 hours of herpetofauna survey and handling (2018).
- Experience handling venomous rattlesnakes with snake tongs.
- Published two scholarly journal articles on the geographic range of turtles in Herpetological Review (2019).
- Over 7 years of professional experience surveying and construction monitoring in areas with high potential for WPT and other reptile species (2014-2017, 2019-2022).

Bird Experience

Swainson's Hawk (SWHA)

- Led 30 protocol-level surveys with positive nesting detections for SWHA across five projects in Solano and Napa Counties (2020-2023).
- Assisted in three protocol-level surveys with positive nesting detections for SWHA across at one project in Napa County (2020).

Burrowing Owl (BUOW)

- Detected 16 BUOW adults and juveniles and examined BUOW burrows and sign at two projects (2017-2021):
  - In 2020-2021 with Brian Lee on the Summit Wind Repowering Project in Livermore, Alameda County.
  - In 2015 at Cesar Chavez Park, Alameda County.
  - Led or assisted in protocol-level BUOW surveys at three projects, with one positive detection.
  - In 2022 led surveys at a site on Patterson Pass Road in southern Contra Costa County.
  - In 2019 and 2022 led surveys at a site in northern San Jose, Santa Clara County.
  - In 2017, assisted in protocol-level surveys with a positive detection in Solano County with Brett Hanshew.

Ridgway's Rail and California Black Rail (CBR)

- Detected and recorded several hours of Ridgway's rail calls:
  - In 2022 with Phillip Peters at Arrowhead Marsh in Alameda County.
  - In 2022 with Phillip Peters at Bahia Marsh in Marin County.
- Attended a training presentation by Jacobs rail expert Scott Demers on rail calls, biology, and identification on January 12, 2021.
- Conducted construction monitoring for Ridgway's rail and CBR for activities in or near tidal marsh around the San Francisco Bay (50 total field days in 2016-2022).

Northern Spotted Owl

- Assisted in one protocol-level callback survey in Potter Valley, Mendocino County, with Ryan Byrnes (2023).
- Performed two northern spotted owl habitat assessments in Sonoma and Napa Counties with Eric Lichtwardt (2021 and 2022).

Tricolored Blackbird

- Detected 300+ tricolored blackbird and recorded vocalizations:
  - In April 2022 with Leeann McDougal in Yuba County.

Other Bird Experience

- Over 7 years of professional experience surveying for birds (2014-2017, 2019-2022).
- Completed 120+ prework nesting bird surveys (2014-2017, 2019-2021).

- Assisted graduate student colleagues in mist netting, banding, and fitting radio transmitter backpacks to live birds (2018).
- Conducted construction monitoring for Western snowy plover for activities in or near salt evaporation ponds (30 total field days in 2020).
- Additional special-status bird in situ observations: American peregrine falcon, prairie falcon, northern harrier, white-tailed kite, northern goshawk, golden eagle, bald eagle, American white pelican, California brown pelican, common loon, black swift, olive-sided flycatcher, loggerhead shrike, Alameda song sparrow, San Pablo song sparrow, Suisun song sparrow, salt-marsh common yellowthroat, and yellow-headed blackbird.

Mammal Experience

Salt-marsh Harvest Mouse

- Conducted construction monitoring for salt-marsh harvest mouse for activities in or near pickleweed tidal marsh around the San Francisco Bay. Identified a western harvest mouse in hand over 50 total field days (2016-2022).

San Francisco Dusky-footed Woodrat (SFDFW)

- Conducted construction monitoring for San Francisco dusky-footed woodrat. Observed one San Francisco Dusky-footed woodrat in situ and dismantled woodrat nests approved under permits in oak woodland on the San Francisco Peninsula over 15 total field days (2016-2017).

Bat Species

- Identified, handled, and as necessary relocated two living and over 50 dead Yuma myotis bats during bat mortality carcass collection and identification at a power generating facility in Northern California, in coordination with the California Department of Fish and Wildlife. Fourteen total field days with Rick Crowe and Sean O'Neil (2021-2022).
- Observed 80+ Brazilian free-tailed bats and 20+ Yuma myotis bats at two bridge projects in Solano County (2019-2021).
  - In 2019, with Steve Foreman at McCune Creek in Solano County.
  - In 2021, with Dave Johnson at Suisun Creek in Solano County.
  - In 2021, with Ryan Byrnes at McCune Creek in Solano County.
- Conducted 11 reconnaissance-level bat habitat surveys, proficient at identifying bat roosting habitat and sign, experience with emergence surveys and acoustic detection software (2019-2022).

Other Mammal Experience

- American Badger: Observed one American badger in situ in Fremont County, Colorado with Morgan King (2022). Observed one den at Alton Preserve in Sonoma County with Sheila Murphy (2023). Observed badger sign at Jenner Headlands Park in Sonoma County (2022), and in Alameda County with Brian Lee (2021).
- San Joaquin Kit Fox: Conducted one reconnaissance-level survey for San Joaquin kit fox with Brian Lee (2020).
- Over 7 years of professional experience surveying for and handling mammals, including live mammal relocation (2014-2017, 2019-2022).

Fish Experience

- Special-status fish species in situ observations: Observed five migrating steelhead adults and handled 20 steelhead smolts while fishing at Russian River, Sonoma County (2021), observed 20 adult steelhead spawning at Barnabe Creek in Samuel P. Taylor State Park in Marin County (2019), observed migrating Chinook salmon in Solano County with Stephanie Owens (2022).

Invertebrate Experience

- Observed elderberry bushes with bore holes potentially created by Valley elderberry longhorn beetle along the Sacramento River near Hamilton City, Glenn County in November 2022 with Steve Long.
- Observed 100+ vernal pool branchiopods of the Branchinecta genus in rock pools during the 2021/2022 and 2022/2023 winter seasons on the Summit Wind Repowering Project in Livermore, Alameda County.

