AVIAN AND BAT PROTECTION PLAN FOR THE OCOTILLO WIND ENERGY FACILITY
(DRAFT)

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1.0 INTRODUCTION

1.1 Purpose

The primary purposes of this Avian and Bat Protection Plan are to identify the operational risks associated with bird and bat interactions with the proposed Ocotillo Express Wind Energy Facility, identify measures to avoid and minimize risks through site planning and advanced conservation practices, and describe the adaptive management, monitoring, and reporting requirements for the proposed project. This plan describes the measures that would be implemented prior to, during, and following construction to protect migratory and resident birds and bats and allow for the proposed wind energy facility in an environmentally responsible and practicable manner. This Avian and Bat Protection Plan was prepared in accordance with the Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities (USFWS 2010a) and with the California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (CEC 2007).

1.2 Background

In order to address the growing interest in developing wind energy resources and National Energy Policy recommendations to increase renewable energy production capability, the Bureau of Land Management (BLM) began evaluating wind energy potential on public lands and developing a wind energy policy.
In October 2003, the BLM started preparation of a *Wind Energy Development Programmatic Environmental Impact Statement* (PEIS) to analyze the potential impacts of wind energy development on public lands and to minimize those impacts to natural, cultural, and socioeconomic resources. The PEIS was published in June 2005, and in December 2005 the Record of Decision was signed to implement a comprehensive Wind Energy Development program on BLM-administered lands in the western United States. The program has established policies and best management practices (BMPs) to address the administration of wind energy development actions on BLM lands and has identified mitigation measures. The programmatic policies and BMPs of the Wind Energy Development Program allow project-specific analysis to focus on the site-specific issues and concerns of individual projects.
On August 24, 2006, the BLM Washington Office issued Instruction Memorandum (IM) 2006-216, Right-of-Way Management, Wind Energy Land Use Plan Amendments, Wind Energy. The IM provided guidance on issuing rights-of-way (ROWs) for wind energy testing, monitoring, and development.
Until then, the BLM had an interim wind energy policy, issued in 2002.

In August 2009, Pattern Energy, through Ocotillo Express LLC (OE LLC), applied for a testing and monitoring ROW near Ocotillo, CA. Since then, it has maintained anemometers to determine the suitability of the project for wind energy development. In October 2009, OE LLC applied for a wind energy development ROW grant from BLM. The ROW grant would be for the construction, operation, and maintenance of the 158-turbine, up to 474-megawatt (MW) Ocotillo Express Wind Energy Facility (OWEF) and associated facilities. The OWEF would be located on approximately 15,000 acres in the project area (Table 1) and consist of up to158 turbines and associated infrastructure.

In December 2008, a new IM, 2009-044, was issued to update policy and give further guidance on processing Wind Energy Facilities (WEFs) on BLM-administered lands. OE LLC's Plan of Development (POD) complies with the new guidance. The POD was tentatively finalized in February 2011 but may change in response to comments on the preliminary Environmental Impact Report/Environmental Impact Assessment (EIR/EIS).

On July 9th, 2010, IM 2010-156 was issued to provide direction for complying with the Bald and Golden Eagle Protection Act (Eagle Act), including its implementing regulations (*i.e.*, September 11, 2009, Eagle Rule (Rule) 50 CFR parts 13 and 22) for golden eagles, and to identify steps that may be necessary within the habitat of golden eagles to ensure environmentally responsible authorization and development of renewable energy resources. OE LLC has developed an Eagle Conservation Plan as a separate, but in support of this Avian and Bat Protection Plan.

1.3 Facility Description

The principal components of the OWEF would consist of wind turbine generators (WTGs), an underground electrical collection system for collecting the power generated by each WTG, electrical substation and switchyard, access roads, Operation and Maintenance (O&M) building, temporary laydown and storage areas, concrete batch plant, sand and gravel source, fiber-optic communications, two permanent meteorological (MET) tower, and one radar unit. The maximum temporary and permanent disturbance areas are described in Table 1 below. The OWEF totals approximately 15,000 acres, all of which are on BLM land covered by the requested ROW except for 26 acres of private land. This is to allow for the necessary set back distances and spacing between individual WTGs and linear arrays. The total area estimated for use by the wind energy facility (including both short- and long-term disturbance) is approximately 733.4 acres, or approximately 4.7% of the total ROW.

Table 1. Ocotillo Express Wind Facility Components; Maximum Disturbance Summary Table, Based on Construction of 158 Turbines.

Facility Component	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)
Turbine Foundations & Crane Pads	286	40
Access Roads	108	86
Collector Lines	149	1
Substation / Switchyard	9	12
O&M Facility	0	3.4
Railroad Unloading Area	10	0
Batching Plant & Laydown/Parking Area	12	0
Meteorological Towers	1	1
Gravel Source(s)	0	15 (if needed)
Total	**575**	**158.4**

Since wind turbine technology is continually improving and the cost and availability of specific types of WTGs vary from year to year, a representative range of turbine types that are most likely to be used for the project are listed in Table 2. Up to 158 WTG sites have been identified that provide not only the highest wind speeds but also the most consistent wind resource, which provides the highest overall energy output and reliability.

Table 2. Wind Turbine Specifications

Turbine	Hub Height	Rotor Diameter	Total Height	Rated Capacity Wind Speed	Rotor Speed (RPM)	Tower Base Diameter
2.3/3.0 MW Siemens	80 m	101m/113m	130.5 m	13rpm	6-16	4.5
1.6/2.75 MW GE	80 m	100m/107m	130m	13.5rpm	14.8rmp	4.3m

Notes: m/s = meters per second; rmp = rotations per minute.

Wind turbines consist of three main components: the turbine tower, the nacelle, and the rotor consisting of the hub and the blades (Figure 2.10-1). The nacelle is the portion of the wind turbine mounted at the top of the tower, which houses the gearbox and electrical generator. Turbine hub heights and rotor diameters (RD) for the potential turbines may have slight variations, but for purposes of analysis will not exceed the 2.3 MW turbine specifications as the 3.0 MW specifications is not readily available on the market at this time. The towers will be a tapered tubular steel structure manufactured in three or four sections depending on the tower height, and approximately 15 feet (4.5 meters) in diameter at the base. The towers will be painted white per FAA requirements. A service platform at the top of each section will allow for access to the tower's connecting bolts for routine inspection. A ladder inside the structure will ascend to the nacelle to provide access for turbine maintenance. The tower will be equipped with interior lighting and a safety glide cable alongside the ladder. The towers will be fabricated and erected in sections.

The nacelle houses the main mechanical components of the wind turbine generator, the drive train, gearbox, and generator. The nacelle will be equipped with an anemometer and a wind vane that signals wind speed and direction information to an electronic controller. A mechanism will use electric or hydraulic motors to rotate (yaw) the nacelle and rotor to keep the turbine pointed into the wind to maximize energy capture. An enclosed steel-reinforced fiberglass shell houses the nacelle to protect internal machinery from the elements.

Modern wind turbines have three-bladed rotors. The diameter of the circle swept by the blades will be no more than 371 feet (113 meters). Generally, larger wind turbine generators have slower rotating blades, but the specific RPM values depend on aerodynamic design and vary across machines. Based on the turbines considered, the blades will turn at no more than 16 rotations per minute (RPM).

The proposed facility will connect to the new SDG&E Sunrise Powerlink 500kV transmission line scheduled for completion in June 2012 across the middle of the project site. The Point of Interconnection will be adjacent to the project substation. A new substation, electrical collection system, padmount transformer vaults (if used), and above ground junction boxes will be installed. Furthermore, a 500 kV above ground stub line will connect the new substation to the new SDG&E Sunrise Powerlink 500 kV line. In addition to the turbines, the project will include the construction of twenty-three 34.5 kV electrical collection system circuits connecting into a new high voltage (HV) main transformer located at the substation. The new substation will be located within the project area, near the new SDG&E 500kV line.

The collection lines connecting one turbine to the next and to the project substation will be buried underground generally adjacent to the interior turbine access roads as noted above. Above ground components of the collection system will include pad mounted transformers alongside each turbine, junction boxes throughout the project site, the main substation/switchyard (which will be fenced), and the overhead 500 kV stub line connecting the switchyard to the new 500 kV transmission line.

1.4 Key Avian and Bat Laws, Regulations, Authorizations

The project is subject to all relevant federal, state, and local statutes, regulations, and plans as described in the EIS/EIR. The key federal, state, and local agency approvals, reviews, and permitting requirements for avian and bat species that are anticipated to be needed are presented in Table 3.

Table 3. Key Avian and Bat Laws, Regulations, and Authorizations Table

Authorization	Agency Authority	Statutory Reference
Federal		
National Environmental Policy Act (NEPA) Compliance to Grant Right-of-Way	BLM	NEPA (Public Law [PL] 91-190, 42 United States Code [USC] 4321−4347, January 1, 1970, as amended by PL 94-52, July 3, 1975, PL 94-83, August 9, 1975, and PL 97-258, §4[b], Sept. 13, 1982)
Endangered Species Act Compliance	U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act (PL 93-205, as amended by PL 100-478 [16 USC 1531 *et seq*.]); 50 Code of Federal Regulations (CFR) 402
Migratory Bird Treaty Act	USFWS	16 USC 703–711; 50 CFR 21 Subchapter B
Bald and Golden Eagle Protection Act	USFWS	16 USC 668−668(d)
State		
Section 2081 Incidental Take Permit	California Department of Fish and Game	California Endangered Species Act (CESA) of 1984, Fish and Game Code §§ 2050-2098

The regulatory framework for protecting birds includes the Endangered Species Act of 1973, as amended (ESA), the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA) of 1940, and Executive Order (EO) 13186. The MBTA prohibits the take of migratory birds and does not include provisions for allowing unauthorized take. This project affords substantial design measures to avoid and minimize the likelihood of take, but if take occurs, it will be reported to the U.S. Fish and Wildlife Service (USFWS) for further action. Additionally, this ABPP has been developed to meet BLM and USFWS requirements for addressing the ESA, MBTA, and BGEPA. Both the BGEPA and the MBTA prohibit take as defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs. Under the BGEPA, "disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: 1) injury to an eagle; 2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. However, on September 11, 2009 (*Federal Register,* 50 Code of Federal Regulations [CFR] 13 and 22), the USFWS set in place rules establishing two new permit types: 1) take of bald and golden eagles that is associated with, but not the purpose of, the activity; and 2) purposeful take of eagle nests that pose a threat to human or eagle safety. The USFWS recommends that project proponents prepare an ABPP to avoid, minimize, and mitigate project-related impacts to birds and bats and specifically golden eagles to ensure no-net-loss to the golden eagle population. Pursuant to BLM IM 2010-156, the BLM will request "concurrence" from the USFWS that the ABPP meets specific requirements.

