Appendix B-4: Bird and Bat Conservation Strategy

Searchlight Wind Energy Project
Bird and Bat Conservation Strategy

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1.0 INTRODUCTION

1.1 Duke Energy Renewables' Corporate Policy

Duke Energy Renewables and its subsidiary companies, including Searchlight Wind Energy LLC, are committed to siting, constructing, operating, and decommissioning their facilities in an environmentally responsible and sustainable manner. This environmental responsibility includes conserving and minimizing impacts to natural resources, including avian and bat species and the habitats they use. This Bird and Bat Conservation Strategy (BBCS) has been prepared according to Duke Energy Renewables programmatic approach and the USFWS wind energy land-based guidelines (USFWS 2012); and is considered to be a living document that will be updated periodically as new information becomes available and subsequent "Tiers" as outlined in the Wind Energy Guidelines are completed. This approach allows new information on risk, monitoring, or adaptive management to be incorporated so that the BBCS is accurate and uses the best information for decision making.

1.2 Statement of Purpose

While wind power projects or "wind farms," such as the Searchlight Wind Energy Project (Project), utilize a renewable-energy resource (wind), there are potential avian and bat impacts resulting from their construction and operation. The following site-specific Bird and Bat Conservation Strategy (BBCS) outlines various processes that Duke Energy Renewables has and/or will employ to: 1) comply with all state and federal avian and bat conservation and protection laws and regulations at the Project; 2) to ensure that any impacts to avian and bat resources are identified, quantified, and analyzed; and 3) implement various conservation, avoidance, minimization, and mitigation measures to address any impacts that result from the operation of the Project.

Federal laws and regulations protect the majority of birds found in and around the Project site. Interactions of birds with generating facilities (including wind turbines, transmission and distribution lines, substations, and other associated structures and equipment) are potentially harmful or fatal to birds. In addition, bird interactions can result in outages, which in turn could lead to grass and forest fires, raising concerns by employees, resource agencies, and the public.

Generating facilities also have the potential to impact bats. Significant impacts on bats may raise concerns by employees, resource agencies, and the public. Therefore impacts on birds, bats, and other wildlife that occur as a result of Duke Energy Renewable projects are important to Duke Energy from both a regulatory priority, and natural resource conservation priority.

2.0 BACKGROUND AND DESCRIPTION OF THE PROJECT

Searchlight Wind Energy, LLC (Searchlight Wind), a wholly-owned subsidiary of Duke Energy Renewables, received a temporary right-of-way (ROW) grant from the Bureau of Land Management (BLM) in July 2007 to develop the Searchlight Wind Energy Project on portions of public land in southern Clark County, Nevada. The Project as currently proposed would be an approximately 220 megawatt (MW) wind energy facility (Figure 1). The purpose of the Project is to develop, own and operate a wind conversion facility that will contribute to Nevada's Renewable Portfolio Standards for electricity generation. Searchlight Wind Energy, LLC has contacted the BLM, Nevada Department of Wildlife (NDOW), and the USFWS regarding ecological study needs for the Project (Table 1).

The Project area lies to the north of the Newberry Mountain Range and south of the Eldorado Mountain Range in southern Clark County, Nevada (Figure 1). It is situated approximately 2.4 kilometers (km; 1.5 miles) west of Lake Mead National Recreation Area, 97 km (60 miles) southeast of Las Vegas and 64 km (40 miles) north of Laughlin, Nevada. Specifically, the Project area for the Searchlight Wind Energy Project encompasses lands approximately 0.8 km (0.5 miles) northeast to 4.8 km (3 miles) southeast of the town of Searchlight. The Project area encompasses 3,399 hectares (8,400 acres) east of I-95 and is located on undeveloped BLM land interspersed with private holdings, most of which are in the form of mine claims.

The Project area is located in the Mojave Basin and Range ecoregion in extreme southern Nevada (Bryce et al. 2003). Caliche formations are present throughout the Project area with creosote bush scrub and Joshua tree woodland as the predominant plant communities (Bryce et al. 2003). Topography varies greatly within the Project area, with flats, washes, valleys, and steep mountains/hills present at elevations ranging from 683 – 1319 m (2,240 to 4,327 feet) above mean sea level. Topographical variation is highest in the northern portion of the Project area while the southwestern portion lies predominantly within the valley floor. Dry washes exist throughout the Project area.

The Project has been planned to include 87 wind turbines generators (WTGs; Figure 2) with the anticipated turbine model being the Siemens 2.5 MW turbine which has a hub height of 80 meters (m; 262 feet) and 101 m (331 feet) rotor diameter, producing a rotor-swept area (RSA) occurring between 30 and 130 m (98 – 427 feet) above ground. Turbine configuration takes advantage of local terrain and is located primarily along hill- and ridge-tops within the Project area, configured to maximize access to the wind resource in the area while minimizing impacts to wildlife. In addition to the turbines, the facility will include access roads, an electrical collection system, a substation, a transmission connection, an operations and maintenance (O&M) building and 5 permanent meteorological (met) towers (Figure 2). The total area affected by development will be up to approximately 157 hectares (389 acres; Table 2).

Table 1. Chronology of Agency Coordination for Searchlight Wind Energy Project

Meeting	Type	Parties	Dates
Site visit and discussion of completed, ongoing, and future wildlife studies	In person	Duke, Tetra Tech, BLM, NDOW, O'Farrell Biological	November 5, 2008
Discussion of upcoming 2009 wildlife studies, protocols	Conference call	Duke, Tetra Tech, BLM, NDOW, URS, O'Farrell Biological	March 4, 2009
Discussion of 2009 wildlife study results, upcoming fall studies	In person	Duke, Tetra Tech, BLM, NDOW, URS, O'Farrell Biological	July 24, 2009
Discussion of results of wildlife monitoring, development of mitigation strategies	In person	Duke, Tetra Tech, USFWS, BLM, NDOW	Feb 7, 2011
Discussion of wildlife risk assessment, need for future monitoring, mitigation strategies	In person	Duke, Tetra Tech, USFWS, BLM, NDOW	July 26, 2011

Table 2. Area Affected by Development

Project Feature	Total Acres of New Habitat Disturbance (acres)	Approximate Temporary Construction Disturbance (acres)[1]	Approximate Permanent Construction Disturbance (acres)
Turbine pads	69.2	66	3.2
New and upgraded Project roads and crane pads[2]	253.0	111.4	141.6
Operations and maintenance facility	6.5	1.5	5.0
Equipment storage and construction laydown areas[3]	28.3	28.3	0
Overhead transmission line right-of-way	16.5	16.5	0
Substations	7.0	5.0	2.0
Batch plant	1.0	1.0	0
Meteorological towers	0.01	0	0.01
Western's switching station	7	2.5	3.5
Total Estimated Impacts	388.5	232.2	155.3

1Temporary construction impacts are in addition to permanent impacts.
2Restoration of roadsides.
3Includes temporary office trailers and crane assembly areas.