Terrestrial Wildlife Salvage Experience

- Identified, handled, and as necessary relocated over 30 living and dead bats during bat mortality carcass collection and identification at a power generating facility in Northern California, in coordination with the California Department of Fish and Wildlife (2021-2022).
- Collected and euthanized two gray treefrog specimens from the field using American Veterinary Medical Association approved handling techniques (2018). Preserved specimens using injected formaldehyde and stored in ethanol.
- Live-relocated 60+ animals in the field according to relevant permit protocols (2014-2017, 2019-2020).
- Over 7 years professional experience in terrestrial wildlife salvage (2014-2017, 2019-2022).

Memberships and affiliations

- The Wildlife Society, Since 2014

Project experience

Linear Project Environmental Support, California, June 2014 – February 2017; March 2019-Present

Client: Confidential Client

Role on project: Biologist

Responsibilities: Environmental compliance lead biologist for two projects. Ensured permit compliance during construction monitoring in a variety of sensitive habitat types. Coordinated activities of biologists in the field. Conducted construction monitoring for Ridgway's rail, CBR, and salt-marsh harvest mouse, for activities in or near tidal marsh around the San Francisco Bay. Key roles include conducting biological surveys, performing permit compliance during construction, writing and reviewing biological reports, scheduling staffing, budgeting, proposal writing, and staff training.

Wind Turbine Environmental Support, Northern California, December 2019-Present

Client: Confidential Clients

Role on project: Biologist

Responsibilities: Acted as lead field biologist for biological construction monitoring. Supported permitting including field surveys, technical report writing, and permit application writing. Performed aquatic dipnet/seine surveys for CTS and CRLF to support the establishment of a conservation easement. Relocated CTS away from the work area during construction monitoring activities an agency-approved biological monitor. Performed Stormwater Pollution Prevention Plan inspections.

Roadway Maintenance Environmental Support, Northern California, March 2019-Present

Client: Transportation-Sector Client

Role on project: Biologist

Responsibilities: Met regularly with the client to provide project status updates and discuss permitting strategy. Prepared deliverables including permit applications, scientific literature reviews, and biological resource reports. Provided budget and schedule analysis for multiple projects. Coordinated the activities, deliverables, and budgets of subconsultants. Conducted project site visits and habitat assessments, authored biological reports, and assisted

in aquatic resource delineations (i.e., wetland delineations). Led 18 protocol-level surveys for SWHA. Ensured permit compliance during construction monitoring in a variety of sensitive habitat types. Monitored for CRLF, CTS, and WPT.

Culvert Replacement Project Environmental Support, Santa Clara County, California, November 2019-March 2020, July 2022-Present

Client: Confidential Client

Role on project: Biologist

Responsibilities: Project manager and lead biologist for two projects. Prepared proposal and secured contract. Conducted aquatic resource delineation, wrote delineation report, completed land-cover mapping, and prepared mitigation opportunities technical report.

Power Plant Support, September 2019-Present

Client: Confidential Client

Role on project: Biologist

Responsibilities: CEC-approved Designated Biologist at three energy centers, Alternate Designated Biologist at the one energy center, and Biological Monitor at one energy center. Performed environmental support including venomous snake capture and relocation, nesting bird surveys, bird nest monitoring, providing Worker Environmental Awareness Training to crew, and other as-needed activities.

Data Center Construction Environmental Support, San Jose, California, June 2019-July 2022

Client: Confidential Client

Role on project: Biologist

Responsibilities: Conducted habitat assessments and wrote biological resources section of a Small Power Plant Exemption permit application document. Supported permitting through the Santa Clara Valley Habitat Plan. Led protocol-level BUOW surveys.

Operations and Maintenance Environmental Support, Aptos, CA, March-August 2020

Client: Confidential Client

Role on project: Biologist

Responsibilities: Assisted in pitfall trapping research for SCLTS. Became proficient in SCLTS identification and understanding of SCLTS ecology. Ensured permit compliance through construction monitoring in areas with high potential for SCLTS.

Published papers

- Lindemann, S., D. Putnam, M. Hunter, Jr, and T. Persons. 2020. Spotted burnsi pattern in Northern Leopard Frog (*Lithobates pipiens*) in Maine. Canadian Field Naturalist 133(3):193-195.
- Lindemann, S., A. O'Brien, T. Persons, and P. DeMaynadier. 2020. Axanthism in Green Frog (*Lithobates clamitans*) and American Bullfrog (*Lithobates catesbeianus*) in Maine. Canadian Field Naturalist 133(3):196-198.
- Lindemann, S., and A. O'Brien. 2019. Geographic distribution: USA, Maine: *Hyla versicolor* (Gray Treefrog). Herpetological Review 50:97.
- Lindemann, S., A. O'Brien, and D. Putnam. 2019. Geographic distribution: USA, Maine: *Lithobates pipiens* (Northern Leopard Frog). Herpetological Review 50:97.
- Lindemann, S., A. O'Brien, and D. Putnam. 2019. Geographic distribution: USA, Maine: *Chelydra serpentina* (Snapping Turtle). Herpetological Review 50:99.

- Lindemann, S., and A. O'Brien. 2019. Geographic distribution: USA, Maine: *Sternotherus odoratus* (Eastern Musk Turtle). Herpetological Review 50:101.

Leeann McDougall

Biologist/Bay Area/Central Coast Region-Land Lead

Personal details

Length of service in the profession: 8 years

Year joined Jacobs: 2019

Jacobs office location: Oakland, CA

Summary biography

Leeann is a Biologist providing biological and environmental planning services to major utility companies throughout California. Leeann supports multiple projects across various workstreams within PG&E's Central Valley, Bay Area, Northern, and Central Coast service areas along with various projects for UPRR throughout Northern California and multiple construction projects for Caltrans District 4. Her expertise includes endangered species surveys, nesting bird surveys, bat surveys, biological assessments (BAs), biological monitoring, linear project planning, project coordination, and environmental permitting. Leeann is a dynamic teammate, able to handle fast-paced environments and adapt to changes in project priorities while remaining focused on meeting project deadlines and deliverables. Her roles and responsibilities range from project coordination, technical writing, site visits, biological surveys, biological monitoring, facilitating project deliverables, and ensuring projects are in environmental compliance.