1.5 Policy and Commitment to Environmental Protection

Pattern is an independent, fully integrated energy company that develops, constructs, owns, and operates wind power projects across North America and parts of Latin America. Pattern commenced operations in June 2009 as one of the most experienced and best capitalized renewable energy companies in the United States. OE LLC, through Pattern, is dedicated to delivering the highest values for their partners and the communities where they work, while exhibiting a strong commitment to promoting environmental stewardship and corporate responsibility. The OE LLC team has a proven track record of using science and ground-breaking technology to build wind projects that successfully coexist with wildlife and protect the environment. OE LLC is committed to building environmentally responsible renewable energy projects and continues to work closely with environmental agencies to develop appropriate mitigation measures to reduce impacts to wildlife.

1.6 Public Outreach

OWEF will coordinate with key interest groups within the community to determine how capital contributions from the project can go towards worthwhile community projects. In addition, a project fact sheet describing the project and measures that have been put in place to address avian and bat issues will be prepared and made available at the local BLM El Centro District Office.

2.0 EXISTING CONDITIONS

2.1 Environmental Setting

The project site is located within four U.S. Geological Survey 7.5-minute quadrangle maps; Carrizo Mountain, Coyote Wells, In-Ko-Pah Gorge, and Painted Gorge. The northern portion of the site is generally situated north of Interstate 8 (I-8), from the Imperial/San Diego County border on its western edge to approximately 1.5 miles northeast of the town of Ocotillo on its eastern edge. The northern area includes several distinct features, including a portion of the I-8 Island, which is undeveloped rocky and hilly terrain between the eastbound and westbound lanes of I-8, Sugarloaf Mountain, and a portion of the San Diego and Arizona Eastern railroad tracks. County Route (CR) S2 bisects the northern project area, and I-8 passes through the southern portion of the northern project area. The southern area is much smaller than the northern area and the majority is south of State Route (SR) 98.

Vegetation on site consists of a variety of desert scrub habitat types. Several dry desert washes cut through the site, generally from west to east: Palm Canyon Wash cuts through the center of the northern project area; Myer Creek Wash cuts through the southern portion of the northern project area; a portion of Coyote Wash cuts through the northwest portion of the southern project area; and several additional unnamed washes cut through the site.

Elevations on site range from approximately 300 feet above mean sea level (amsl) in the northeast portion of the site to approximately 1,700 feet amsl in the southwest portion of the site. The site generally slopes downward from the west to the east, with the Coyote Mountains to the north of the site, and the Jacumba Mountains to the west and south of the site.

2.2 Monitoring and Surveying to Date

In response to concerns about wildlife impacts resulting from the development of the OWEF, a variety of field studies and literature reviews were initiated. Field studies consisted of avian and bat surveys, which are summarized below in Table 4. The field studies were conducted by HELIX Environmental Planning, Inc. (HELIX) biologists and subconsultants to HELIX.

Table 4. Monitoring and Surveying Efforts

Study	Taxa	Survey Dates
Raptor Migration Count Surveys (Helix 2010a)	Raptors, Vultures	September – November 2009,March – May 2010
Avian Point Count Surveys (Helix 2010b)	All Birds	September 2009-August 2010
Eagle Nest Surveys (WRI 2011)	Eagles	March – April 2010
Bat Surveys (Rahn 2011)	Bats	January – November 2010
AnaBat Acoustic Surveys (Rahn 2011)	Bats	April – November 2010
Burrowing Owl Surveys (Helix 2010c)	Owls	Jan 2010 ,March-April, 2010,June-July 2010, July-August 2010

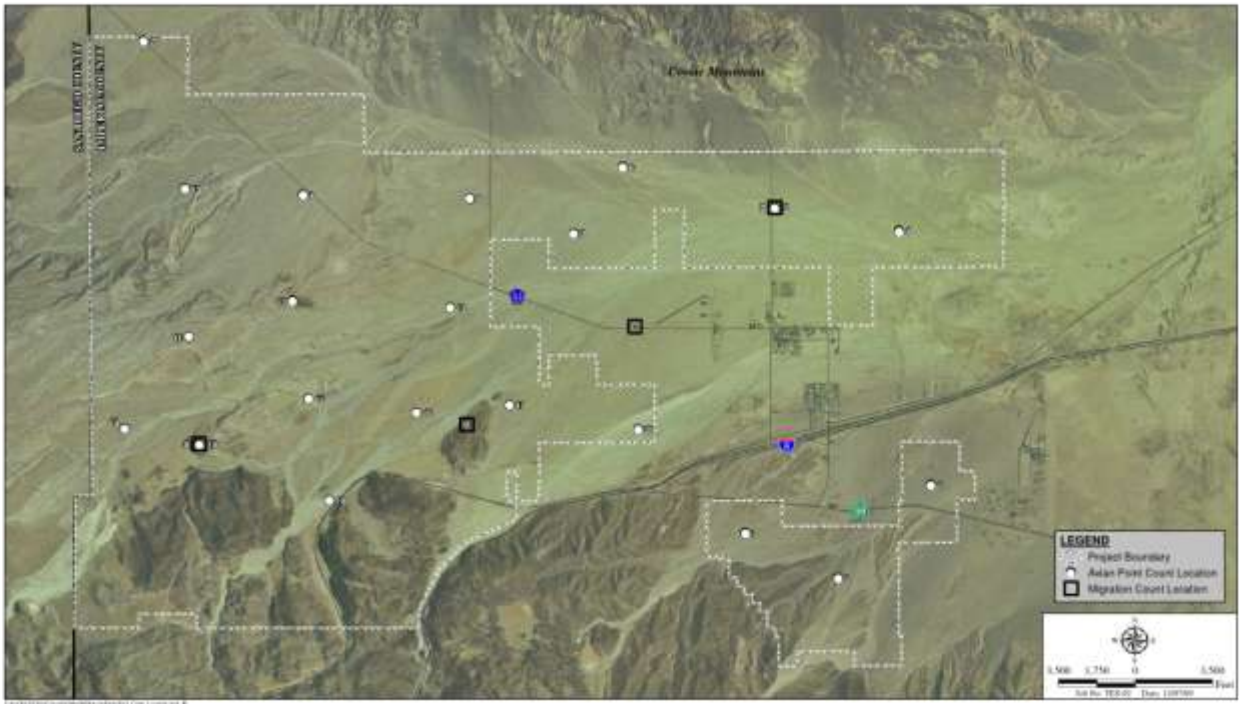
2.2.1 Raptor Migration Count Surveys

The purpose of the raptor migration counts study was to document the diurnal raptor activity within the OWEF project area in order to provide a risk assessment for these species. HELIX conducted migration counts over an 8 calendar-week period during the 2009 fall migration period (September 24-November 10, 2009) and over a 10-week calendar-week period during the 2010 spring migration period (March 22-May 28, 2010). HELIX stationed 4 surveyors throughout the site to scan the sky and record bird migration data. The 4 migration count locations (Locations A through D; Figure 1) were spaced approximately 2 miles apart generally along a southwest-northeast axis across the site. Migration count locations were located to maximize the likelihood of detecting potential north-south and east-west migration through the site. Migration counts were conducted in accordance with the OWEF survey protocols approved by BLM and generally in accordance with the methods described in the California Energy Commission's (CEC's) Guidelines for Reducing Bird Impacts from Wind Development (CEC 2007).

Migration counts were staggered to either begin shortly after sunrise or to conclude before sundown to cover the bimodal activity of diurnal bird migrants. Surveyors methodologically scanned the sky and recorded all bird species, number of individuals, direction of movement, estimated distance from the surveyor, and estimated height above the ground. Surveyors documented activity on standardized datasheets for each date. Weather conditions (e.g., temperature, wind speed, wind direction, cloud cover, etc.) at the start and end of each day were also recorded. Surveyor positions were rotated each day.

HELIX biologists Kimberly Davis, Erica Harris, Rob Hogenauer, Jason Kurnow, Erik LaCoste, Debbie Leonard, Eric Piehl, and Dale Ritenour, along with John Konecny (Konecny Biological Services), conducted the migration counts. Independent contractor Marie Bennett assisted on one date.

Figure 1. Raptor Migration Count and Avian Point Count Locations.



Results

Large numbers of raptor and turkey vultures were not documented during the fall 2009 migrations counts. A total of 165 raptors/large birds were counted on site or directly adjacent to the site during the fall. The number of raptors and turkey vultures observed during the spring migration counts was greater compared to fall. A total of 520 raptor observations were made on site or directly adjacent to the site during the spring migration counts.

HELIX calculated raptor use estimates and relative abundance using the fall 2009 and spring 2010 migrations count data (Table 5). Raptor use was calculated by dividing the number of raptor observations by the number of observation hours. Relative abundance was calculated by dividing the number of observations of each raptor species by 685, which is the total number of raptor observations during both seasons. Raptor use of the site was very low during the fall and spring migration periods with less than 1 raptor observed per hour of observation. Raptor use of the site in spring (0.546 observations/hour [hr]) was more than double the raptor use of the site during fall (0.216 observations/hr). With the exception of turkey vultures, each raptor species' use of the site did not vary dramatically between the 2 seasons. Turkey vulture use of the site in the spring (0.332 observations/hr) was approximately 16 times greater than turkey vulture use in fall (0.020 observations/hr).

During the fall migration counts, the species with the highest use of the site were the red-tailed hawk (0.089 observations/hr), American kestrel (0.022 observations/hr), prairie falcon (0.020 observations/hr), and turkey vulture (0.020 observations/hr). During the spring migration counts, the species with the highest use of the site were the turkey vulture (0.332 observations/hr), red-tailed hawk (0.127 observations/hr), and prairie falcon (0.021 observations/hr).

The turkey vulture accounted for 48 percent of the total observations during the study period. The red-tailed hawk constituted 28 percent of the total observations. Prairie falcon and American kestrel each accounted for 5 percent of total observations. There were 61 raptor sightings that could not be definitively identified, which accounted for approximately 9 percent of observations.