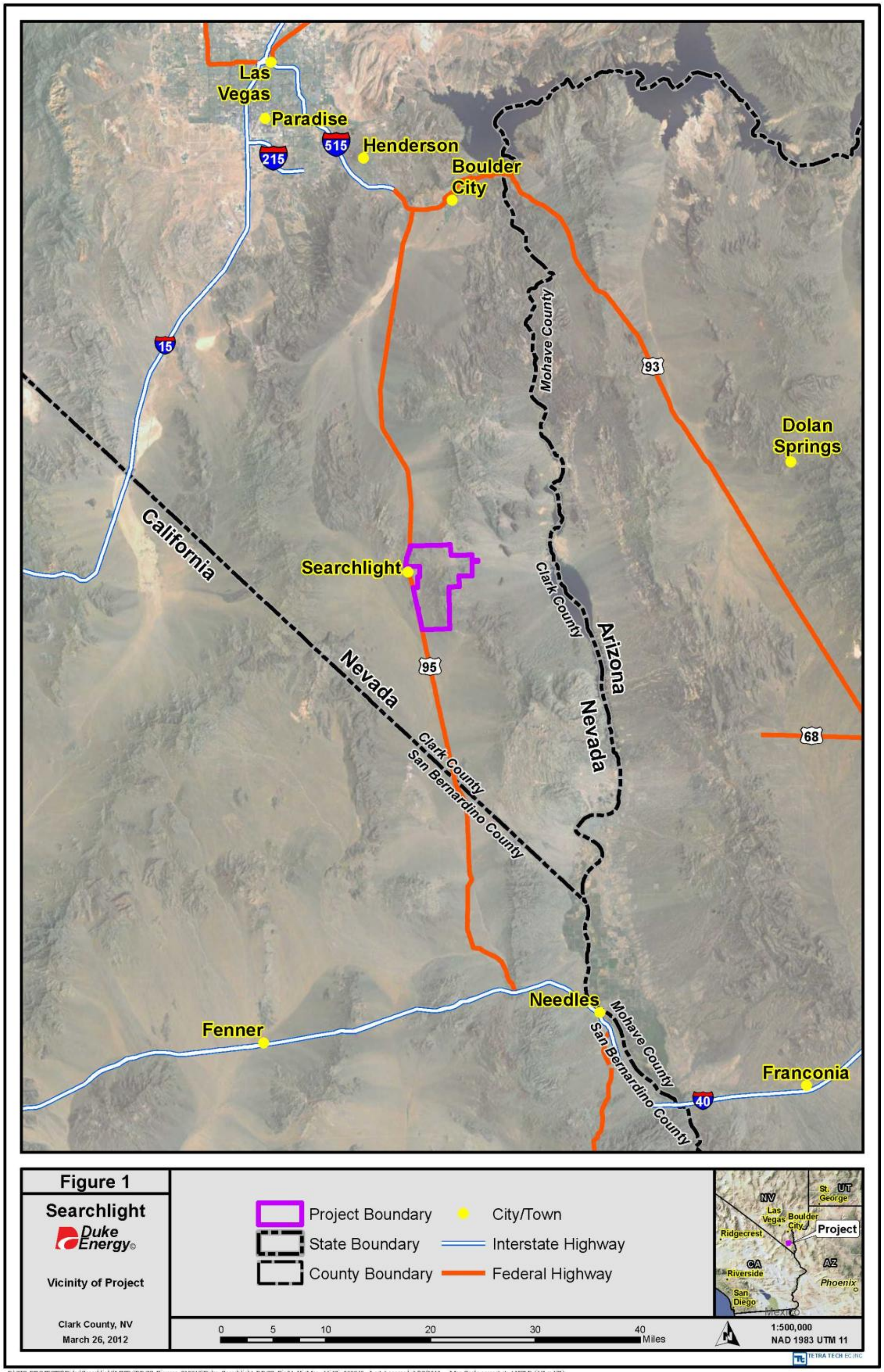


Figure 1. Vicinity of Project

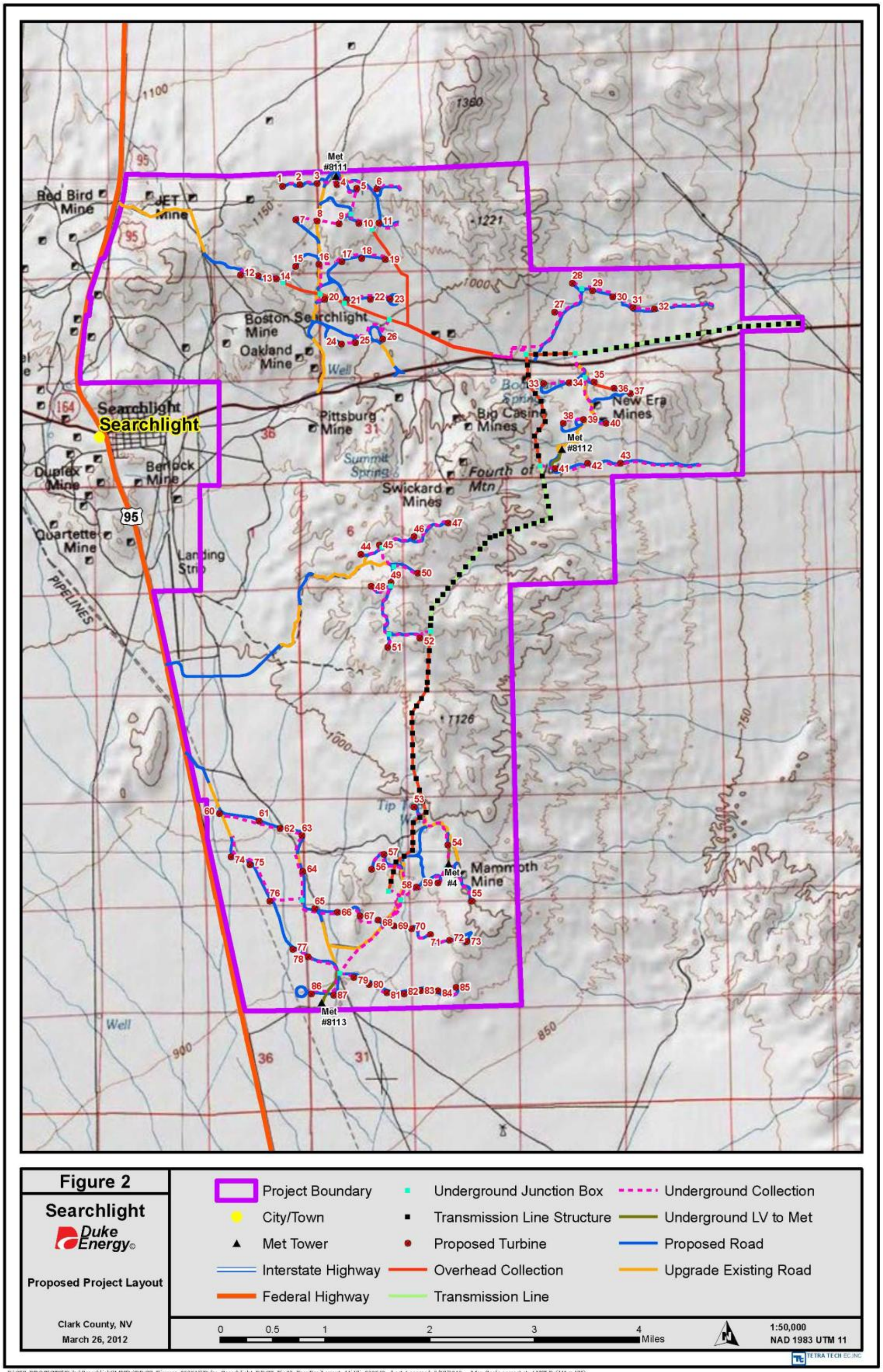


Figure 2. Proposed Project Layout

3.0 PROJECT-SPECIFIC REGULATORY REQUIREMENTS

Bird and bat species are protected under a variety of federal and state laws and regulations. Relative to the Project, these include the federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), BLM Instructional Memorandum 2010-156, and Nevada State Codes. These regulations are described in the following subsections.