Key skills and areas of expertise

Mammal Experience:

- Conducted 20+ bat habitat assessments throughout California (2017-present)
- Conducted 20+ bat emergence surveys throughout California (2017- present)
- Conducted construction monitoring for salt-marsh harvest mouse for activities in or near pickleweed tidal marsh around the San Francisco Bay (2020)
- Small mammal trapping in northern and Southern California (2014, 2015, 2018)

Bird Experience:

- Conducted protocol-level surveys for western snowy plover (2016, 2018-2019, 2022) (100+ hours)
  - Biological lead for construction monitoring for western snowy plover (2022)
- Protocol-level surveys for Swainson's hawk (2020)
- Conducted tri-colored black bird surveys for Beale Airforce Base (2022)
- Assisted in protocol-level surveys for burrowing owl on several projects throughout California (2017- 2018, 2022-2023) (50+ hours)
- Conducted construction monitoring for Ridgway's rail, California black rail, and other marshland bird species for activities in or near tidal marsh around the San Francisco Bay (2020-2021)
- 8+ years professional experience surveying for birds (2015-present)

Education and qualifications

- BS, Biological Science (Conservation and Organismal Biology), San Jose State University, California.
- Minor, Spanish, San Jose State University, California.

Registrations and certifications

- California Department of Fish and Wildlife (CDFW) Scientific Collecting Permit SCP-13625

Project experience

PG&E Gas Transmission and Electrical Program, April 2019- current

Client: Pacific Gas and Electric Company

Role on project: Biologist

Responsibilities: Provide biological support for gas line and electrical distribution testing, replacements and in-line inspection projects within California. Tasks include biological surveys, environmental tailboards, and biological monitoring to ensure project environmental compliance for I-519, S-888, Moraga-Oakland X, and Ignacio-Mare Island 115-kilovolt (kV) Towers 93, 94, and 105 Emergency Tower Replacement. Major Project highlights include Worker Environmental Awareness Training trainings, nesting bird surveys and monitoring for Ridgway's rail and salt-marsh harvest mouse for Ravenswood-San Mateo 230 kV Tower 001/007 Emergency Tower Replacement.

On-call Environmental Services, Northern California, April 2021- current

Client: California Department of Transportation, District 4

Role on project: Biologist

Responsibilities: Provide biological construction monitoring services, including supporting environmental compliance for roadway project planning, operations, maintenance, and management. Currently manages multiple Caltrans North Bay (District 4) projects where she coordinates with subconsultants, ensures compliance with environmental permits, and provides daily and annual reporting. Regularly meets and coordinates with the client to provide project status updates and provide deliverables. Major Project highlights include Suisun Creek Bridge Replacement, Highway 101 Repave and Culvert Replacement, Huichica Creek Replacement and Sonoma Highway 12 Repave.

Union Pacific Railroad Bridge Replacements, April 2019- current

Client: Union Pacific Railroad

Role on project: Biologist

Responsibilities: Provide biological support for track maintenance and replacements to enhance the safety of the clients' rail system within California. Tasks include biological surveys including preconstruction nesting bird surveys, nest monitoring, and biological monitoring to ensure project environmental compliance. Major Project highlights include Fresno MP 57.27, Fresno MP 57.69 and 57.9, Fresno MP 55.71, and Martinez 46.87 and 47.37.

Previous employer experience

Employer: LSA Associates, Irvine, California

Title: Biologist

Start/End Dates: July 2016–March 2019

Scope/Description: Conduct biological surveys and monitoring for a variety of construction and restoration projects throughout Southern California. Surveys include: vegetation mapping, preconstruction nesting bird, small mammal, bat emergence, bat habitat, herpetological, general wildlife, and special-status species such as western snowy plover, burrowing owl, California gnatcatcher, Arroyo toad, and desert tortoise. Performs technical studies and produce technical reports for Caltrans and California Environmental Quality Act documents, including BA, Natural Environment Study and Natural Environment Study (Minimal Impacts), and biological sections within Environmental Impact Reports/Environmental Assessments. Environmental permit applications preparation and

submittal for United States Army Corps of Engineers (USACE) Clean Water Act (CWA) Section 404 authorizations, Regional Water Quality Control Board (RWQCB) CWA Section 401 Water Quality Certifications, and CDFW Section 1601 authorizations. Projects included Emergency USACE and CDFW permits for Prima Deshecha Landfill to repair a ravine and alleviate erosion to an access road that contained a Landfill gas collection line; and USACE, RWQCB, and CDFW permits for Rivers, Trails, and. Conservation Assistance Temescal Canyon Bridge Replacement and Road Realignment. Oversee agency permit compliance including: Worker Environmental Awareness Plan training, construction monitoring, vegetation removal, and successful compliance documentation such as as-built reports, annual reports, mitigation reports, and tree inventory reports.

Employer: Institute for Conservation Research San Diego Zoo Global, Camp Pendleton, California

Title: Research Associate

Start/End Dates: April 2016–July 2016

Scope/Description: Monitored behavior and nesting success of Western Snowy Plovers and California Least Terns on the Marine Corps Base in Camp Pendleton California. Identify nests and individuals of the target species. Acquire biometrics by measuring the wing cord length and weight of the chicks found in our study area and applied United States Geological Survey bands on the upper or lower leg. Assessed the impacts of the presence of predators and human disturbance on the behavior and survival of the target species. Incorporated community and education outreach projects to encourage participation of the public in the conservation of the species.

Employer: Wildlife Field Technician, U.S. Fish and Wildlife Service, St. Lazaria, Alaska

Title: Planner

Start/End Dates: May 2015–September 2015

Scope/Description: Monitored, recorded and analyzed data on Fork-tailed and Leach's Storm-Petrels Rhinoceros Auklets, Pelagic Cormorants, Glaucous Winged Gulls, Tufted Puffins and Common and Thick-billed Murres. Conducted species counts, monitored plots and transects to collect data on breeding chronology, reproductive performance, chick growth, population density and food habits. Collection of diet samples and data such as weight, wing cord length and diagonal tarsus measurements.

Volunteer experience

Christmas Bird Count Volunteer, Sea and Sage Audubon Conservation, Orange County, California, 2018

Conducted bird surveys along the Santa Ana River and surrounding marsh areas. Helping provide information on wintering bird species in Orange County.