Table 5
RAPTOR USE AND RELATIVE ABUNDANCE

Species	Fall 2009		Spring 2010		Total		Relative Abundance
	No.	No./hr	No.	No./hr	No.	No./hr	
American kestrel	17	0.022	16	0.017	33	0.019	0.05
Cooper's hawk	2	0.003	1	0.001	3	0.002	<0.01
ferruginous hawk	4	0.005	0	0	4	0.002	0.01
golden eagle	8	0.010	0	0	8	0.005	0.01
merlin	1	0.001	0	0	1	0.001	<0.01
northern harrier	8	0.010	2	0.002	10	0.006	0.01
osprey	1	0.001	5	0.005	6	0.003	0.01
prairie falcon	15	0.020	20	0.021	35	0.020	0.05
red-tailed hawk	68	0.089	121	0.127	189	0.110	0.28
sharp-shinned hawk	1	0.001	0	0	1	0.001	<0.01
Swainson's hawk	1	0.001	2	0.002	3	0.002	<0.01
turkey vulture	15	0.020	316	0.332	331	0.193	0.48
unidentified raptor	24	0.031	37	0.039	61	0.036	0.09
Total Observations	**165**	**0.216**	**520**	**0.546**	**685**	**0.399**	
Total Identified Species	**12**		**8**		**12**		
Observation Hours	**763**		**952**		**1,715**		

HELIX noted raptor nests during the migration counts and during the other biological studies for the project. An active raven nest was observed on another lattice tower in the spring just south of Sugarloaf Mountain. A prairie falcon was observed on multiple occasions flying with nesting material to an area in the rocky hills south of Sugarloaf Mountain; however, a nest was not definitively located. Other large bird nests were documented on site during other biological surveys. A barn owl (*Tyto alba*) nest was documented in the western portion of the project site.

Collision risks of individual species was accessed and can be found in the OWEF Raptor Migration Report prepared by HELIX (HELIX 2010a). During analysis, the rotor swept area (i.e., the zone where the blades of the turbine would occur; RSA) was assumed to be between 150 feet to 450 feet above ground level.

Conclusion

The majority of the project site supports desert scrub vegetation and dry desert washes. The site does not contain the appropriate topography to funnel migrating birds through the site. With the exception of Sugarloaf Mountain and the rocky terrain in the southwest portion of the site, the project is generally flat and is located east of the Jacumba Mountains and south of the Coyote Mountains. The site lacks a major ridgeline, water bodies, and large stands of mature trees. The closest major water body is the Salton Sea, which is 30 miles to the northeast of the site, and the irrigated agriculture fields near El Centro are approximately 15 miles to the west of Ocotillo. The results of HELIX's labor-intensive fall 2009 and spring 2010 migration counts indicate that the OWEF site is not part of a major migratory pathway for diurnally migrating raptor species.

The resident raptors species (red-tailed hawk, American kestrel, and prairie falcon) would be at a higher risk of collision because their foraging heights are within the proposed RSA, One migratory raptor species (turkey vulture) would be at a higher collision risk than the other migratory raptor species due to the greater number of observations made and the frequency of the observations within the RSA. Risks associated with the only listed raptor species observed on site (Swainson's hawk) is very low because only 3 individuals were observed, and the species is not known to nest in the area.

The overall collision risk to raptors/large bird species is low because of the low raptor use of the OWEF site (0.399 observations/hr), the small resident raptor population, and the lack of major raptor migration through the site during the fall and spring.

2.2.2 Avian Point Count Surveys

The purpose of the avian point count surveys (Point Counts) was to determine what avian species are present on the project site and how the project site is used by those species. This was accomplished by recording bird species, abundance, behavior, and flight characteristics at selected sampling locations over 30-minute period.

HELIX conducted Point Counts approximately weekly over a 1-year period (September 1, 2009 – August 31, 2010). A total of 50 weeks of Point Counts were conducted over the 1-year period (Point Counts were not conducted the week of November 29-December 5, 2009 or the week of January 17-23, 2010). Each Point Counts location was visited once per week (the one exception is that Location 13 was not surveyed the week of February 21-27, 2010). The Point Counts were conducted in accordance with the OWEF survey protocols approved by BLM and generally in accordance with the bird use count methods described in the CEC's Guidelines for Reducing Bird Impacts from Wind Development (CEC 2007).

Twenty-one Point Count locations were established approximately 1 mile apart throughout the approximately 15,000 acre site (Locations 1-21; Figure 1). The Point Count locations cover a wide range of elevation, from approximately 340 feet AMSL (Location 4) to approximately 1,250 ft AMSL (Location 18). The Point Counts locations were strategically located to sample different microhabitats. Although each of the locations occurred in desert scrub habitat, several of the locations were within and adjacent to dry desert washes (e.g., Locations 6, 10, 13, 14, and 21) while others were located on or adjacent to hilly topography (e.g., Locations 2, 12, 18, and 19).

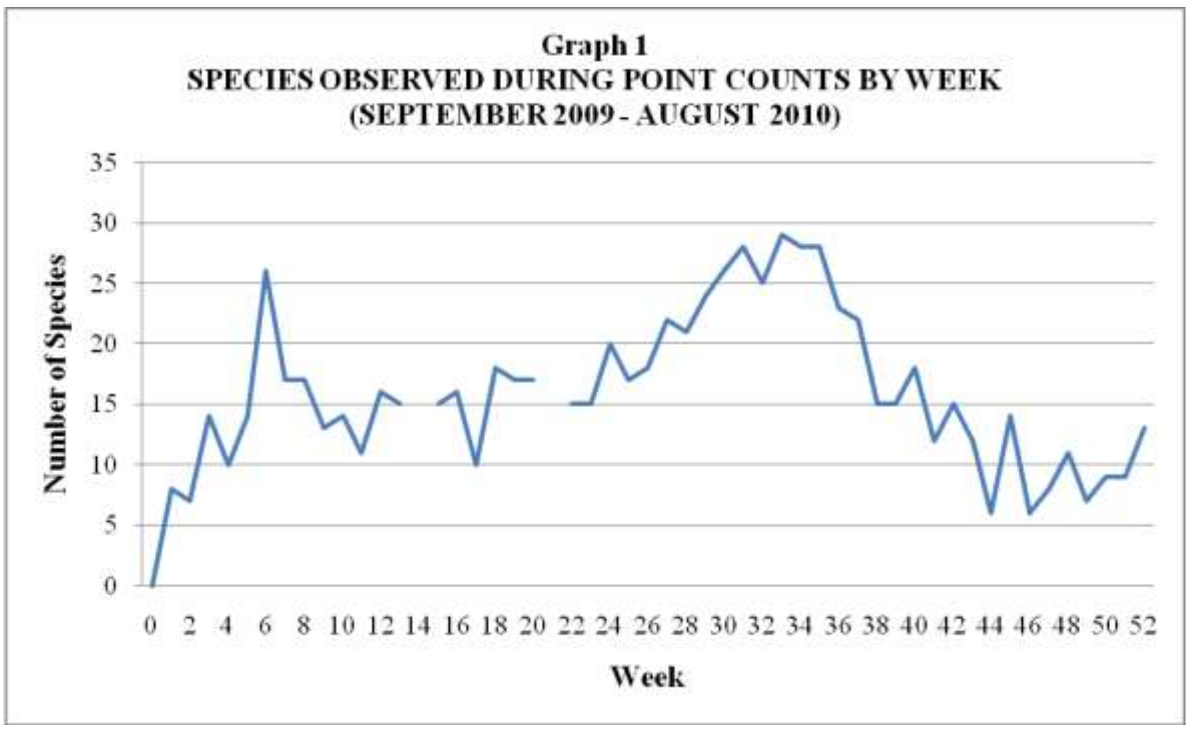
At each Point Counts location the species, number of individuals, flight height, flight direction, distance from observer, and behavior (directional flight, perched, flapping flight, soaring, etc.) was recorded over a 30-minute period. Weather conditions (temperature, wind speed and direction, and cloud cover) were recorded at the start and end of the 30-minute interval using a hand-held Kestrel anemometer. Species were detected visually with the aid of binoculars and by identifying songs and call notes. All observations were recorded on standardized data sheets. Efforts were made to sequence observation times so that locations were surveyed both in the morning and in the afternoon and under varying weather conditions, in accordance with the CEC's Guidelines.

Results

Resident species observed on site include black-throated sparrow (*Amphispiza bilineata*), rock wren (*Salpinvtes obsoletus*), house finch (*Carpodacus mexicanus*), loggerhead shrike (*Lanius ludovicianus*), cactus wren (*Campylorhynchus brunneicapillus*), Costa's hummingbird (*Calypte costae*), verdin (*Auriparus flaviceps*), common raven (*Corvus corax*), and red-tailed hawk (*Buteo jamaicensis*). Wintering species observed include white-crowned sparrow (*Zonotrichia lucophrys*), Brewer's sparrow (*Spizella breweri*), yellow-rumped warbler (*Dendroica coronata*), sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), and blue-gray gnatcatcher (*Polioptila caerulea*). Fall migratory species include various swallow species (of the genus *Tachycineta*, *Hirundo* and *Petochelidon*), black-throated gray warbler (*Dendroica nigrescens*), and chipping sparrow (*Spizella passerina*). Spring migratory species include various warblers (of the genus *Dendrocia* and *Vermivora*), swallows, hooded oriole (*Icterus* *cucullatus*), western kingbird (*Tyrannus vociferans*), Swainson's hawk (*Buteo swainsoni*), and lazuli bunting (*Passerina amoena*).

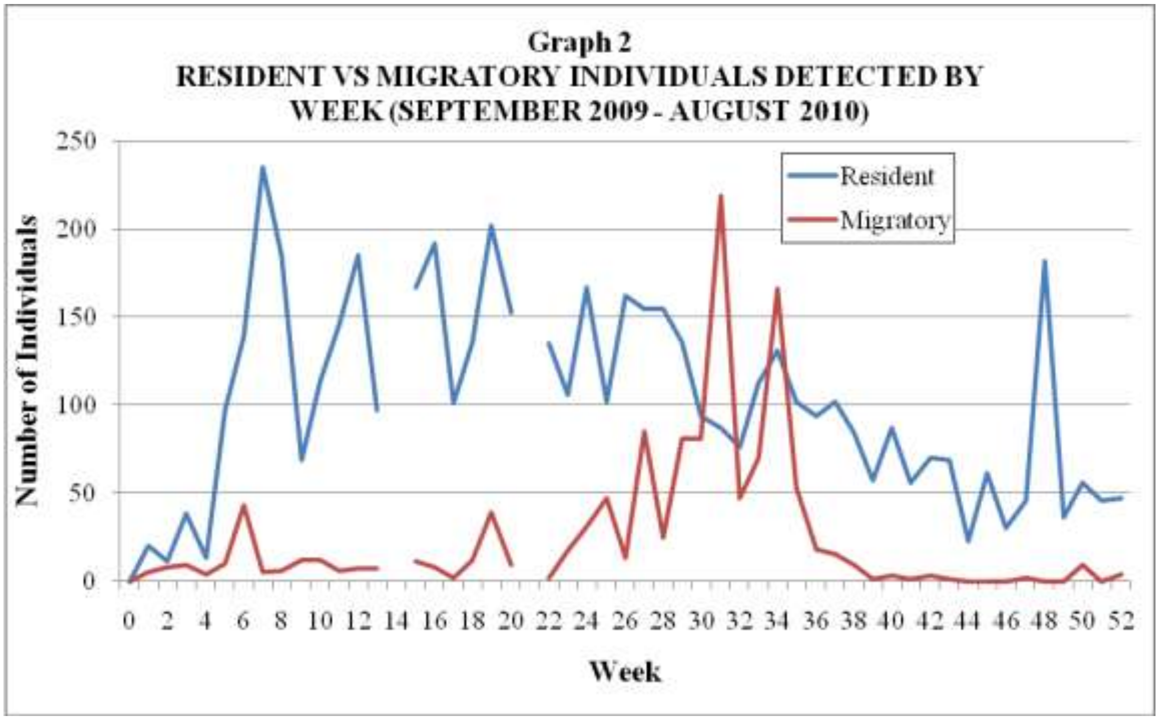
Forty-seven of the seventy-seven species detected during point counts are considered migratory. Thirty-eight of the migratory species passed through the site, while nine of the species migrated to the site. Species that migrated to the site either arrived in the fall and wintered at the site, or arrived in the spring and summered at the site. Approximately one-third of the species that migrated through the site were warblers and swallows. The remaining two-third consisted of an assortment of species that included lazuli bunting, western tanager (*Piranga ludoviciana*), pacific-slope flycatcher (*Empidonax difficilis*), black-headed grosbeak (*Pheucticus melanocephalus*), and warbling vireo (*Vireo gilvus*). Raptors accounted for 9 of the 77 species observed.