3.1 Potential Endangered Species Act-Listed Wildlife Species

The purpose of the ESA is “to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species.” Section 9 of the ESA prohibits “take” of threatened or endangered species, which includes killing, injuring, or harming a listed species or its habitat. Any activity that may result in the “incidental take” of a threatened or endangered species requires a permit issued from the USFWS under Sections 7 or 10 of the ESA. A review of the USFWS endangered, threatened, and candidate species for Nevada (USFWS 2012a) was conducted to identify species listed under the ESA that have the potential to occur in Clark County. Only two threatened or endangered species, Yuma clapper rail (*Rallus longirostris yumanensis* – federally endangered), and southwest willow flycatcher (*Empidonax traillii extimus* – federally endangered), have the potential to occur within the county (USFWS 2012a), and neither have been detected during Project field surveys (Section 5.2.1). The yellow-billed cuckoo is a candidate species with potential to occur in Clark County (USFWS 2012a), although no sightings have been made during field surveys. There are no federally listed bat species known to occur in Clark County (USFWS 2012a).

3.2 Migratory Bird Treaty Act

Under the Migratory Bird Treaty Act (MBTA) it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any native migratory bird, part, nest, egg or product. Generally speaking, the MBTA protects all birds in the U.S., except gallinaceous birds (e.g., upland game birds, such as greater sage grouse *Centrocercus urophasianus*, wild turkey *Meleagris gallopavo*, and Hungarian partridge *Perdix perdix*) rock pigeons (*Columba liva*), Eurasian collared doves (*Streptopelia decaocto*), European starlings (*Sturnus vulgaris*), and house sparrows (*Passer domesticus*). The USFWS has established a permitting scheme for a variety of intentional activities, such as hunting and scientific research, but has not done so for the incidental take of migratory birds during otherwise lawful activities. As a result, there is no permitting framework that allows a company to protect itself from liability resulting from take at wind facilities; however, the USFWS does not usually take action under the MBTA if good faith efforts have been made to minimize impacts. As is the case with all wind energy projects, a variety of birds protected under the MBTA occur within and/or around the Project site.

3.3 Bald and Golden Eagle Protection Act

The BGEPA prohibits the take of any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), alive or dead, including any part, nest, or egg. “Take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” a bald or golden eagle. “Disturb” means to agitate or bother an eagle to a degree that causes, or is likely to cause (1) injury to an eagle; (2) a 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. Historically permits were not available under the BGEPA; however, a rule change in 50 CFR in November 2009 provided a mechanism to acquire permits for incidental take resulting from an otherwise lawful activity (§22.26).). Further, on April 12, 2012 the USFWS announced an Advanced Notice of Proposed Rulemakeing to potentially further amend the November 2009 regulations on the issuance of incidental take permits for eagles. The Draft Eagle Conservation Plan Guidance outlining the steps requested for permits was released in February 2011 (USFWS 2011a). This Guidance will likely change as a result of the rulemaking process. Golden eagles are known to occur in Clark County, and were rarely detected during field surveys (Section 5.2.1). No bald eagles have been sighted within the Project or vicinity during field surveys (Section 5.2.1

3.4 Nevada State Codes

Under Nevada law and regulation, any wildlife receiving the distinction of fully protected species may not be captured, removed or destroyed at any time except with special permit as provided under Nevada Revised Statutes (NRS) 503.584-503.589 and Nevada Administrative Code (NAC) 503.093. Section 503.093 indicates that protected species include wildlife species that are classified as sensitive, threatened or endangered by NDOW and that an “appropriate license, permit or authorization required to hunt, take or possess protected wildlife; (NRS 501.105**,** 501.181)” is necessary. A number of bird and bat species are protected under NRS 501; protected species with potential to occur within the Project are listed within Table 4 within Section 5.2.

4.0 DECISION FRAMEWORK

Duke Energy Renewables has adopted the decision framework and “tiered” or stepwise process, as currently recommended in the USFWS Land-based Wind Energy Guidelines (USFWS 2012). This tiered process that has been and is being implemented at the Project includes the following:

- Tier 1: Preliminary evaluation or screening of sites (landscape-level screening of possible project sites);
- Tier 2: Site characterization (broad characterization of one or more potential project sites);
- Tier 3: Field Studies to document site-specific wildlife conditions and predict project impacts (site-specific surveys and assessments at and around the proposed project site);
- Tier 4: Perform Post-construction fatality studies to assess and evaluate direct avian and bat fatalities resulting from turbine blade strikes; and

Tier 5: Other post-construction studies to assess and evaluate direct and indirect impacts to certain species of concern (i.e., greater sage-grouse and golden eagles), including habitat impacts, nest productivity, and other potential impacts.

This process and decision framework starts out general or broad and becomes more specific as information is gathered and the potential for avian and bat issues is better understood during each tier. Information gathered addressing the potential for avian and bat issues helps to answer questions and formulate additional questions that may need to be addressed in subsequent tiers. The stepwise or "tiered" approach ensures that sufficient data are collected on avian and bat species to enable Duke Energy Renewables to make informed decisions regarding the proposed project while ensuring that Duke Energy Renewables is complying with its corporate environmental policy.

These specific studies that have been or will be conducted at the Project will be used to inform and direct subsequent studies and surveys for the Project, as well as to identify the potential need for additional conservation measures. The following sections provide details of the tiered process being utilized for Project. They also identify avoidance and minimization measures that Duke Energy Renewables is planning or may implement based on the results of studies conducted to date and the anticipated impacts of those measures.

5.0 PROJECT-SPECIFIC RESULTS FROM THE PRE-CONSTRUCTION EVALUATION PHASE AND PROJECT SITING

5.1 Site Characterization/Site Visit (Tier 1 and 2)

A site visit was conducted by Tetra Tech in February 2 and 3, 2007 as part of an Environmental Assessment to evaluate the potential impacts caused by building six met towers for the proposed Searchlight Project (Tetra Tech 2007). Tetra Tech biologists reviewed existing information on biological resources in the Project area prior to conducting fieldwork. This review included federally-listed sensitive-species from lists provided by the USFWS office for Clark County, the BLM list of special status species, and the Nevada Natural Heritage Database (Tetra Tech 2007). Based upon the data review and results of the site visit, the findings indicated low potential for occurrence of special status and sensitive bird and bat species within the Project area.

5.2 Baseline Wildlife or Site-Specific Field Studies (Tier 3)

In response to concerns about potential impacts to avian and bat species resulting from the development of the Project, a variety of field studies and literature reviews were initiated (Table 3). The geographic coverage of each study may differ due to changes in the anticipated turbine layout at the time when the studies were initiated. Full details about methods, exact areas covered, and the locations and numbers of species detected during the surveys can be found within the original reports provided in Appendix A. Survey highlights are summarized below.

Table 3. Survey Efforts to Date at the Searchlight Wind Energy Project.

Study	Taxa	Dates conducted	Type of Survey	Reports
Avian use surveys	All birds	Fall 2007, spring 2008, fall – winter 2008-2009, spring 2009	Point counts	Tetra Tech 2008, 2010
Raptor nest surveys	Raptors	Spring 2008, spring 2009	Ground and aerial	Tetra Tech 2008, 2010
Bat acoustical monitoring at mines and met towers	Bats	April 2008 – April 2010	Passive acoustic	O'Farrell 2009a, 2010
Golden eagle and raptor nest surveys	Golden eagles, raptors	Spring 2011	Aerial	Tetra Tech 2011
Bald eagle winter use surveys	Bald eagles	December 2011 – January 2012	Ground	Tetra Tech 2012

5.2.1 Avian Use Surveys

Avian use surveys were conducted for 2 years within the Project area. Weekly surveys were conducted in fall 2007, spring 2008, fall 2008 through winter 2009, and spring 2009 for a total of 4 survey seasons (Tetra Tech 2008, 2010). Surveys in spring captured breeding birds and spring migrants, winter residents were documented during winter surveys, and fall migrants were sampled during fall surveys. Fixed-point count surveys (800-meter [m] radius) were conducted for 20 minutes (min) at points distributed throughout the Project, and covered 30.6 percent of the Project area (Figure 3).