Snowy Plover Volunteer, Sea and Sage Audubon Conservation, Orange County, California, 5/2016-5/2017

Conducted protocol beach surveys to help gather spatial and temporal data on western snowy plovers on Orange County beaches; helping provide information on how wintering and breeding plovers use the local beaches.

Volunteer Adult California Least Tern Banding, Marine Corps Base Camp, Pendleton, California, 5/2016-7/2016

Assisted in trapping and banding of adult California least terns. Monitoring nests to identify band status.

Samantha Vaughan

Biologist

Personal details

Length of service in the profession: 8 years

Summary biography

Samantha has 8 years of experience as a wildlife biologist. Her biological experience includes research and monitoring of endangered species in the field, preparing Biological Assessments (BAs) and Biological Evaluations and conducting special status species habitat assessments and surveys, and conducting wildlife inventories. She is permitted by U.S. Fish and Wildlife Service (USFWS) to survey for a variety of Endangered Species Act (ESA)-protected species (southwestern willow flycatcher, Yuma Ridgway's rail, yellow-billed cuckoo, Mojave desert tortoise), and is permitted by multiple states to conduct surveys for various sensitive species (including bats and burrowing owls). Samantha's professional experience includes conducting preconstruction surveys for various types of projects according to species-specific survey protocols. Additional professional experience includes conducting preconstruction nesting bird surveys for solar developments; site surveys for state and city agencies; and assisting with bat surveys, pronghorn surveys, small mammal trapping, and annual bird surveys. She often coordinates and consults with various local, state, Tribal, and federal agencies.

Key skills and areas of expertise

- Endangered species surveys
- ESA compliance
- Bird surveys and exclusion
- Construction monitoring
- Technical writing and research

Education and qualifications

- B.A. Environmental Studies. Prescott College, 2014

Project experience

Mesquite Solar Energy Project. Maricopa County, AZ

Client: Sempra Generation

Responsibilities: Samantha conducted Sonoran desert tortoise and burrowing owl surveys within a 4,000 acre area prior to construction. Samantha spent 6 weeks and approximately 260 hours conducting surveys for tortoises and potential burrows. Tortoises were not found, but approximately 330 burrows were found and assessed throughout the project area. Multiple burrowing owls were found in the area and relocated.

UPRR Pirate, Queen Creek, AZ

Client: UPRR

Responsibilities: Assisted archeologist in a general survey of the proposed action area for a rail extension project. This transect survey was conducted at 5-to-20-meter intervals. Data collection included using ESRI Field Maps to take notes, locate points, and make polygons. Satellite images and paper data sheets were also kept. Samantha also assisted in collecting burrowing owl location, organizing biological data, and writing the biological report.

CHMRP Pit Lake Remediation Project Migratory Bird Nest Survey. Barrick. Cerrillos, NM.

Responsibilities: This project involved preconstruction Migratory Bird Treaty Act (MBTA) bird nest survey for a new water treatment operation in Cerrillos, NM. Meandering line transects, with a thorough inspection of all trees, shrubs, and bunch grass for any active nest, were conducted within the project limits. Samantha also wrote the technical memorandum for this project.

Rio Salado Safe Harbor Agreement Surveys. Tempe, AZ.

Client: City of Tempe

Responsibilities: General bird surveys along with marsh-bird and southwestern willow flycatcher protocol surveys in accordance with the Rio Salado Safe Harbor Agreement. Samantha conducted multiple years of surveys within the footprint of the Rio Salado Safe Harbor Agreement. She conducted general bird point surveys, marsh-bird, and southwestern willow flycatcher protocol surveys along and within the spill way of Tempe Town Lake. Samantha also assisted in writing the technical survey reports for each year they were conducted.

Shoalwater Dune Restoration. Tokeland, WA.

Responsibilities: Samantha monitored the reconstruction of a dune along the Washington coast. Two species covered by the ESA, the snowy plover and the streaked horned lark, were nesting in the project area. Bird surveys, data collection using ESRI FieldMaps, and species identification were conducted daily. This project involved correspondence with the prime, construction crews, U.S. Army Corps of Engineers, and Tribal employees. Due to the project area occurring along a public beach, Samantha also had to interact with the public on a regular basis.

Verde Connect Protocol Surveys and Acoustic Monitoring. Cottonwood, AZ.

Client: Yavapai County

Responsibilities: This project involved surveying along the Verde River in Cottonwood, Arizona to document yellow-billed cuckoo, southwestern willow flycatcher, and Arizona Toad. Protocol surveys were carried out for the bird species by playing call back and marking the response location with a global positioning system (GPS) unit. Acoustic monitoring was conducted for Arizona Toad. Samantha conducted the data analysis for the recorded calls with the Kaleidoscope program. Samantha assisted with writing the survey reports for all three surveys.

US 60 Superior to Miami Biological Monitoring. Pinal County, AZ.

Client: Arizona Department of Transportation

Responsibilities: Samantha conducted preconstruction surveys and monitoring for Arizona hedgehog cactus along a busy highway during an approximately 6-month road widening project. She assisted with the identification and relocation of plants present in the project area and provided worker awareness trainings for all new workers covering all sensitive species found in the project area. She also conducted preconstruction bat survey to determine if a maternity colony was present in a bridge and conducted bird nest searches in compliance with the MBTA.

LA-RICs Biological Monitoring. Los Angeles County, CA

Client: LA-RICS Authority

Responsibilities: Samantha spent 6 months monitoring radio tower construction on Santa Catalina Island. She coordinated with multiple landowners, including the Catalina Island Conservancy, USFWS, and Tribal representatives. Samantha was often the site logistics coordinator, making sure vehicles were maintained, delegated work locations, provided transport to the campsite and work areas, and communicated with supervisors about project developments. She also monitored construction sites for nesting birds, Island Fox activity, cleanliness, and safety issues.

BNSF Bridge Construction, 669.5 Needles, Tortoise Survey Monitoring. San Bernardino County, CA.