Seventy-seven species were recorded over the 52-week survey period. The number of species detected during Point Counts varied weekly (Graph 1). Species richness substantially increased between March and May of 2010, corresponding to the peak in spring migration. Species richness was lowest (less than 10 individuals) during weeks 1, 2, 44, 46, 47, and 49-51, which corresponded with very hot daytime temperatures occurring during times of the year when migratory activity was either low or absent. Conversely, species richness was highest (25 or more species per week) during weeks 6 and 30-35, which were weeks when migratory species composed approximately 50 percent of the species recorded. The two peaks in species richness, shown in Graph 1 (i.e. weeks 6-8 and weeks 30-35), correspond with the fall 2009 and spring 2010 migratory periods.



A total of 6,387 individual observations were recorded over the 52-week survey period. Of the 6,387 individual observations 5,169 were considered resident species and 1,218 were considered migratory species. House finches, black-throated sparrows, and horned larks were the most abundant species observed during the study. Combined, they make up 51 percent of total individual observations.

Migratory species occurred in low numbers throughout the survey period, with the exception of several weeks in April (Graph 2). During the first seven weeks, swallows were most abundant species migrating through the site. During Week 6, there was a peak in species migrating through the site, a majority of which were Vaux's swifts. Beginning in March, spring migratory species were observed on site. The number of migratory individuals peaked during the first week in April (Week 31), which was the result of numerous observations of western kingbirds and Bullock's orioles (*Icterus bullockii*). In addition, low numbers of northern rough-winged swallows, warblers, and other migratory species were observed. A high number of migratory individuals were also detected during the end of April (Week 34). During this week, Brewer's sparrows, northern rough-winged swallows, and Vaux's swifts accounted for a majority of the species observations. Following April, observations of migratory species abundance were minimal.



Raptors were observed throughout the survey period. A total of 225 raptor observations (3.6 percent of the total species) were detected during the survey period. Raptor observations varied weekly from a low of 0 in Weeks 46, 47, 49 and 51 to a high of 21 in Week 33. The most frequently observed raptors were red-tailed hawk and turkey vulture. The greatest number of raptor observations occurred in the spring (Weeks 28, 32-34, and 36-37). The American kestrel, Cooper's hawk, northern harrier, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, and unidentified raptors made up the remaining 50 observations. HELIX conducted a Raptor Migration Study (HELIX 2010a), which is discussed in Section 2.2.1.

Conclusion

The OWEF site does not support a large population of resident species. Many of the resident species observations, including raptor observations, were likely repeat observations of the same individual. The site does not appear to be part of a major migration corridor for sensitive and non-sensitive species. Sensitive species observed were Swainson's hawk, ferruginous hawk, northern harrier, loggerhead shrike, yellow warbler, Vaux's swift, and Le Conte's thrasher. All sensitive species were observed in low numbers except Loggerhead Shrike which is a resident bird of the region.

A total of 77 species and 6,387 individual observations were documented during the yearlong Point Counts study. Species abundance was variable throughout the year with the biggest fluctuation occurring between seasons. The weekly surveys began in fall, which had one of the lower seasonal detection rates (5.4 individuals per 30-minuted period). The lower detection rates corresponded with very high daytime temperatures in September and early October. Species abundance was comparatively greater in the winter and spring compared to the fall. Migratory species were responsible for the increase in observations in spring. Hot temperatures and the absence of migratory species accounted for low abundance in summer.

Raptor observations account for 3.6 percent of birds recorded during the survey period. Peak observations occurred in the spring, with the higher numbers likely correlated with an increase in prey availability. The majority of these sightings were common desert species, including Red-tailed Hawk, Turkey Vulture, American Kestrel, and Prairie Falcon. Other raptor observations included a single individual of each of the 3 species (Ferruginous hawk, Cooper's Hawk, and Northern Harrier) and a single Swainson's Hawk observed flying over the site on 3 separate occasions in spring.

Migratory species account for 19 percent of total observations over the yearlong study. Approximately 68 percent of individuals that were considered migrants occurred during the peak of spring migration (March-April). It is also notable that migratory species abundance surpassed that of resident species twice within this period. This is in contrast to fall migration where resident species outweighed migratory species 10:1. The amount of food resources available to migrants in spring is much greater than in winter, which is likely the primary factor responsible for the disproportionate numbers associated with migratory species richness and abundance.

Ninety-six percent of observations occurred outside the rotor swept area (RSA) range of 150-450 feet. However, there is the potential for all recorded species, including the sensitive species observed and raptor species observed, to fly within the RSA. Given that the site is not part of a major migratory movement corridor and the bird abundance is relatively low, overall collision risk for diurnally active avian species is low. It is likely that nocturnal species such as owls, nightjars, etc., and species that migrate at night would be at a greater risk of collision. Even with the abundance of individuals during spring migration, site use by migratory species should be considered low given the size of the site. Many of the migratory species were detected in relatively low numbers, which indicates this is not a major migratory corridor for passerines.

2.2.3 Eagle Nest Surveys

HELIX contracted with the Wildlife Research Institute (WRI) to conduct surveys of golden eagle (*Aquila chrysaetos*) nest sites in eagle territories that occur within 10 miles of the project site, in accordance with the guidance provided in the USFWS Inventory and Monitoring Protocols (USFWS 2010b). WRI conducted helicopter surveys in 4 known territories (referred to as Coyote Mountains West, Coyote Mountains East, Table Mountain, and Carrizo Gorge) in spring 2010. A handheld GPS was used to record the helicopter flight path and the location of each nest site. Nest-specific information was documented by 2 eagle biologists in the helicopter, and each nest site was photographed. In addition to helicopter surveys, WRI conducted ground surveys of an additional suspected golden eagle territory (referred to as Mountain Springs) in spring 2010. Helicopter surveys were not allowed by USFWS in the Mountain Springs area because of potential disturbance to Peninsular bighorn sheep (*Ovis canadensis nelsoni*). Results of the golden eagle nest surveys were provided in a survey report (WRI 2011). An Eagle Conservation Plan is being prepared separately for the OWEF project and golden eagles will not be discussed further in this ABPP.

2.2.4 Bat Surveys

The purpose of the bat surveys was to characterize what species are using the project area and the locations at which those species are observed. In addition, surveys aimed to characterize key areas of bat activity and determine which areas within the proposed wind turbine project area have a high impact risk for bats.

Initial surveys and site assessments were conducted in January 2010 to determine the best routes for active bat monitoring, and evaluate the availability of important bat-resources (e.g. roost sites, standing water, and potential foraging areas). The surveys included assessments during the peak of all four seasons, which was dependant on prevailing weather conditions and expected periods of peak bat activity; winter (January/February), spring (May/June), summer (July/August), and fall (October/November).

A minimum of 9 nights of active AnaBat surveys were conducted during each season to determine the presence of resident and migratory bat species. Biologists followed established trails and access roads within the project area in three distinct areas, maximizing coverage of the entire study area. Survey routes were stratified across the various vegetation communities and habitat features (e.g. rocky outcrops, cliffs, and desert washes) in order to maximize the detection of bats. The active bat surveys utilized AnaBat™ SDI Bat Detectors that download all record echolocation signals into a Compact Flash memory card and can be linked to a GPS unit. The GPS provides the location of the echolocation calls as they are recorded during an evening. A thermal imaging camera was used to estimate the number of bats present along the survey route (relative abundance), and document the behavior of the bats (commuting, foraging, drinking, etc.). The thermal camera was also used to estimate the height that the bats were flying above ground level and their direction of travel. Ambient environmental conditions were recorded each night, ensuring that data are collected only during those conditions that are optimal for bat activity. Finally, surveys along the areas adjacent to the project area attempted to locate and identify potential roost sites, resources (e.g. water or potential foraging areas) and bat activity areas adjacent to the project area to determine if any bat species are actively using these adjacent, and identify any path of emergence.