A total of 4,299 birds were observed within the Project, including 3,954 birds of 64 species and 345 individual birds that could not be identified to species. Overall mean bird use within the Project was 5.97 birds/20 min and ranged from 0 to 44 birds/20 min. Variation in mean use occurred among the 4 survey periods, with fall surveys having a lower overall mean use than spring surveys (3.81 birds/20 min in fall 2007 and 4.08 birds/20 min in fall/winter 2008-2009 versus 7.21 birds/20 min in spring 2008 and 8.46 birds/20 min in spring 2009). More species were detected during the spring (42 in 2008, 45 in 2009) compared to fall and winter (33 in 2007, 30 in 2008-2009).

Songbirds had the highest mean use out of all species groups observed (4.44 birds/20 min). The species with the highest mean use were the black-throated sparrow (1.26 birds/20 min), house finch (0.33 birds/20 min), the ash-throated flycatcher (0.25 birds/20 min) and the horned lark (0.24 birds/20 min). Overall mean raptor use for all surveys for was 0.31 birds/20 min. Raptor species with the highest mean use over all surveys were the turkey vulture (0.12 birds/20 min), red-tailed hawk (0.11 birds/20 min), and American kestrel (0.05 birds/20 min). Each other raptor species, including northern harrier, Cooper's hawk, golden eagle, burrowing owl, prairie falcon, and sharp-shinned hawk had a mean use of 0.01 birds/20 min or less. No bald eagles were seen.

The common raven had the highest overall encounter rate (number of individuals flying within the anticipated RSA) with 0.15 birds flying within the anticipated RSA height range/20 min. The turkey vulture, red-tailed hawk, and American kestrel had the highest overall encounter rates among raptor species (≤0.10 birds flying at RSA height/20 min or less).

5.2.1.1 Golden Eagles

During the fall 2007 survey, 2 golden eagles were observed during point count surveys (0.014 birds/20 min) and 2 were observed incidentally. Both individuals were observed flying within the anticipated RSA, for an overall encounter rate of 0.014 birds/20 min flying within the RSA for fall 2007. No further observations of golden eagles occurred in subsequent survey seasons for an overall use rate of 0.003 birds/20 min; this rate was obtained by dividing 2 observations by 667 counts.

5.2.1.2 Special Status Species

No federally endangered, threatened or candidate species for Clark County, NV (USFWS 2012a) were detected during avian surveys or as incidental observations. Five species observed over all surveys were Nevada BLM, or Nevada state-sensitive species: burrowing owl, loggerhead shrike, LeConte's thrasher, Bendire's thrasher, and Brewer's sparrow (Table 4). The Project area overlaps the breeding range of each of these species. All species listed above had encounter rates of <0.01 birds/20 min flying within the RSA when analyzed per survey and overall, primarily because of their low mean use within the Project area.

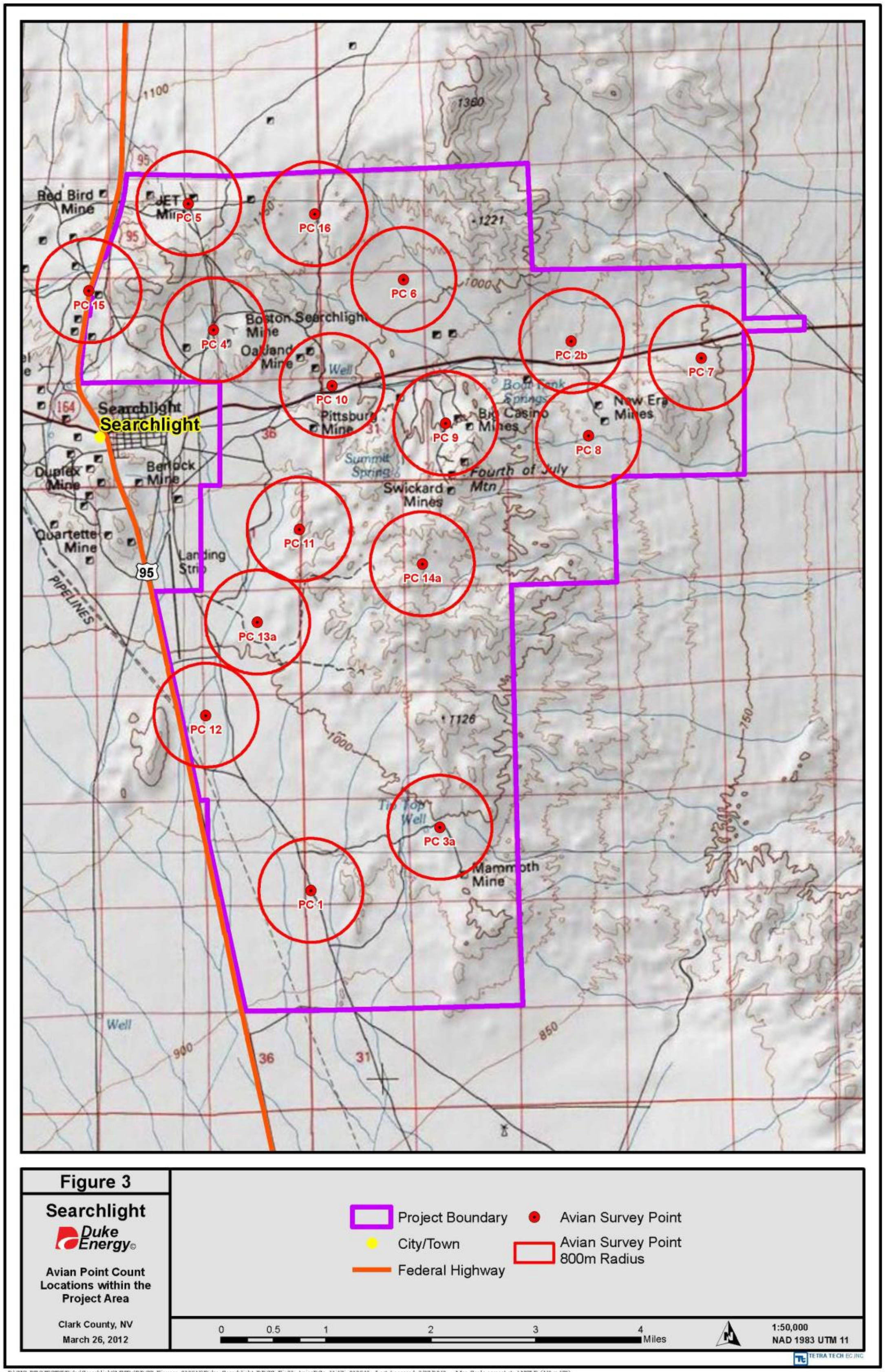


Figure 3. Avian Point Count Locations within the Project Area

Table 4. Special Status Species Occurrence within the Project Area

Species	Status[1]	Presence within Project Area
Bald eagle	BLM, NSE	None detected
Bendire's thrasher	BLM	Spring 2008 (2 birds)
Brewer's sparrow	BLM, NSS	Fall 2007, Spring 2008, and Spring 2009 (78 birds)
Ferruginous hawk	BLM	None detected
Golden eagle	BLM	Fall 2007 (2 birds plus 1 observed incidentally)
Loggerhead shrike	BLM, NSS	All 4 seasons (126 birds)
LeConte's thrasher	BLM	Spring 2008 (3 birds)
Peregrine falcon	BLM, NSE	None detected
Southwestern willow flycatcher	BLM, NSE	None detected
Western burrowing owl	BLM	Spring 2008 (2 birds)
Western snowy plover	BLM	None detected
Western yellow-billed cuckoo	USFWS Candidate, BLM, NSS	None detected
Yuma clapper Rail	USFWS Endangered, BLM, NSE	None detected