Client: BNSF Railway

Responsibilities: Samantha spent 6 weeks and approximately 180 hours monitoring the construction site for Mojave desert tortoise. She was constantly checking construction equipment, materials, roads, and vehicles for nearby individuals. She also made sure that the workers kept within their footprint and the area clear of trash.

McCracken Mine Survey. Mohave County, Arizona.

Client: Environmental Resources Management

Responsibilities: Samantha conducted a Sonoran desert tortoise survey and a native plant inventory for a mine closure and rehabilitation project. She searched burrows and caliche caves for sign of tortoise within the 1.5-mile project area. While no tortoises were found, scat and a hand full of probably burrows were located. Other species such as MBTA species were also recorded. The native plant inventory was conducted using Trimble GPS units for submeter accuracy.

China Lake Naval Base Emergency Repair Tortoise Monitoring. Ridgecrest, CA.

Client: United States Department of Defense

Responsibilities: This was a desert tortoise monitoring project for geotechnical exploration associated with the 2019 earthquake damage. Samantha assisted with the Mojave desert tortoise monitoring at multiple site within the base. Preconstruction surveys were also conducted at the sites prior to any geotechnical disturbance. Tortoise and burrows were discovered during these surveys.

Red Rock NCA Trail and Intersections Project Tortoise Survey. Las Vegas, NV.

Client: Clark County

Responsibilities: Samantha conducted Mojave desert tortoise surveys within the Red Rock Canyon. Samantha spent 2 days and approximately 16 hours conducting surveys according to the 2009 Desert Tortoise (Mojave Population) Field Manual. Approximately four tortoises and four burrows were detected.

Red Cliffs Desert Reserve Tortoise Surveys. St. George, UT.

Client: Utah Department of Transportation

Responsibilities: Samantha conducted Mojave desert tortoise surveys within the Red Cliffs Desert Reserve. She spent 4 weeks and approximately 160 hours conducting surveys according to the 2009 Desert Tortoise (Mojave Population) Field Manual modified according to the USFWS's request for 100 percent coverage in the entire survey area, including the 500-foot buffer for four alignments. GPS units, tablets, and the ESRI Collector software was used to collect data in the field. In total, 15 tortoises and 138 burrows were detected.

Appendix D
Occupied Burrowing Owl Burrow Tables

Table D-1. Occupied Burrow Location Details

BUOW ID	BRGP BSA	BRGP 656-foot (200-meter) buffer	ENGP BSA	ENGP 656-foot (200-meter) buffer	MBGP BSA	MBGP 656-foot (200-meter) buffer
BUOW_01		X				
BUOW_02		X				
BUOW_03		X				
BUOW_04	X					
BUOW_05	X					
BUOW_06	X					
BUOW_07		X				
BUOW_08		X				
BUOW_09		X				
BUOW_10		X				
BUOW_11		X		X		X
BUOW_12		X		X		X
BUOW_13	X			X		X
BUOW_14	X			X		X
BUOW_15	X			X		X
BUOW_16	X			X		X
BUOW_17	X			X		X
BUOW_18		X		X		X
BUOW_19	X		X		X	
BUOW_20	X			X		X
BUOW_21	X		X		X	
BUOW_22		X		X		X
BUOW_23			X			
BUOW_24			X			
BUOW_25				X		
BUOW_26			X			
BUOW_27			X			
BUOW_28				X		
BUOW_29				X		
BUOW_30				X		

BUOW ID	BRGP BSA	BRGP 656-foot (200-meter) buffer	ENGP BSA	ENGP 656-foot (200-meter) buffer	MBGP BSA	MBGP 656-foot (200-meter) buffer
BUOW_31				X		
BUOW_32				X		
BUOW_33				X		
BUOW_34		X	X			
BUOW_35		X		X		
BUOW_36		X	X			
BUOW_37		X		X		X
BUOW_38		X		X		X
BUOW_39				X		
BUOW_40		X		X		X
BUOW_41		X		X		X
BUOW_42		X		X		X
BUOW_43		X		X		X
BUOW_44		X		X		X
BUOW_45					X	
BUOW_46						X
BUOW_47						X
BUOW_48	X					
BUOW_49		X		X		X
BUOW_50		X		X		X
BUOW_51		X		X		X
BUOW_52	X			X		X
BUOW_53		X		X		X
BUOW_54				X		
BUOW_55				X		
BUOW_56			X			
BUOW_57				X		
BUOW_58			X			
BUOW_59			X			
BUOW_60		X	X			
BUOW_61		X	X			

BUOW ID	BRGP BSA	BRGP 656-foot (200-meter) buffer	ENGP BSA	ENGP 656-foot (200-meter) buffer	MBGP BSA	MBGP 656-foot (200-meter) buffer
BUOW_62		X		X		X
BUOW_63		X		X		X
BUOW_64				X		
Total Burrows	**13**	**29**	**13**	**37**	**3**	**26**

BRGP = Black Rock Geothermal Plant

BSA = Biological Study Area

BUOW = burrowing owl

ENGP = Elmore North Geothermal Plant

MBGP = Morton Bay Geothermal Plant

Table D-2. Details of Occupied Burrow Observations

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_01	6/5/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 628422 3667858
BUOW_01	7/12/2023	1	0	N/A	N/A	N/A	N/A	N/A	11S 628422 3667858
BUOW_01	8/15/2023	0	1	Adult	N/A	N/A	Resting	N/A	11S 628422 3667858
BUOW_02	6/5/2023	1	1	Adult	N/A	N/A	Flight, resting	Whitewash	11S 628431 3667951
BUOW_02	7/12/2023	2	0	N/A	N/A	N/A	N/A	Whitewash	11S 628431 3667951
BUOW_02	8/15/2023	1	1	Adult	N/A	N/A	N/A	N/A	11S 628431 3667951
BUOW_03	6/5/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 628426 3668020
BUOW_03	7/12/2023	1	0	N/A	N/A	N/A	N/A	Whitewash	11S 628426 3668020
BUOW_03	8/15/2023	0	2	Adult, juvenile	N/A	N/A	Resting	N/A	11S 628426 3668020
BUOW_04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_04	7/12/2023	2	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash, feathers	11S 628430 3668067
BUOW_04	8/15/2023	0	1	Adult	N/A	N/A	Resting	N/A	11S 628430 3668067
BUOW_05	6/5/2023	1	1	Adult	N/A	N/A	Resting	Whitewash	11S 628429 3668100
BUOW_05	7/12/2023	1	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash, feathers	11S 628429 3668100
BUOW_05	8/15/2023	1	2	Adult, juvenile	N/A	N/A	Alarm	Whitewash, feathers	11S 628429 3668100
BUOW_06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_06	7/12/2023	1	2	Adult	N/A	N/A	Alarm	Whitewash	11S 628688 3668089
BUOW_06	8/15/2023	1	1	Adult	N/A	N/A	Foraging	N/A	11S 628688 3668089
BUOW_07	6/5/2023	1	2	Adult	N/A	N/A	Resting	Whitewash, feathers	11S 629009 3668090