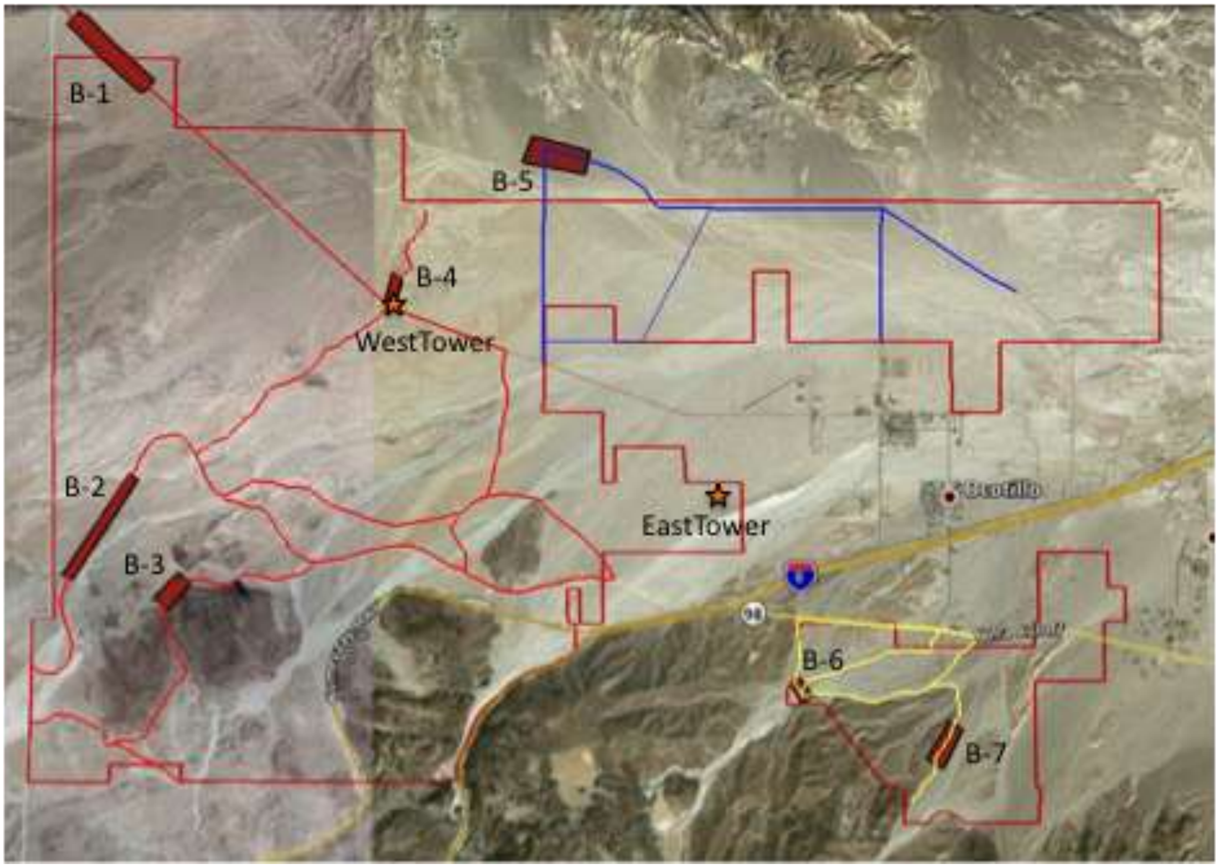
Long-term echolocation monitoring stations were installed on two met towers to assess the temporal variability of bats in the project area. These stations collected data autonomously from April 18 through November 31. These stations collected data passively by storing bat calls for later analysis. Two stations were installed on the East and West tower at approximately 50m and 2m above ground level. Long-term acoustic monitoring collected data on bat presence and activity, as well as seasonal changes in species composition. The data were analyzed using software filters to remove those calls that were the result of wind or insect background-noise. Analysis was conducted for all calls recorded during the project period, identifying bat species where possible.

Surveys were conducted by trained and expert bat biologists. Regular staff included Dr. Matt Rahn and Ms. Kelcey Stricker. Dr. Rahn has over 17 years of experience as a bat biologist, expensive experience with habitat assessments, and has been working with the AnaBat system since 1995. Ms. Stricker has been working on bat projects as both a researcher and consultant since 2005. Biologists from HELIX also regularly supported the bat surveys.

Results

Ultimately, only five bat species were identified in the project area in 2010: California Myotis, Big Brown Bat, Mexican Free-tailed Bat, Western Pipistrelle, and Western Mastiff Bat. Majority of the bats (approximately 77%) were recorded during the spring (103 calls; May-June) and summer (56 calls; August-September). Bat activity was lower during the winter or fall survey periods (winter = 15 calls; fall = 31 calls). Bat activity was recorded at only seven distinct locations within the project area and from two tower locations within the project area (Figure 2). The remainder of the project area showed no bat activity, either through the echolocation recording or use of the thermal imaging camera.

Figure 2. Bat Survey Routes. Long-term AnaBat stations were located on the two towers indicated on the map (designated East and West). Polygons represent areas where bat activity was observed or recorded during surveys (B-1 through B-7).



Most bat activity was located along the western edge of the project area. Other locations identified during the surveys recorded bats only along the perimeter of the area. The thermal imaging camera was used to identify the total number of bats flying when an echolocation signal was recorded. Over 95% of the time, the calls recorded represented only a single individual flying in the vicinity. Bats were infrequently observed in the interior of the site during the survey, and only from a distance using the thermal imaging camera.

Majority of the bats recorded during the driving/walking surveys were found at sites B-1 and B-2 (26% and 28% respectively). Both B-4 and B-7 had roughly 12% of the bats recorded, with the remaining sites having all less than 10% of the remaining calls recorded (B-3 = 7%; B-5 = 5%; B-6 = 9%). The most abundant species recorded was the Big Brown Bat (43%), the California Myotis (26%), and the Western Pipistrelle (17%). The Greater Western Mastiff Bat and the Mexican Free-tailed bat were rarely recorded within the project area (6% and 9% respectively). Table 6provides a summary of all bat data collected from both active and passive surveys in 2010.

Table 6. Bat species recorded at each survey location during each survey season in 2010.

Location	California Myotis	Big Brown Bat	Mexican Free-tailed Bat	Western Pipistrelle	Western Mastiff Bat	Unknown
Winter						
B-1	1	3				
B-2	1	4				1
B-3						
B-4						
B-5						
B-6						
B-7						
Spring						
B-1	1	1		1		2
B-2		1		1	1	2
B-3		1				
B-4						
B-5						
B-6						
B-7						
East Tower - 50m						
East Tower - 2m	6	11		7		
West Tower - 50m					3	
West Tower - 2m	23	16		19	7	

Location	California Myotis	Big Brown Bat	Mexican Free-tailed Bat	Western Pipistrelle	Western Mastiff Bat	Unknown
Summer						
B-1	1	2			1	
B-2	2					2
B-3	1					
B-4	1	2	1	1		2
B-5			1			
B-6	1	1		1		1
B-7			2		1	
East Tower - 50m		1		1		
East Tower - 2m		3		1		1
West Tower - 50m	2	1	2		2*	
West Tower - 2m	6	5	2	4	2*	3
Fall						
B-1		1		1		
B-2	1					
B-3		1		1		
B-4						
B-5	2					
B-6		1				
B-7		2		2		
East Tower - 50m**		1		1		1
East Tower - 2m		2		2		
West Tower - 50m	1	2		1	1	2
West Tower - 2m	1	2		1		1
Abundance/% (Transects)	12/25.5%	20/42.5%	4/8.5%	8/17.1%	3/6.4%	10/NA
Calls Recorded (Tower)	39	44	4	37	13	8
TOTAL	**51**	**64**	**8**	**45**	**14**	**18**
*Calls were from the same individual at the same time in both upper and lower microphones						
**Strong winds broke the upper mounting bracket in late September.						

Conclusion

Bat use of the project area is remarkably low. Over 70% of the surveys conducted failed to record a single bat during the night. Bat activity was generally restricted to the perimeter of the project boundary, with infrequent observations of bats. Bats observed during the surveys were commuting through the area (22%), actively foraging (60%), or were both foraging and commuting (18%). Surveys of adjacent land did not identify areas of suitable roosting habitat nor are there any significant opportunities for tree roosting nearby or within the town of Ocotillo. There was a general lack of cave formations, suitable cliff faces and boulders.

The results of the long-term echolocation monitoring stations suggest that most of the bats in the project area were flying at lower heights. This is likely true for all species except the Greater Western Mastiff Bat, which is typically found flying at higher elevations than many species, particularly when commuting through an area. Observations with the thermal imaging camera showed similar results. For all species of bats observed, they were typically seen at elevations between 1-25 meters above ground level. Again, the only exception was the Greater Western Mastiff Bat, which was typically observed above 25m.

Four of the five species observed in the project area are considered to be at low risk and not particularly sensitive species within the local area or the region (California Myotis, Western Pipistrelle, Mexican Free-tailed bat, and Big Brown Bat). The Greater Western Mastiff Bat is the species considered a high-risk species. This species is severely limited to habitat areas based on its high demand for water (it is the largest bat in North America) and is unable to drink from water sources less than 30 m long. Therefore, because there are no water bodies within the project area that could likely support this species, and foraging potential is rather limited, this rare occurrence is probably only moving through the project area infrequently in search of suitable habitat.

No significant pattern in the distribution or flight behavior of the bats was observed. It is unlikely that significant numbers of bats occur throughout the project area. All observations and survey results suggest that the majority of the bat population in the local area occurs outside of the Ocotillo valley area. No significant resources for foraging or water exist, severely limiting the bat abundance and diversity, particularly when compared with adjacent mountain ranges to the west and the Imperial Valley to the east.

2.2.5 Burrowing Owl Surveys

The CDFG requested HELIX to follow The California Burrowing Owl Consortium (CBOC) Guidelines (CBOC 1993) for burrowing owl (*Athene cunicularia*) habitat surveys within the OWEF study area. The CBOC Guidelines include 3 phases: (1) habitat assessment; (2) focused burrow search; and (3) surveys for owls during the breeding season. HELIX conducted a burrowing owl habitat assessment, a burrow survey, and focused owl surveys in accordance with the CBOC Guidelines and with OWEF's survey protocols that HELIX prepared and the BLM approved. The purpose of the surveys was to determine presence/absence of burrowing owls on site.

HELIX conducted a (Phase I) habitat assessment within the proposed project footprint in January 2010. HELIX biologists evaluated the project site to determine if it contained areas that met the basic requirements of owl habitat, which include open expanses of sparsely vegetated areas (less than 30 percent canopy cover for trees and shrubs), gently rolling or level terrain, small mammal burrows (especially those of antelope ground squirrel [*Ammospermophilus leucurus*]), and/or fence posts, rock, or other low perching locations. Suitable owl habitat was found to be present throughout the study area. As such, additional surveys were required.

HELIX conducted a winter resident burrowing owl survey from January 16 through 29. The CBOC and CDFG define the wintering survey period as December 1 to January 31 (CBOC 1993; CDFG 1995). The winter resident owl survey was conducted to gather data on burrowing owl use of the study area during the non-breeding season. The winter resident burrowing owl surveys were conducted in areas with the highest potential for burrowing owl use (i.e., low hilly regions, deep canyon washes with numerous rodent colony holes, and along both sides of the railroad tracks that cross through the study area; Figure 8). Biologists walked slowly and methodically through each of the survey areas to search for burrowing owls and to evaluate and map potential owl burrows, including those that showed signs of recent owl occupation.

HELIX conducted a (Phase II) focused burrow search in spring 2010 within the project footprint (i.e., proposed project features plus a 150 meter [500-foot] buffer from proposed project features). The focused burrow search was conducted concurrently with the spring rare plant survey in March and April 2010. Biologists walked transects within the survey area to allow for 100 percent coverage. All potential burrows, burrowing owl sign, or burrowing owls were recorded with a GPS. Burrowing owl sign includes pellets/casting (e.g., regurgitated fur, bones, and insect parts), white wash (excrement), and feathers.