[1]BLM = Nevada BLM Sensitive Species; NSS = Nevada State Sensitive Species; NSE = Nevada State Endangered

5.2.2 Raptor Nest Surveys

Raptor nest surveys were conducted in spring 2008 and spring 2009 (Tetra Tech 2008, 2010; Table 5). In 2008, surveys were conducted by foot within the Project area (2008 layout) and approximately a 1-mile buffer (Tetra Tech 2008). One active red-tailed hawk nest and 5 inactive stick nests were found, with an additional red-tailed pair thought to be breeding within the Project area but no nest was found. A pair of American kestrels was also observed to be breeding in the Project area but no nest was located. Three burrowing owl burrows were observed, with 2 of the 3 burrows occupied by owl pairs. Both a barn owl and great horned owl pair were found utilizing abandoned mine shafts in the northern portion of the Project area.

In spring 2009, an aerial survey of the Project area and a 2-mile buffer conducted in April and follow-up ground surveys in May located 10 active red-tailed hawk nests (Tetra Tech 2010; Table 5). Additionally, 9 inactive stick nests and a breeding barn owl pair within a mine shaft were located. No active burrowing owl burrows were found in 2009. One of the red-tailed hawk nests and three of the inactive stick nests were located within the Project area (April 2009 layout).

Table 5. Raptor Nests Located During 2008 and 2009 Raptor Nest Surveys

Raptor Species	2008	2009
Red-tailed hawk	1	10
Inactive nests	5	9
Burrowing owl burrows	2 active, 1 inactive	None active
TOTAL	**9**	**19**

5.2.3 Bat Acoustic Monitoring

Acoustic detection of bats occurred year-round for 2 years, starting 9 April 2008 and concluding on 15 April 2010 (O'Farrell 2009a, 2010), in order to generate a baseline of knowledge on temporal changes in species composition and differential habitat use within the Project. The six stationary acoustic monitoring stations utilizing Anabat SD1 detectors were established at select sites within the Project area (Figure 4). Sites were selected that sampled the general habitat that may be affected by the proposed activities, and corresponded to locations proposed for wind turbines based on the Project layout at the time the protocol was developed (2008; Figure 4). The objective of this portion of the monitoring effort was to assess species richness and general level of bat use within the Project area. Monitoring stations were placed on four existing met towers, with acoustic detectors located at 2 m aboveground (Met Low) and 40-50 m aboveground (Met High). The dispersion of monitoring stations provided an adequate examination of general bat usage over the entire proposed Project area. Two additional stations (Stakes 1 and 2) were selected to sample areas deemed as potential movement corridors, and each only had a single detector 2 m above ground (Figure 4). Changes in the size of the Project area and turbine placement resulted in removal of one acoustic station (Met 4) in October 2008 and subsequent placement of a new stake station (Stake 4) in the southeastern portion of the Project area (Figure 4); Stake 4 was established 21 January 2009.

During the second year of bat surveys, additional acoustic monitoring stations were placed near local abandoned mines with known roosts (suspected maternity colonies) in order to address agency concerns about potential impacts of turbine placement (O'Farrell 2010). Monitoring at the mines occurred from May 1, 2009 to April 15, 2010.Two mine complexes (Mine 1 and 2) were identified from BLM data as being within the development area of the proposed Project, and judged to contain significant bat resources. Reconnaissance of the mines verified suitable conditions (e.g. wash or dry creek systems) near mine entrances for use as bat foraging and movement corridors. Three stake monitoring stations were established around each mine complex to monitor the bat activity associated with the respective wash systems.

Identification of species from acoustic recordings used the methods of O'Farrell et al. (1999) based on frequency characteristics, call shape, and comparison with a comprehensive library of vocal signatures developed by O'Farrell and colleagues. Thus, both activity data and species richness (number of species verified as present) were obtained for each location. Species use data were measured using an Index of Activity (IA), or the magnitude of each species contribution to spatial use, by using the sum of 1-minute time increments for which a species was detected as present divided by the number of nights of sampling (Miller 2001). The IA was multiplied by a factor of 100 and rounded to the nearest whole number in order to bring the smallest numbers up to whole numbers.

5.2.3.1 General Patterns

A total of 16 species of bats were recorded over both years (Table 6). One species, *Lasionycteris noctivagans*, was recorded in the first year of monitoring but not in the second (common names listed in Table 6). Conversely, *Macrotus californicus* and *Nyctinomops femorosaccus* were not recorded until the second year of monitoring. Seven of the species are listed as Federal Species of Special Concern (SOSC), four of them are State-listed Sensitive and three are State-listed Protected (Table 6). Species richness varied among the stations but no site had representatives of all 16 species found within the study area (Table 7).

Bat activity varied among stations and between detector heights. The highest total IA among all stations was found at Stake 4, Met 6 Low, Mine 2A and 2C; the total IA at these areas was approximately 1.4 times greater than that observed at the next most abundant areas (Table 7). All three High stations had the lowest total IA during the study with the exception of Met 1 in the first year of study (Table 7). In general, the majority of the bat activity at Met stations (76-81 percent) occurred at the Low rather than High stations (Table 7). Among Mine stations, the total IA varied in relation to the direction of station placement away from each mine. Twice as much activity was recorded in the drainage west of Mine 1 (1C) as was recorded either east (Mine 1A) or north (Mine 1B) of the mine. Likewise, more than twice as much activity was recorded east (Mine 2A) and south (Mine 2C) of Mine 2 as was recorded north (Mine 2B) of the mine.

All the data for Met stations were combined and analyzed for nightly patterns in activity. Two basic patterns were revealed. First, a crepuscular pattern was exhibited by *Parastrellus hesperus* with a small discrete peak just before sunset followed by a large peak in activity within the first hour after sunset. The remaining species demonstrated a later initial peak and then prolonged moderate activity through much of the night. The patterns were similar regardless of altitude of sampling.

Annual and seasonal variation in bat activity was also evident. The second year of monitoring had use rates 2-3 fold greater than the first year of monitoring. Seasonal patterns in use revealed the highest levels of activity to be during summer and early fall months. Migratory species had higher presence in spring than in fall months.

5.2.3.2 Species-specific Patterns

Tadarida brasiliensis and *P. hesperus* accounted for the majority of bat activity at both height levels throughout both years of monitoring (Table 7). Both species ranked as primary (contributed >25 percent of all bat activity) or secondary species (species contributed <25 but >6 percent) at all stations. *T. brasiliensis* had higher activity rates in the first year of study compared to the second, and was generally a secondary species at Mine stations (Table 7). In contrast, *P. hesperus* was ranked as primary more frequently in the second year of monitoring. *M. californicus* and *Myotis yumanensis* were also commonly ranked as primary or secondary species. *Eptesicus fuscus* was a secondary species at four locations among both years of study, but generally had low activity rates. The remaining 11 species including eight special status species (Table 7) were infrequently detected during both years of monitoring and individually contributed 6 percent or less to bat activity at any given station.