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_07	8/15/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 629009 3668090
BUOW_08	6/5/2023	1	6	Adult, juvenile	N/A	N/A	Resting	N/A	11S 628704 3668552
BUOW_08	7/12/2023	1	3	Adult, juvenile	Y	N/A	Resting	N/A	11S 628704 3668552
BUOW_08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_09	6/5/2023	1	1	N/A	N/A	N/A	Flying	N/A	11S 628476 3668813
BUOW_09	7/12/2023	N/A	0	N/A	N/A	N/A	N/A	N/A	11S 628476 3668813
BUOW_09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_10	6/5/2023	8	4	Adult	N/A	N/A	Resting	N/A	11S 628502 3668887
BUOW_10	7/12/2023	8	9	Adult, juvenile	Y	N/A	Resting	Pellets, whitewash	11S 628502 3668887
BUOW_10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_11	6/5/2023	11	12	Adult, juvenile	N/A	N/A	Resting	N/A	11S 628498 3669273
BUOW_11	7/12/2023	4	4	Adult	Y	N/A	Resting	Whitewash, feathers	11S 628498 3669273
BUOW_11	8/15/2023	4	2	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 628498 3669273
BUOW_12	6/5/2023	1	6	Adult, juvenile	N/A	N/A	Resting	Whitewash, feathers	11S 628553 3669501
BUOW_12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_12	8/15/2023	1	1	Unknown					
BUOW_13	6/5/2023	1	2	Adult	N/A	N/A	Resting	Whitewash, feathers, decoration	11S 628403 3669748
BUOW_13	7/12/2023	1	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 628403 3669748
BUOW_13	8/15/2023	1	2	Adult, juvenile	N/A	N/A	Resting	N/A	11S 628403 3669748

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_14	6/8/2023	2	7	Adult, juvenile	N/A	N/A	Resting	Whitewash, feathers	11S 628469 3670495
BUOW_14	7/12/2023	2	1	Adult	Y	N/A	Resting	N/A	11S 628469 3670495
BUOW_14	8/15/2023	2	0	N/A	N/A	N/A	N/A	Eggshells	11S 628469 3670495
BUOW_15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_15	7/12/2023	2	2	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 628610 3670502
BUOW_15	8/15/2023	2	3	Adult, juvenile	N/A	N/A	Resting	N/A	11S 628610 3670502
BUOW_16	6/8/2023	2	1	Adult	Y	N/A	Resting	Pellets, whitewash, feathers	11S 628747 3670501
BUOW_16	7/12/2023	2	1	Adult	N/A	N/A	Alarm	Pellets, whitewash, feathers	11S 628747 3670501
BUOW_16	8/15/2023	2	2	Adult, juvenile	Unknown	N/A	Resting	Whitewash, feathers	11S 628747 3670501
BUOW_17	6/8/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 628776 3670501
BUOW_17	7/12/2023	1	3	Adult, juvenile	Y	N/A	Resting	Pellets, whitewash	11S 628776 3670501
BUOW_17	8/15/2023	1	7	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 628776 3670501
BUOW_18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_18	7/12/2023	1	4	Adult, juvenile	Y	N/A	N/A	Pellets, whitewash	11S 628576 3670917
BUOW_18	8/15/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 628576 3670917
BUOW_19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_19	7/12/2023	2	1	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 629066 3670642
BUOW_19	8/15/2023	2	1	Juvenile	N/A	N/A	Resting	Pellets, whitewash, feathers, decoration materials	11S 629066 3670642
BUOW_20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_20	7/12/2023	1	2	Adult	N/A	N/A	Resting	N/A	11S 629160 3670911