HELIX conducted a (Phase III) focused burrowing owl survey between June 14 and July 8, 2010 for each of the potential burrow locations mapped during Phase II burrow search. The breeding season is defined by CDFG (1995) and CBOC (1993) as the period between April 15 and July 15. Surveys consisted of 4 site visits, each on a separate day, conducted approximately one week apart. Surveys took place from 2 hours before sunset to one hour after sunset or from one hour before sunrise to 2 hours after sunrise in accordance with the CBOC Guidelines. Biologists took care to not disturb potentially nesting burrowing owls, and used a combination of techniques to determine occupancy and nesting status, including observing the locations from a distance using binoculars and spotting scopes, and carefully walking through the habitat.

In addition, HELIX also conducted follow-up breeding season surveys between July 26 and August 3. The purpose of the follow-up breeding season surveys was to search for burrowing owls and owl burrows in areas of the project site that were not extensively surveyed during other surveys conducted by HELIX in spring and summer 2010 (i.e., rare plant surveys, FTHL survey, or Point Counts/migration surveys). Burrowing owls also were mapped opportunistically during other surveys, including during the fall 2010 special status plant surveys.

Results

The results of the Phase I, II, and III surveys were provided in a survey report (HELIX 2010c). Three burrowing owls and one active burrow were documented during the January 2010 winter resident burrowing owl survey. The three owls were in the north-central and western portions of Site 1 of the study area; the active burrow was in Site 2 of the study area. No burrowing owls were observed during the Phase II burrow search in March/April 2010. Two burrowing owl pairs with active burrows were documented during the Phase III focused survey in June/July 2010 in two of the same locations in Site 1 as in January. The active owl burrow observed in January in Site 2 was re-evaluated during the Phase III owl surveys and was determined to be inactive during the 2010 breeding season. Burrowing owls were repeatedly observed near the westernmost active burrow in Site 1 during the summer survey conducted at the end of July and early August. It is assumed that these repeat observations near the westernmost burrow were the owls associated with the active burrow. In addition, 22 burrowing owl/ burrowing owl burrow locations were documented throughout the study area during the fall 2010 special status plant surveys.

Conclusion

The burrowing owl is a year-long resident of open, dry grassland and desert habitats. It is also found as a resident in grass, forb, and open shrub stages of pinyon-juniper and ponderosa pine habitats as well as agricultural lands. This small owl is found the length of the State of California in appropriate habitats. The burrowing owl is migratory over much of its range, even in southern California (Unitt 2004). Burrowing owl observations on the proposed project site during the non-breeding season is likely a combination of owls that use the Imperial Valley for breeding and owls that migrate through and/or overwinter in the project site from their breeding grounds in Canada and the northern United States.

3.0 MONITORING AND ADAPTIVE MANAGEMENT PROCESS

The process for addressing potential impacts to bird and bat species from implementation of the OWEF is divided into two sections: 1) Post-Construction Monitoring and 2) Adaptive Management based on monitoring results.

Post-construction monitoring is designed to evaluate the project during operation to determine actual impacts. Adaptive management has been designed to use monitoring data to evaluate whether impacts are determined to be significant or unique, and if so, to implement measures to reduce them to acceptable levels or consider some other type of minimization or mitigation.

To help ensure that impacts to avian and bat species can be monitored and mitigated in necessary due to routine operations of the OWEF, a Technical Advisory Committee (TAC) will monitor OWEF activities, including mortality data, to determine the need for project mitigation. The TAC will consist of a single resource specialist (two members may be appropriate if one person specializes in birds and the other in bats) from the BLM, USFWS, and CDFG. The TAC will provide advice and recommendations to the BLM Authorized Officer on developing and implementing effective measures to monitor, avoid, minimize, and mitigate impacts to avian and bat species and their habitats related to operations. The BLM Authorized Officer will evaluate any recommendations of the TAC, including discussions with the proponent on new measures or measures that are not completely detailed in this ABPP, and make a decision on what measure(s) to require for implementation.

A TAC Lead will be designated for the group whose duties will include disseminating project data, including data on mortality events, setting up and moderating meetings, reviewing mortality data, and documenting mitigation recommendations for the OWEF. Because the OWEF occurs on BLM land and they are the federal decision-maker, BLM will provide a designated TAC Lead for the duration of the project. Because it is the TAC Lead’s responsibility to coordinate meetings and involve all team members, the TAC Lead reserves the right to make recommendation decisions under extraordinary circumstances or when all TAC members are unable to meet.

A Memorandum of Agreement (MOA) will be signed by each party to ensure participation in the TAC. Unless there is a failure on the part of any of these representatives to respond or agree to participate, the TAC shall be formed prior to project operations.

The guiding principles, duties, and responsibilities of the TAC include the following.

- Approve TAC charter and sign MOA.
- Make recommendations based on best available science and to address specific issues resulting from this project.
- In the event decisions cannot be made by consensus, decisions of the TAC shall be made by simple majority vote.
- The TAC is only an advisory committee, and final management decisions will be made by the BLM Authorized Officer.
- Provide sufficient flexibility to adapt as more is learned about the project as well as strategies to reduce avian and bat impacts.
- Review initial and any subsequent revised monitoring protocols for mortality monitoring studies.

- Review results of mortality monitoring.
- Recommend appropriate mitigation measure(s) to the BLM Authorized Officer for implementation in the event that a significant or unique event occurs.
- Review annual report on status of compliance with mitigation measures and permit conditions and provide recommendations to the BLM Authorized Officer, as necessary.
- Develop and recommend additional mitigation measures or research to the BLM Authorized Officer if predetermined mitigation is outdated or deemed ineffective or “unexpected fatalities” occur.
- Evaluate effectiveness of implemented mitigation strategies and provide the BLM Authorized Officer with recommendations based on findings.
- If selected as part mitigation, recommend compensatory mitigation funding opportunities for implementation of off-site species or habitat enhancement or protection/conservation measures.
- The TAC will terminate when the BLM Authorized Officer determines that it is no longer a necessary pathway in reducing avian and bat impacts.

The TAC shall hold the first meeting prior to the commencement of operations to develop and approve the charter and requirements of this ABPP. The charter will include an MOA ensuring participation in the TAC and agreeing to how funds provided in this ABPP would be accessed. Thereafter, the TAC shall meet annually, unless data reveal that mortality thresholds have been exceeded. Attendance at TAC meetings shall be by invitation of its members only.

4.0 POST-CONSTRUCTION MONITORING

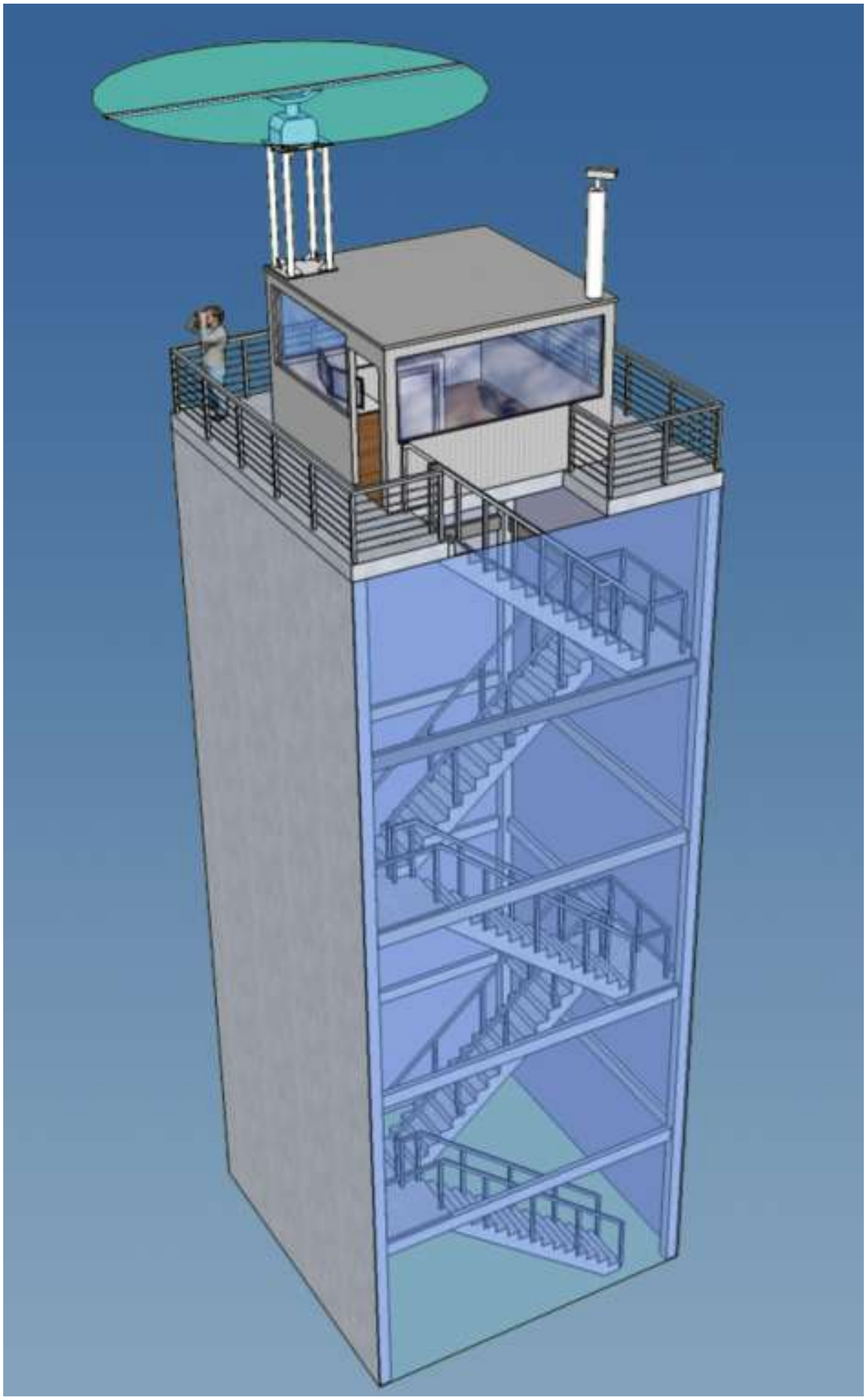
Post-construction monitoring for bats and birds is a critical component of this ABPP. The observations made during post-construction monitoring will be reported to the TAC, which will respond with appropriate management decisions should mortalities exceed the thresholds outlined in this ABPP. Post-construction monitoring will be completed for bats and birds concurrently, and detailed methods for these surveys are presented below. Since post-construction monitoring methods are constantly improving as researchers develop new and more accurate methods of survey, the TAC should consider recommendations to adopt new survey techniques and protocols as they become available.