Within Mine stations, *M. yumanensis* was active at both mine complexes and regularly left the Project area immediately upon exiting day roosts to forage outside of the Project site at foraging areas associated with Lake Mohave. Although both mine complexes were previously identified as being used by *Corynorhinus townsendii townsendii*, this species was absent from all Mine stations (Table 7), indicating lack of presence during the monitoring period.

Ma. californicus, My. californicus, Myotis ciliolabrum, Myotis yumanensis, P. hesperus, and *T. brasiliensis* are year-round resident species that were detected during the study (Table 6). *Antrozous pallidus* and *E. fuscus* are breeding residents that appear to be absent from the Project area in winter. Detections from early spring through late fall suggest that some, at least, of the breeding residents may remain locally and hibernate through the winter. *C. townsendii townsendii* is not present during the summer breeding season but apparently occurs, at least in small numbers, during the remaining portion of the year. The remaining seven species (*Myotis thysanodes, Lasiurus blossevillii, Lasiurus cinereus, L. noctivagans, N. femorosaccus, Nyctinomops macrotis,* and *Eumops perotis californicus*; Table 6) appear to be transient in the spring and/or fall months.

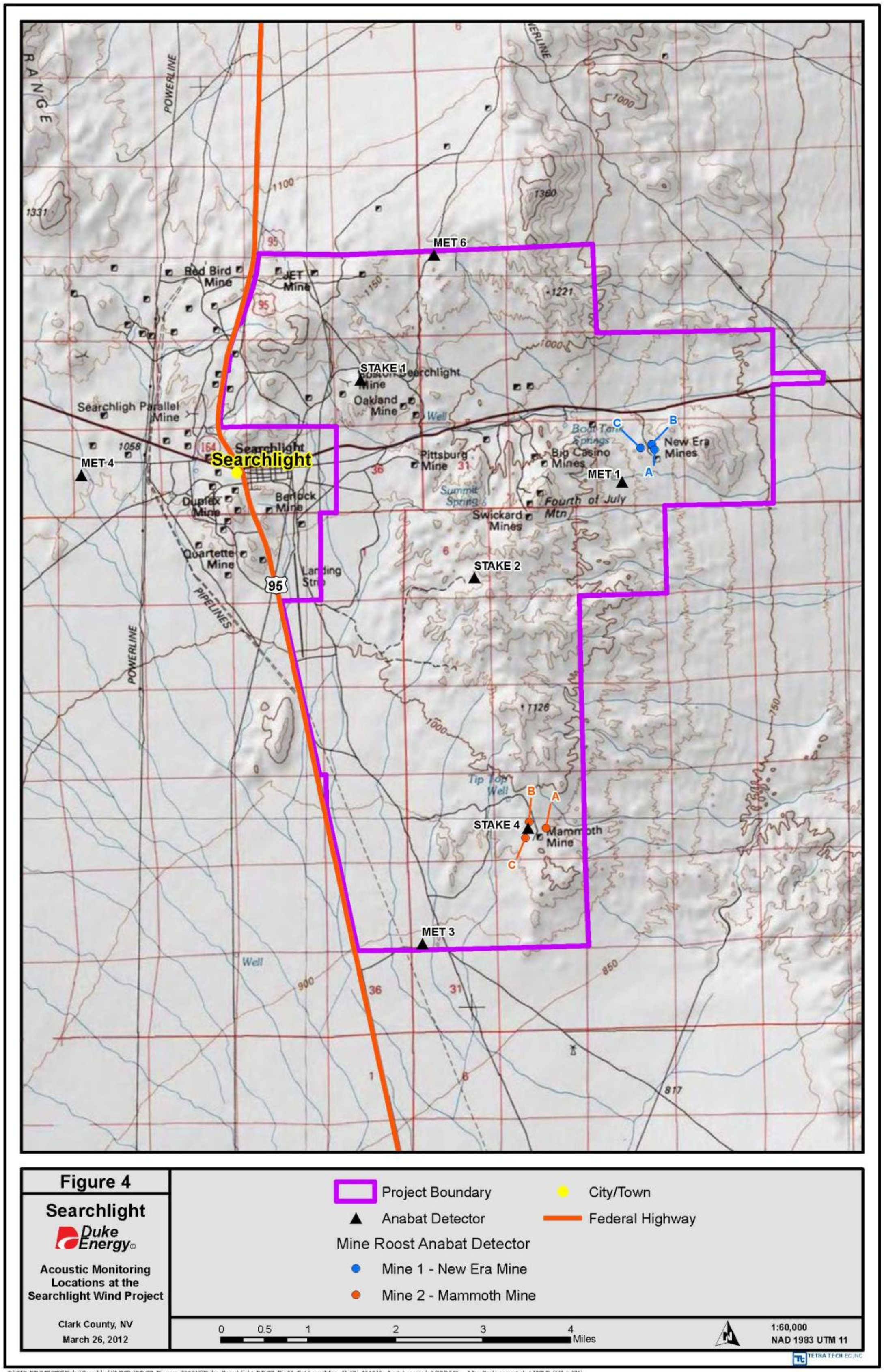


Figure 4. Acoustic Monitoring Locations at the Searchlight Wind Energy Project

Table 6. Checklist and Status of Bats Detected Within the Searchlight Wind Energy Project Site, 2008-2010.

Scientific Name	Common Name	Status[1]	Resident/Migrant Status	Years Detected
Macrotus californicus	California Leaf-nosed Bat	Federal SOSC, NSS	Year-round resident	2009-2010
Myotis californicus	California Myotis	-	Year-round resident	2008-2010
Myotis ciliolabrum	Western Small-footed Myotis	Federal SOSC, BLM	Year-round resident	2008-2010
Myotis thysanodes	Fringed Myotis	Federal SOSC, BLM NSP	Migrant	2008-2010
Myotis yumanensis	Yuma Myotis	Federal SOSC	Year-round resident	2008-2010
Lasiurus blossevillii	Western Red Bat	BLM, NSS	Migrant	2008-2010
Lasiurus cinereus	Hoary Bat	BLM	Migrant	2008-2010
Lasionycteris noctivagans	Silver-haired Bat	BLM	Migrant	2008-2009
Parastrellus hesperus	Western Pipistrelle	-	Year-round resident	2008-2010
Eptesicus fuscus	Big Brown Bat	-	Year round resident; may be breeding resident only in Project area.	2008-2010
Corynorhinus townsendii townsendii	Pacific Western Big-eared Bat	Federal SOSC, BLM, NSS	Year-round resident	2008-2010
Antrozous pallidus	Pallid Bat	NSP	Year round resident; may be breeding resident only in Project area.	2008-2010
Tadarida brasiliensis	Brazilian Free-tailed Bat	BLM, NSP	Year-round resident	2008-2010
Nyctinomops femorosaccus	Pocketed Free-tailed Bat	-	Migrant	2009-2010

Scientific Name	Common Name	Status[1]	Resident/Migrant Status	Years Detected
Nyctinomops macrotis	Big Free-tailed Bat	Federal SOSC	Migrant	2008-2010
Eumops perotis californicus	Greater Western Mastiff Bat	Federal SOSC, NSS	Migrant	2008-2010

[1]SOSC = Species of Special Concern, NSP= Nevada State Protected, NSS = Nevada State Senstive, BLM = Nevada BLM sensitive species
Nomenclature follows Hoofer et al. (2006), Wilson and Cole (2000), and Wilson and Reeder (1993).