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_20	8/15/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 629160 3670911
BUOW_21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_21	7/12/2023	2	2	Adult	N/A	N/A	Alarm	Pellets, whitewash, feathers	11S 629554 3669719
BUOW_21	8/15/2023	1	1	Adult	N/A	N/A	Resting	Whitewash	11S 629554 3669719
BUOW_22	6/7/2023	1	2	Adult	Y	N/A	N/A	Whitewash	11S 629658 3670134
BUOW_22	7/12/2023	2	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers, prey remains	11S 629658 3670134
BUOW_22	8/15/2023	2	1	Adult	N/A	N/A	Foraging	N/A	11S 629658 3670134
BUOW_23	6/7/2023	4	6	Adult, juvenile	Y	N/A	Resting	N/A	11S 630364 3670134
BUOW_23	7/12/2023	3	3	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 630364 3670134
BUOW_23	8/15/2023	1	5	Adult, juvenile	Y	N/A	Resting	N/A	11S 630364 3670134
BUOW_24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_24	7/12/2023	1	1	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 630508 3670136
BUOW_24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_25	6/7/2023	2	2	Adult	N/A	N/A	Resting	Pellets, whitewash, feathers	11S 630826 3670030
BUOW_25	7/12/2023	2	0	N/A	N/A	N/A	N/A	Pellets, whitewash	11S 630826 3670030
BUOW_25	8/15/2023	1	1	Unknown	N/A	N/A	Resting	Pellets, whitewash, feather	11S 630826 3670030
BUOW_26	6/7/2023	1	2	Adult	Y	N/A	Resting	Whitewash	11S 630322 3670526
BUOW_26	7/12/2023	3	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers, eggshells	11S 630322 3670526
BUOW_26	8/15/2023	1	1	Adult	N/A	N/A	Resting	Whitewash	11S 630322 3670526
BUOW_27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_27	7/12/2023	2	2	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 630595 3670530
BUOW_27	8/15/2023	1	1	Unknown	N/A	N/A	Resting	Whitewash	11S 630595 3670530
BUOW_28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_28	7/11/2023	1	2	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 630830 3670453
BUOW_28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_29	6/7/2023	1	2	Adult	N/A	N/A	Resting	Whitewash, feathers	11S 630826 3670570
BUOW_29	7/11/2023	1	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers, eggshells	11S 630826 3670570
BUOW_29	8/14/2023	N/A	1	Adult	N/A	N/A	Territorial Defense	N/A	11S 630826 3670570
BUOW_30	6/7/2023	3	1	Adult	N/A	N/A	Resting	Whitewash	11S 630815 3670673
BUOW_30	7/11/2023	2	2	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 630815 3670673
BUOW_30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_31	6/8/2023	1	4	Adult, juvenile	N/A	N/A	Resting	Whitewash, feathers	11S 631621 3670506
BUOW_31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_31	8/14/2023	1	2	Adult	Unknown	N/A	Territorial Defense	Whitewash, feathers	11S 631621 3670506
BUOW_32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_32	7/11/2023	1	2	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 631635 3670736
BUOW_32	8/14/2023	1	1	N/A	N/A	N/A	Resting	N/A	11S 631635 3670736
BUOW_33	6/8/2023	1	2	Adult	N/A	N/A	N/A	Whitewash	11S 632416 3670510
BUOW_33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_33	8/14/2023	1	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers	11S 632416 3670510
BUOW_34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_34	7/11/2023	3	3	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 630754 3670938
BUOW_34	8/15/2023	3	2	Adult, juvenile	Unknown	N/A	Resting	Whitewash	11S 630754 3670938
BUOW_35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_35	7/11/2023	3	3	Adult, juvenile	Y	N/A	N/A	Pellets, whitewash	11S 630751 3671035
BUOW_35	8/15/2023	1	3	Unknown	Unknown	N/A	Resting	Whitewash	11S 630751 3671035
BUOW_36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUOW_36	7/11/2023	2	5	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 630747 3671337
BUOW_36	8/15/2023	2	0	N/A	N/A	N/A	N/A	Pellets, whitewash	11S 630747 3671337
BUOW_37	6/6/2023	1	1	Adult	N/A	N/A	N/A	Pellets, whitewash, feathers	11S 629980 3671811
BUOW_37	7/11/2023	2	1	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 629980 3671811
BUOW_37	8/14/2023	2	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers	11S 629980 3671811
BUOW_38	6/6/2023	2	2	Adult	Y	N/A	Resting	Whitewash, feathers	11S 629978 3671982
BUOW_38	7/11/2023	2	2	Adult	Y	N/A	Parental behavior	Pellets, whitewash	11S 629978 3671982
BUOW_38	8/14/2023	2	0	N/A	N/A	N/A	N/A	Whitewash	11S 629978 3671982
BUOW_39	6/6/2023	2	2	N/A	N/A	N/A	Resting	Whitewash	11S 629569 3672531
BUOW_39	7/10/2023	2	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 629569 3672531
BUOW_39	8/14/2023	2	1	Adult	Unknown	N/A	Resting	Whitewash	11S 629569 3672531
BUOW_40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_40	7/10/2023	1	6	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 630255 3672547
BUOW_40	8/14/2023	3	7	Unknown	N/A	N/A	Resting	Whitewash, feathers	11S 630255 3672547
BUOW_41	6/6/2023	1	1	Adult	N/A	N/A	Resting	Whitewash	11S 630315 3672546
BUOW_41	7/10/2023	1	6	Adult, juvenile	Y	N/A	Alarm	Whitewash	11S 630315 3672546
BUOW_41	8/14/2023	1	2	Unknown	Unknown	N/A	Resting	N/A	11S 630315 3672546
BUOW_42	6/6/2023	1	1	Adult	N/A	N/A	Resting	Whitewash	11S 630461 3672550
BUOW_42	7/10/2023	1	1	Adult	N/A	N/A	Alarm	Pellets, whitewash	11S 630461 3672550
BUOW_42	8/14/2023	1	1	Adult	Unknown	N/A	Resting	Whitewash	11S 630461 3672550
BUOW_43	6/8/2023	1	1	Adult	N/A	N/A	Flying	Whitewash	11S 631570 3672419
BUOW_43	7/11/2023	3	0	N/A	N/A	N/A	N/A	Pellets, whitewash, feathers	11S 631570 3672419
BUOW_43	8/14/2023	3	1	Adult	Unknown	N/A	Resting	Whitewash, feathers	11S 631570 3672419
BUOW_44	6/6/2023	2	1	Adult	N/A	N/A	Resting	Whitewash, decoration	11S 634592 3671807
BUOW_44	7/11/2023	1	0	N/A	N/A	N/A	N/A	Whitewash	11S 634592 3671807
BUOW_44	8/15/2023	1	1	Adult	Unknown	N/A	Resting	Feathers	11S 634592 3671807
BUOW_45	6/6/2023	3	2	Adult	Y	N/A	Resting	Whitewash	11S 634132 3673399
BUOW_45	7/10/2023	2	2	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 634132 3673399
BUOW_45	8/15/2023	2	1	Adult	Unknown	N/A	Resting	Whitewash	11S 634132 3673399
BUOW_46	6/6/2023	1	2	Adult	N/A	N/A	Resting	Pellets, whitewash	11S 634251 3673399
BUOW_46	7/10/2023	2	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 634251 3673399
BUOW_46	8/15/2023	2	1	Adult	Unknown	N/A	Resting	Whitewash, feathers	11S 634251 3673399
BUOW_47	6/6/2023	1	2	Adult	Y	N/A	N/A	Pellets, whitewash	11S 634305 3673408