Post-construction surveys will focus on mortality surveys for birds and bats. These surveys will be completed regularly to document the number and species of birds and bats killed as a result of the OWEF. As part of these mortality surveys, the searcher efficiency rate (i.e., the ability of a surveyor to locate a mortality) and carcass removal rate (i.e., the average time that a carcass persists before a scavenger removes it) will be determined for bats and small and large bird size classes. For each mortality located, the appropriate (i.e., bat, small bird, large bird) searcher efficiency and scavenger removal rate will be used to estimate the actual number of bird and bat mortalities. Methods for completing post-construction surveys are described below.

OE LLC will also have a state of the art Merlin radar system onsite specifically tiered to collect data to potentially curtail turbines in order to minimize direct impacts to Golden Eagles and indirect impacts to bighorn sheep. The Merlin radar system will be mounted on top of a 50-foot tall Advanced Biological Observation Command and Control Center (ABOCCC) that would be constructed in the central portion of the site. The Merlin system incorporates vertical and horizontal radar and the information detected on the radar is linked to a high-resolution camera, which will also be mounted on top of the ABOCCC. A depiction of the ABOCCC is provided as Figure 3. Due to the low level and avian migration and bat use at the site, this system will also be used for data collection purposes for general avian and bat species. The

ABOCCC will be manned from sunup to sundown for the first 5 years of operations to specifically monitor movements of eagles and other wildlife.

Figure 3.Advanced Biological Command and Control Center (ABOCCC)



4.1 Raptor Nest Surveys

Nest surveys will be conducted prior to the nesting season (approximately March 15 to July 30) and once each month during the nesting season during the first three years of operations. Aerial or ground based raptor nest surveys will be conducted within the entire project area and a 1-mile buffer for raptors (BLM 2007), except for golden eagles. The golden eagle nest surveys and associated mitigation are discussed in the OWEF's Draft Eagle Conservation Plan (OE LLC 2011). Where appropriate, activities will be restricted from May 1 through July 15 within 0.5 mile of any raptor nest site (except golden eagles) that has been active within the past 5 years. Nest locations found within the project area and within buffer will be documented by noting the species, dates of activity, Universal Transverse Mercator (UTM) NAD 83 coordinates, nest contents (where possible), and behavior. The data will be presented to the TAC to determine whether mitigation should be recommended to reduce impacts to nesting activities. Active raptor nests will be monitored to track the breeding success of resident raptors and evaluate the effectiveness of mitigation measures, if any are applied.

4.2 Avian Monitoring

To provide a comparison between pre-construction use and post-construction use at the site, avian point count surveys will be conducted twice each month during the first two years of operation. Point-count surveys will be completed using the same methods as pre-construction studies. Basic methods will include general use point-counts in the first few hours of the morning, followed by raptor counts during the middle of the day, and several hours of general use point-counts in the late-afternoon/evening. General use point-count data will be collected to provide an accurate comparison between pre- and post-construction use to inform our understanding of avian exposure and probability of mortality as well as behavioral responses to the facility. Raptor count data would be collected to help determine how post-construction use compares to recorded mortality.

4.3 Mortality Surveys

OWEF will be subject to three years of post-construction monitoring unless additional monitoring. Post-construction monitoring shall begin no later than three (3) months after the COD. Post construction monitoring shall include collecting field data on behavior, utilization and distribution patterns of affected avian and bat species in addition to fatalities.

OWEF will implement monitoring of turbines for fatalities pursuant to an enforceable monitoring program established in consultation with the TAC. OWEF shall monitor a subset (30%) of the turbines at least twice per month for the duration of the post-construction monitoring period for fatalities, bird and bat utilization and or behavior, in consultation with the TAC, as appropriate. Data collected for each carcass will include estimated time since death, condition, type of injury, cover type, distance to nearest WTG location, distance to nearest road, and distance to nearest structure. All observed carcasses will be photo-documented and identified. All mortalities that cannot be identified will be recorded as an unidentified bat or bird. Contingent upon approval and permit by CDFG and the USFWS, it is recommended that carcasses be collected for use in searcher efficiency and scavenger removal trials. Post-construction monitoring shall be conducted by a consultant with applicable experience ("Monitor") approved by the TAC.

4.4 Searcher Efficiency Trials

Searcher efficiency and scavenger rate studies will be used to develop correction factors that will be applied to mortality findings for each surveyed turbine. The corrected data for surveyed turbines will be used to evaluate the mortality per turbine and per MW. Additionally, survey intervals may need to be adjusted based on the findings for these studies in order to ensure precise correction factors, as described by Huso (2008).

Searcher efficiency trials will be conducted throughout the year to correct observed bat and bird mortalities for bias created by the ability of the surveyor to detect bat and bird carcasses. These will be conducted for each searcher to address differences between searchers. Searcher efficiency trials will be completed during each season to account for different field conditions and weather (i.e., springtime when annual vegetation may be dense, summertime when vegetation is dry and temperatures are hot, etc,) that may affect the ability of the surveyor to locate carcasses. Seasons will be defined as described by Erickson et al. (2003): spring migration (March 16–May 15), breeding season (May 16–August 15), fall migration (August 16–October 31), and winter (November 1–March 15). Although seasonal trials will not address fluke events, they will address the overall time period.

Separate searcher efficiency rates will be determined for bats, small birds (passerines), and large birds (raptors). In order to have an adequate sample size (> 50, Huso [2008]), 20 carcasses will be used for each rate. Bat carcasses collected from the OWEF will be used for bat searcher efficiency trials, as available. If an insufficient number of bat carcasses are available, small, drab passerines or brown mice carcasses will be used as substitutes. A minimum of two distinct sizes of bird carcasses will be used to determine searcher efficiency rates for passerines and larger birds. As available, bird carcasses collected from the OWEF will be used in the searcher efficiency trials; however, substitute carcasses may be used as necessary. Substitute small bird carcasses may include species such house sparrows and/or brown-headed cowbirds. Substitute large bird carcasses may include road-killed birds (fresh carcasses only) and/or carcasses from veterinary colleges or wildlife rehabilitation centers; actual large species will be determined in coordination with the TAC. In all cases, carcasses used will either be non-native, non-protected species provided by an authorized agency, or species collected through permitted take, and carcasses will be free of disease and poison.

Prior to initiating the searcher efficiency trial, carcass locations will be randomly generated but constrained so that no more than three carcasses will be located at any one turbine at a time. An additional biologist who is not participating in the searcher efficiency trials will plant carcasses in pre-determined locations. Carcasses will be dropped from waist level, so that they land in a random position and location. The position and location will be recorded for later comparison with actual mortalities.

Bat carcasses will be marked by means of pulling an upper canine tooth as described by Arnett et al. (2009). Similarly, birds will be marked by notching the beak in order to avoid using chemically based marking methods, which may influence scavenger removal rates. When surveyors located a marked carcass, they will note the finding and notify the biologist who planted the carcass. The percentage of planted bats and birds located by surveyors will be used to generate a correction factor to estimate the actual number of bats killed, based on the number of actual mortalities observed.

4.5 Carcass Removal Trials

Carcass removal trials will be completed during each of the 4 seasons over the 3-year post-construction monitoring period. Different seasonal rates for carcass removal are necessary to address the effects of varying weather conditions, scavenger densities, and scavenger assemblages throughout the season, as well as over time, as scavengers adapt to a novel food source. Separate carcass removal rates will be determined for bats, small birds (passerines), and large birds (raptors). All animals used in the carcass removal trials will be handled with disposable nitrile gloves or an inverted plastic bag to avoid leaving a scent on the carcasses and interfering with the scavenger removal trial (Arnett et al. 2009). Carcasses to be used for the carcass removal trials will be obtained from the same sources as described for the Searcher Efficiency Trials, as described in Section 4.4.

4.6 Reporting

The Monitor will prepare interim, annual monitoring reports within three months of completing each year of post-construction monitoring, and will prepare a final three year Monitoring Report within six months of completing three years of post-construction monitoring.
All monitoring reports, including all raw monitoring data upon which the reports are based, will be made available to members of the TAC. All monitoring reports will report adjusted and unadjusted annual fatalities for bats and all other bird species on a per-turbine and per megawatt basis. The fatality numbers will be adjusted to account for searcher efficiency and scavenger rates. The monitoring reports shall also summarize the results of the bird and bat behavior and use studies, the results of the searcher efficiency trials, and the results of the carcass removal trials, for the preceding one or three years, as applicable. The Monitor shall supplement the final three year Monitoring Report with subsequent monitoring data collected.

4.7 Fatality Measures

The TAC, as applicable, shall review the final three year Monitoring Report for the project to evaluate whether any turbines are causing significantly bird and/or bat fatalities relative to other turbines included within that particular portion of the project. If one or more turbines are causing significantly disproportionate bird or bat fatalities, then the TAC, as applicable, in consultation with the Parties, may recommend to the Planning Director of the BLM additional focused monitoring and/or management measures designed to reduce the fatalities attributable to those turbines; provided, however, that such measures shall not include relocation or permanent shutdown of any turbine. Notwithstanding the foregoing, the Parties acknowledge that fatality reduction or other measures may be required pursuant to applicable law inc1uding but not limited to the federal Endangered Species Act (16 U.S.C §§ 1530 *et seq.)*, Bald and Golden Eagle Protection. Act (16 U.S.C. §§ 668-668d), Migratory Bird Treaty Act (16 U.S.C. §§ 703712) or the California Endangered Species Act {California Fish and Game Code, §§ 2050, *et seqJ*

5.0 AVOIDANCE AND MINIMIZATION OF RISK USING ADVANCED CONSERVATION PRACTICE’S AND COMPENSATORY MITIGATION

OE LLC plans to implement a variety of Advanced Conservation Practice’s (ACP’s) to reduce the risk to avian and bat species from the project. The following ACP’s have been implemented or are planned for the OWEF during the pre-construction, construction, and operation phase of the project.

5.1 ACP’s Pre-Construction

OE LLC collected available site-specific information on avian and bat use to guide project siting to avoid and minimize impacts. Other ACP’s implemented during the pre-construction phase of the OWEF include:

- The area and intensity of disturbances was minimized during pre-construction monitoring and testing activities.

- Existing roads and transmission corridors have been used to the extent possible while developing site plans.
- Structures are sited away from high avian use areas and the flight zones between them.
- The Avian Power Line Interaction Committee (APLIC) guidance on power line siting (APLIC 1994) was followed while planning.
- Site plans minimized the extent of the road network needed for the OWEF.
- No lattice or structures that are attractive to birds for perching are including in facility designs.
- No guy wires will be included on permanent MET towers.
- Lighting plans for the facility are the minimum according to requirements.
- All security lighting will be motion or heat activated, instead of being left on throughout the night.
- All security lighting will be down-shield and related to infrastructure lights.
- Turbines will not be sited in areas where raptor prey species are abundant.
- The facility was not sited in any areas containing high concentrations of ponds, streams, or wetlands.
- The OWEF site plan includes a 50-foot tall ABOCCC to allow for early detection of any significant raptor and passerine migration through the site.