Table 7. Summary of Bat Activity from Acoustic Monitoring in April 2008 – April 2010

Station	Overall Species Richness	Index of Activity		Species Presence (2008-2009/2009-2010)[1]															
		2008-2009	2009-2010	MACA	MYCA	MYCI	MYTH	MYYU	LABL	LACI	LANO	PAHE	EPFU	COTO	ANPA	TABR	NYFE	NYMA	EUPE
Stake 1	11	363	497	-/-	S/P	I/I	-/-	I/S	-/I	I/I	I/-	S/P	I/S	I/-	I/I	P/S	-/-	-/-	-/-
Stake 2	11	460	259	-/-	I/S	I/I	-/-	I/S	-/-	I/-	-/-	S/P	I/I	I/I	I/I	P/S	-/-	I/-	-/I
Stake 4	11	543	687	-/-	S/P	I/I	-/-	I/S	-/-	I/I	-/-	S/P	I/I	-/I	I/I	P/P	-/-	-/I	-/I
Met 1 High	12	190	100	-/-	I/-	I/-	-/-	I/I	-/-	I/I	-/-	I/S	I/-	I/-	I/-	P/P	-/I	-/I	I/I
Met 1 Low	11	118	326	-/-	-/S	I/I	-/-	I/S	-/I	-/I	-/-	P/P	I/I	-/I	I/-	P/S	-/I	-/-	-/-
Met 3 High	12	117	119	-/-	I/-	I/-	-/-	S/I	-/-	I/I	-/-	S/S	S/I	I/-	I/-	P/P	-/I	-/I	-/I
Met 3 Low	12	333	497	-/-	S/P	I/I	-/-	S/S	-/-	I/I	-/-	S/P	I/I	I/I	I/I	P/P	-/I	-/I	I/I
Met 4 High	9	457	-	-/na	I/na	S/na	-/na	I/na	-/na	I/na	-/na	S/na	S/na	-/na	I/na	P/na	-/na	-/na	I/na
Met 4 Low	10	687	-	-/na	P/na	S/na	I/na	I/na	-/na	I/na	I/na	S/na	S/na	-/na	I/na	P/na	-/na	-/na	-/na
Met 6 High	10	140	140	-/-	I/-	I/-	-/-	-/I	-/-	I/I	-/-	S/P	I/I	-/-	I/-	P/P	-/I	-/-	I/I
Met 6 Low	12	802	614	-/-	S/S	I/I	I/I	I/I	-/-	I/I	-/-	P/P	I/I	-/I	I/I	S/S	-/-	-/I	I/I
Mine 1A	7	-	290	na/I	-/P	na/I	na/-	na/S	na/-	na/-	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 1B	7	-	250	na/-	-/S	na/I	na/-	na/S	na/I	na/-	na/-	na/P	na/I	na/-	na/-	na/P	na/-	na/-	na/-
Mine 1C	11	-	497	na/I	-/P	na/I	na/-	na/P	na/I	na/I	na/-	na/P	na/I	na/-	na/I	na/S	na/-	na/I	na/-
Mine 2A	7	-	766	na/-	-/S	na/I	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 2B	6	-	341	na/-	-/S	na/-	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/-	na/S	na/-	na/-	na/-
Mine 2C	8	-	775	na/-	-/P	na/I	na/-	na/S	na/-	na/I	na/-	na/P	na/I	na/-	na/I	na/S	na/-	na/-	na/-

1Primary (P) = species contributed > 25 percent of all bat activity; Secondary (S) = species contributed < 25 percent but > 6 percent of bat activity; Infrequent (I) = species contributed ≤ 6 percent of activity; - = not detected; na = not monitored at that location for that year of study. Species abbreviations are derived from the first two letters of the genus and the first two letters of the species (Table 6).

5.2.4 Golden Eagle and Raptor Nest Surveys

Aerial surveys were conducted for nests of golden eagles and other raptor species in spring 2011 (Tetra Tech 2011). The survey area was the area within a 10-mile buffer of the Project area (as of December 2009), exclusive of the area surveyed in 2009 (Project area and 2-mile buffer). A survey route of suitable nesting habitat in this area was developed in conjunction with an NDOW biologist. Nest data collected included species, active or inactive status, substrate, condition, and photographs. Protocol followed that recommended by the USFWS (Pagel et al. 2010).

A total of 16 active raptor nests and 49 inactive stick nests were identified during 2011 surveys (Table 8; Figure 5). These nests are in addition to the 10 red-tailed hawk nests and 9 inactive stick nests located in 2009, for a grand total of 26 active raptor nests and 58 inactive stick nests within the Project area and 10-mile buffer. Active nests located in 2011 included 1 confirmed and 2 probable golden eagle nests (presence of chick but no adult) and 12 confirmed and 1 probable red-tailed hawk nests (presence of chicks but no adult). Golden eagle nest 011 (Figure 5), was updated from probable to confirmed in 2012 based on NDOW datasets, altering the count to 2 confirmed and 1 probable golden eagle nests. All of the golden eagle nests were located on cliffs, whereas only 3 (2 confirmed, 1 probable) red-tailed hawk nests were on cliffs. All other red-tailed hawk nests were on transmission towers. Among inactive stick nests, 35 were found on cliffs (3 in 2009, 32 in 2011), with the rest found on manmade structures (Figure 6). The golden eagle nests were located 4.3 miles (6.9 km; probable golden eagle nest #11), 10.0 miles (16 km; probable golden eagle nest #23), and 10.2 miles (16.4 km; confirmed golden eagle nest #65) from the Project boundary (Figure 5). Two large inactive nests were located approximately 0.5 miles from golden eagle nest #11, and may be alternate nests within that territory. No inactive large nests were located near the other 2 golden eagle nests, possibly as a result of limited survey effort at the edge of the survey area where nests 23 and 65 were located.

Table 8. Raptor Nests Located During 2009 and 2011 Aerial Raptor Nest Surveys

Raptor Species	2009 Surveys			2011 Surveys			Grand Total
	Project Area	2-mile Buffer	10-mile Buffer	Project Area	2-mile Buffer	10-mile Buffer	
Golden eagle	0	0	0	0	0	3[1]	**3**
Red-tailed hawk	1	8	10	1	3	13[2]	**23**
Inactive stick nests	2	7	9	0	0	49	**58**
TOTAL	**3**	**15**	**19**	**1**	**3**	**65**	**84**

[1]Includes 2 probable golden eagle nests
[2]Includes 1 probable red-tailed hawk nest