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_47	7/10/2023	1	4	Adult, juvenile	Y	N/A	Alarm	Pellets, whitewash	11S 634305 3673408
BUOW_47	8/15/2023	1	2	Adult	Unknown	N/A	Resting	Pellets, whitewash	11S 634305 3673408
BUOW_48	8/15/2023	1	1	Adult	N/A	N/A	Resting	N/A	11S 628434 3668259
BUOW_49	8/15/2023	1	3	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 628427 3669625
BUOW_50	8/15/2023	1	7	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 630037 3669287
BUOW_51	8/15/2023	N/A	1	Adult	N/A	N/A	N/A	N/A	11S 628423 3670558
BUOW_52	8/15/2023	1	2	Unknown	N/A	N/A	Resting	N/A	11S 628638 3670504
BUOW_53	8/15/2023	1	2	Adult, juvenile	Unknown	N/A	Resting	Whitewash	11S 630026 3670161
BUOW_54	8/14/2023	2	1	Adult	N/A	N/A	Resting	Whitewash	11S 630166 3670137
BUOW_55	8/14/2023	1	1	Unknown	N/A	N/A	Resting	N/A	11S 630846 3670131
BUOW_56	8/14/2023	1	2	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 630830 3670433
BUOW_57	8/14/2023	1	2	Adult, juvenile	Unknown	N/A	Resting	N/A	11S 631620 3670567
BUOW_58	8/14/2023	1	1[a]	N/A	N/A	N/A	N/A	N/A	11S 632402 3670739
BUOW_59	8/14/2023	3	2	Unknown	Unknown	N/A	Resting	N/A	11S 632417 3670899
BUOW_60	8/15/2023	1	3	Adult, juvenile	Unknown	N/A	Resting	Whitewash	11S 630743 3671262
BUOW_61	8/15/2023	2	3	Adult, juvenile	N/A	N/A	Resting	N/A	11S 630774 3671319
BUOW_62	8/14/2023	1	1	Juvenile	N	N/A	Territorial Defense	N/A	11S 632087 3671759

BUOW ID	Observation Date	Number of Burrow Openings	Number of Owls	Ages	Nesting Pair Y/N	Markers Y/N	Behavior	Sign	UTM Coordinates
BUOW_63	8/14/2023	3	1	Unknown	N/A	N/A	Resting	N/A	11S 632127 3671764
BUOW_64	8/14/2023	3	5	Unknown	N/A	N/A	Resting	Whitewash, feathers	11S 629612 3672538

[a] = Deceased owl observed at mouth of burrow
BUOW = burrowing owl
N = no
N/A = not applicable
UTM = Universal Transverse Mercator
Y = yes

Appendix E
Representative Burrowing Owl at Burrow Photographs - Confidential

Appendix E, Representative Burrowing Owl at Burrow Photographs have been provided under a request for confidentiality.

Appendix F
Impact Evaluation Tables

Table F-1. Black Rock Geothermal Project Details of Potential Impact to Burrows

Unique Identification Number	Potentially Permanently Impacted Y/N	On IID Feature Y/N	Notes [a]
BUOW_04	N	Y	Burrow in BSA but under IID concrete canal
BUOW_05	N	Y	Burrow in BSA but under IID concrete canal
BUOW_06	Y	N	Burrow in BSA in culvert, not protected by IID feature
BUOW_13	N	Y	Burrow in BSA under IID concrete canal
BUOW_14	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_15	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_16	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_17	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_19	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_20	Y	N	Burrow in BSA under concrete vault, not protected by IID feature
BUOW_21	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_48	N	Y	Burrow in BSA but under IID concrete canal
BUOW_52	Y	N	Burrow in BSA in culvert, not protected by IID feature
Total Number of Potentially Permanently Impacted Burrows: 9			

BSA = Biological Study Area

BUOW = burrowing owls

IID = Imperial Irrigation District

N = no

Y = yes

[a] This table only includes occupied burrows within the BSA due to their potential to be permanently impacted by proposed project activities. Occupied burrows within the buffer are not included in this table.

Table F-2. Elmore North Geothermal Project Details of Potential Impact to Burrows

Unique Identification Number	Potentially Permanently Impacted Y/N	On IID Feature Y/N	Notes [a]
BUOW_19	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_21	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_23	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_24	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_26	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_27	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_34	Y	N	Burrow in BSA in rip rap, not protected by IID feature
BUOW_36	Y	N	Burrow in BSA under concrete irrigation structure, not protected by IID feature
BUOW_56	N	Y	Burrow in BSA in soil drain, protected by IID feature
BUOW_58	N	Y	Burrow in BSA under concrete canal, protected by IID feature
BUOW_59	Y	N	Burrow in BSA under hay, not protected by IID feature
BUOW_60	Y	N	Burrow in BSA near valve station, not protected by IID feature
BUOW_61	Y	N	Burrow in BSA near pipeline, not protected by IID feature
Total Number of Potentially Permanently Impacted Burrows: 11			

BSA = Biological Study Area

BUOW = burrowing owls

IID = Imperial Irrigation District

N = no

Y = yes

[a] This table only includes occupied burrows within the BSA due to their potential to be permanently impacted by proposed project activities. Occupied burrows within the buffer are not included in this table.

Table F-3. Morton Bay Geothermal Project Details of Potential Impact to Burrows

Unique Identification Number	Potentially Permanently Impacted Y/N	On IID Feature Y/N	Notes [a]
BUOW_19	Y	N	Burrow in BSA on berm, not protected by IID feature
BUOW_21	Y	N	Burrow in BSA under concrete canal, not protected by IID feature
BUOW_45	N	Y	Burrow in BSA but in IID soil drain
Total Number of Potentially Permanently Impacted Burrows: 2			

BSA = Biological Study Area

BUOW = burrowing owls

IID = Imperial Irrigation District

N = no

Y = yes

[a] This table only includes occupied burrows within the BSA due to their potential to be permanently impacted by proposed project activities. Occupied burrows within the buffer are not included in this table.

Appendix G
Occupied Burrow Photographs Within the Biological Study Areas - Confidential

Appendix G, Occupied Burrow Photographs Within the Biological Study Areas have been provided under a request for confidentiality.