5.2 ACP's during Construction

The following ACP's will be implemented at the OWEF during construction:

- The area and intensity of disturbance will be minimized to the extent possible during construction.
- Existing roads will be used for access during construction to the extent possible.
- Non-operational MET towers will be dismantled during construction.
- Powerlines will be buried to the extent possible to reduce avian collision and electrocution.
- APLIC guidance on power line construction (APLIC 2006) will be followed.
- A transportation plan will be implemented during construction that includes road design, locations and speed limits to minimize habitat fragmentation and wildlife collisions, and minimize noise effects.
- Any construction lighting to be used at night will be down-shielded.
- Clearing of vegetation for construction will avoid the bird breeding season when feasible. Pre-construction bird surveys would be conducted if clearing of vegetation needs to be completed during the bird breeding season. Construction setbacks would be implemented if active nests are found during pre-construction surveys.

5.3 ACP's during Operation

In addition to the intensive monitoring and research program, the following ACP's will be implemented during operation of the OWEF:

- Management activities such as seeding forbs or maintaining rock piles that attract potential prey will be avoided.
- Parts and equipment which may be used as cover by prey will not be stored in the vicinity of wind turbines.
- Any carcasses (with the exception carcasses being used for post-construction bias trials) found within the OWEF will be removed immediately assuming the appropriate permits/authorizations have been granted to OE LLC.

- Low level speed limits (< 25 mph) will be maintained on all roads within the OWEF.
- Personnel will be trained to be alert for wildlife at all times, especially during low visibility conditions.
- Personnel, contractors, and visitors will be instructed to avoid disturbing wildlife, especially during the breeding seasons and seasonal periods of stress.
- Fire hazards will be reduced from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off roads, and allow smoking in designated areas only).
- Federal and state measures for handling toxic substances will be followed.
- Effects to wetlands and water resources will be minimized by following provisions of the Clean Water Act (1972).

5.4 Additional ACP's

The following is a list of possible ACP's that may be considered for implementation depending on the results of the post-construction monitoring programs and discussions with the Technical Advisory Committee (TAC). The post-construction monitoring program and the role of the TAC are described in further detail in Section 6 below.

- A biologist will be staffed at the ABOCCC during the post-construction monitoring period. The biologist will have the ability to curtail turbines if it is deemed necessary to protect biological resources.
- Modification and implementation of the curtailment strategies developed during the three years of post-construction monitoring, including consideration of possibly other technologies.
- Additional curtailment based on data collected on site.
- Placement of visual and/or auditory bird flight diverters in critical locations.
- If fossorial mammals are found burrowing near turbines, burrows may be filled and the turbine pad may be surrounded within gravel at least two inches deep.
- Installing perch guards on overhead electric lines in the vicinity of the OWEF if raptors are shown to regularly use the lines.
- Relocate nests if it is shown that specific resident bird species are being impacted, upon written concurrence from CDFG and/or USFWS.
- Retrofit power poles or pay into a compensatory mitigation fund.
- Changing turbine cut-in speed.
- Other direct mitigation as recommended by the TAC.

6.0 ADAPTIVE MANAGEMENT

The adaptive management techniques described in this section have been developed to ensure that potentially significant levels of mortality from operation of the OWEF are effectively mitigated.
This section describes the adaptive management process that will be applied for avian and bat species. Changes in federal, state, and/or BLM status for wildlife species occurring within the project area may result in the addition of, or changes to, adaptive management strategies, as determined by the BLM through TAC recommendations.

6.1 Adaptive Management Process

The TAC will meet to discuss mitigation needs if the TAC Lead determines if a unique or significant event has occurred. At a minimum, the TAC will meet annually to review data and determine whether mitigation is necessary. If the TAC determines mitigation is necessary, the TAC will be responsible for identifying and recommending suitable mitigation(s). One or more ACP's may be applied for birds or bats if a unique or significant event occurs.

7.0 CONCLUSION

This document was written to provide guidance for all required wildlife mitigation and monitoring prior to, during, and after construction of the OWEF. The measures described in this document are intended to help protect and reduce impacts to wildlife, as well as to monitor potential impacts to wildlife following implementation of the OWEF. It is anticipated that this ABPP will adaptively manage the OWEF based on findings following construction.

8.0 LITERATURE CITED

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APPENDIX A MORTALITY TRACKING SPREADSHEETS

Bird Mortality

Location: ____________________
Turbine number
should add types of towers (e.g., lattice or tubular)

Date: ______________
in a form appropriate for sorting in the database software (i.e., 021496)

Start time: ___________
24-hour clock

Weather
Temperature: _________°C

Precipitation: _______________
Record as N (none), L (light), M (moderate), H (heavy), F (fog)

Snow cover: __________% ground covered

Observer: ____________________
initials

Primary data

Species: _________________________
4-letter code

Sex: M or F; unknown

Age: ____
Adult, immature (be as specific as possible)

Dead: Y or N

Estimated time since death: ___________________
in days

Description of bird (e.g., broken or missing body parts): ____

Disposition of bird: ____

Distance of carcass from turbine: _______m

Notes on bird: ____
(e.g., condition and location)

7

MORTALITY/INJURY STUDY 1996
Field Data Sheet with Variables
(CEC 1/10/96)

Check1___ Comp___
Check2___ Map___
Spp. List___

CODE

_____ **Rec.#**: Record Number: sequential number starting with 001.(Will be assigned outside of field.)

_____ **Date**: Date bird discovered: month/day

_____ **Comp.**:Company/Area:
100 = Zond
110 = near Zond/Zond side of Cameron Rd.
120 = between TWS Rd.& Zond - West of Zond
200 = Cannon
210 = near Cannon/Cannon side of Cameron Rd
220 = area between Cannon & Sea West
300 = Sea West
310 = near Sea West
400 = FloWind

_____ **Trans#**: Transect Number or "0" for not applicable.

_____ **Subloc.**: Sublocation Number or "0" for not applicable.

_____ **Obs.**: Observer:
1 = Dick Anderson
2 = Natasha Neumann
3 = Jennifer Noone
4 = Judy Tom
5= Michaela Disney
6= John Clecker

_____ **Spp.**: Species: the 4-letter acronym for the species of bird found dead.

_____ **Age**:
1 = unknown 2 = immature 3 = adult

_____ **Sex**:
1 = unknown 2 = female 3 = male

_____ **Time**: Estimated time since death:
1 = undetermined
2 = fresh kill - < 2 days old
3 = few days - maggots starting to appear
4 = 1 week - maggots over entire body
5 = 2 week - flesh at least half gone
6 = 1 month - no flesh left, just bones and feathers
7 = over 6 months - bones and feathers disassembled
8 = bird alive - not applicable
9 = status unknown - not applicable

_____ **Cause**: Cause of Death or Injury
1 = unknown
2 = colission with turbine
3 = colission with wire
4 = electrocution
5 = other - explain in comments
6 = not applicable (ie.one feather)

* If bird/feather(s) found in association with a predator/scavenger den (ie. coyote, kit fox) or raptor nest, exclude from study. But be sure to include in an incidental observation report. Make sure to document in mort. rec. only if feather is of resident nester.

CODE

_____ **Certain.**: Degree of certainty for cause of death/injury.
1 low 2 3 4 5 high
6 = not applicable

_____ **Cond.**: Condition (also describe in detail in comments)
1 = dead
2 = alive
3 = unknown - not applicable

_____ **Injur.**: Injuries (For both dead and alive birds)(Can include more than one code)
1 = no obvious signs
2 = wing sheared off
3 = head sheared off
4 = feet sheared off
5 = body sheared in half
6 = multiple dismemberment
7 = broken wing bone
8 = broken neck bone
9 = broken leg bone
10 = injury to wing
11 = injury to legs
12 = injury to eyes
13 = injury to body
14 = injury to head
15 = feather damage
16 = body and feathers intact
17 = feathers and body disassembled
18 = just feathers
19 = just bones
20 = just feathers and bones
23 = wing only
24 = electric burns on feet
25 = electric burns on wings
26 = internal injuries
27 = impact, then continued on
28 = stunned
29 = entangled in wires
30 = other - describe in comments
100 = unknown status - no indication of injury/mortality (ie.single feather; feather(s)of same species found within 1 sublocation.)
200 = unknown status of bird found outside of sublocation (ie. feather found only)
200 + code = injury of bird found outside of sublocation.

_____ **Collected**: Was the bird collected?
1 = collected
2 = not collected
3 = partially collected (ie.few feathers)

_____ **Mx.Dt.**: Maximum Distance(m)at which bird/ bird part/feather could be observed: Refer to feather closest to turbine
1 = <0.5m
2 = 0.5m - 1m
3 = 1.1m - 5m
4 = 5.1m - 10m
5 = >10m

(MORE ON BACK)

RECORD OF DEAD BIRDS - SCAVENGING STUDY # __ __ __ 1996

Date: ________ Obs: _______ [chicken spp. not included in this list] *(CEC 12/12/95)*

Size: 1 = small (ie. sparrow); 2 = medium (ie. dove, kestral); 3 = large (ie raven, hawk,) Cond(ition): 1 = fresh; 2 = old

Band#	Spp.	Size	Cond.	Band#	Spp.	Size	Cond.	Band#	Spp.	Size	Cond.

___ ___ ___ scavenging study #

SCAVENGING STUDY 1996

Company/Area ________ (c)___ OBS ____________ (c)___

pg — of —

heck 1 ☐
mp ☐
heck 2 ☐

Date																				
Time	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm
Temp.																				
Wind																				
Cloud																				
Precip.																				
Fog																				
Moon																				

SITE#:	Time																				
Spp: _____ Size: _____ Bd#: _____	Cond.																				
	Comments:																				

SITE#:	Time																				
Spp: _____ Size: _____ Bd#: _____	Cond.																				
	Comments:																				

SITE#:	Time																				
Spp: _____ Size: _____ Bd#: _____	Cond.																				
	Comments:																				

SITE#:	Time																				
Spp: _____ Size: _____ Bd#: _____	Cond.																				
	Comments:																				

SITE#:	Time																				
Spp: _____ Size: _____ Bd#: _____	Cond.																				
	Comments:																				

OBSERVER BIAS STUDY
1996

DATE:____/____ OSERVER:________ (c) ____

NCom. Type:_____ (c) _____ SITE #:____

ORDER: 1st 2nd 3rd

COMPANY:________ (c) ______ TIME: Start ______ End ______

Bird Mortality Sign Description (small = ≤ 8 in.; large = > 8 in.)
Distance at which sign was first observed

	sm	lg	dist
1.			
2.			
3.			
4.			
5.			
6.			

	sm	lg	dist
7.			
8.			
9.			

	sm	lg	dist
10			
11			
12