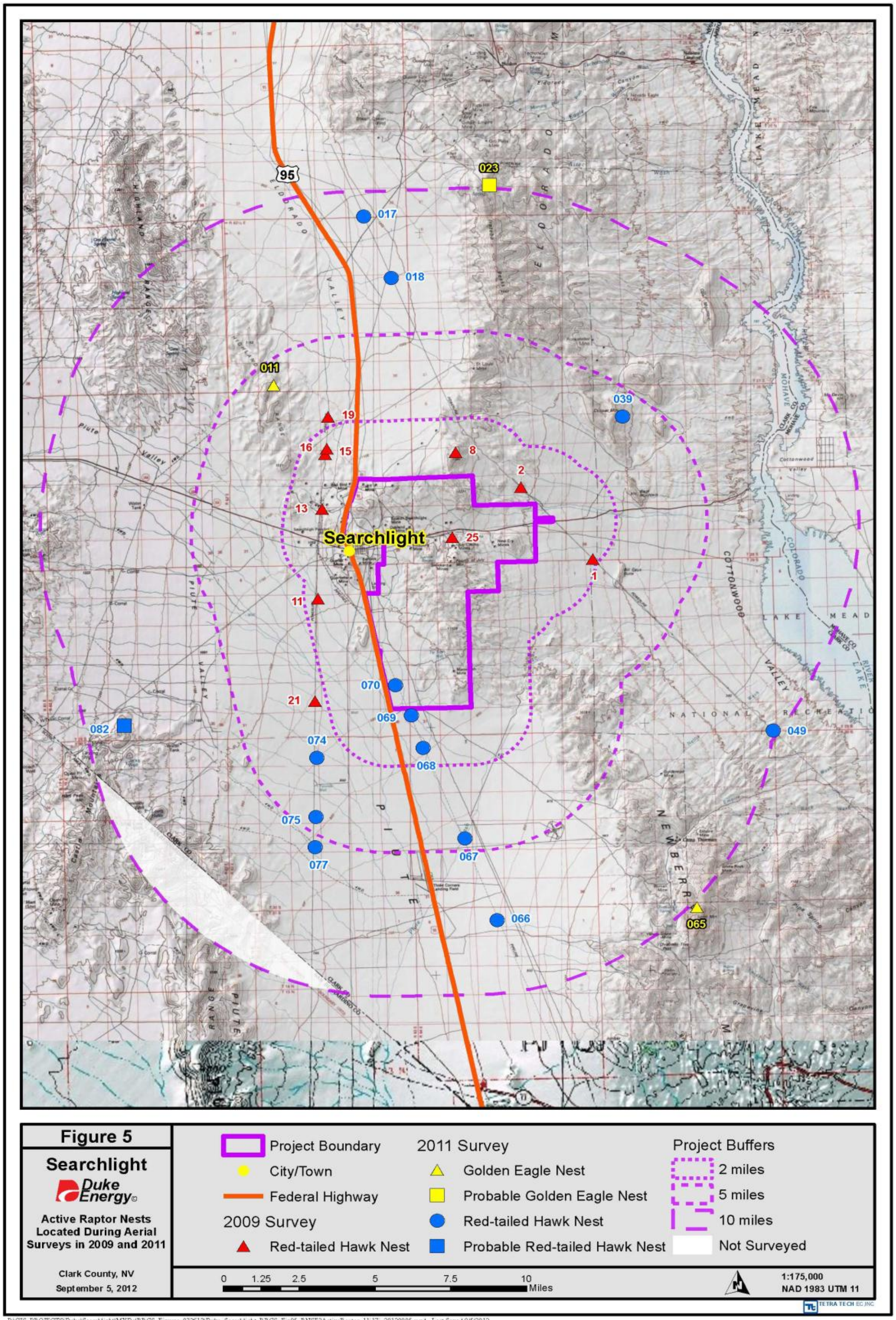


Figure 5. Active Raptor Nests Located During Aerial Surveys in 2009 and 2011

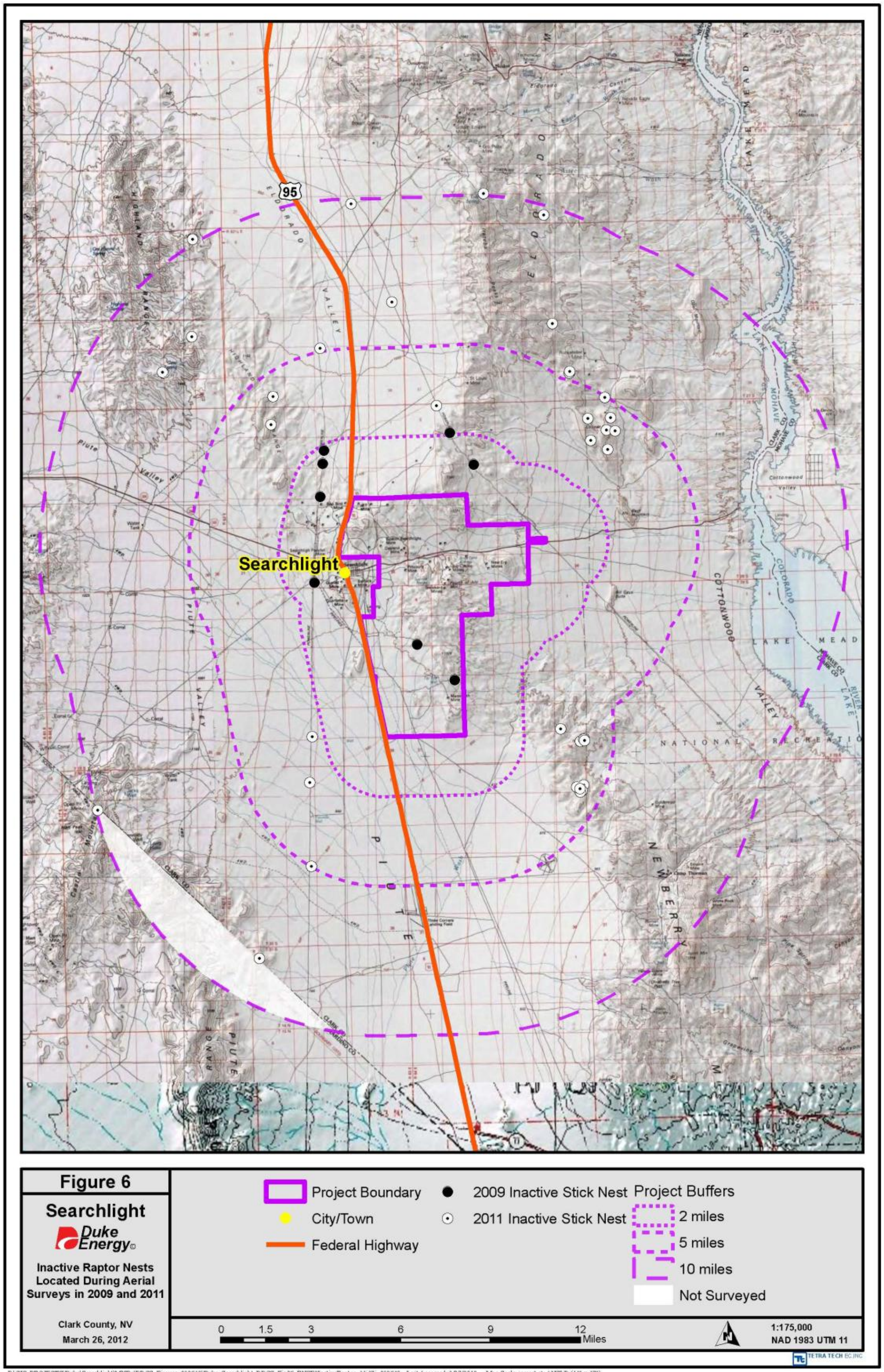


Figure 6. Inactive Raptor Nests Located During Aerial Surveys in 2009 and 2011

5.2.5 Bald Eagle Winter Surveys

In response to USFWS and NDOW concern regarding potential winter use by bald eagles of the Project area and Lake Mohave, ground-based eagle surveys were performed roughly every other week from December 16, 2011 to January 26, 2012 (Tetra Tech 2012). These surveys were designed to assess spatial and temporal patterns of bald eagle use, although incidental observations of golden eagles would be recorded. Surveys were conducted from 2 survey locations established in the northeastern-most region of the Project on topographical high points, using a visibility distance cut-off of 3 miles, past which species identification is questionable. Each survey session was 4 hours in length, and both locations were surveyed concurrently by 2 surveyors (1 at each location). Each location was surveyed 4 times, with time of day rotated between morning and afternoon periods. No bald eagles or golden eagles were observed during the 32 hours of surveys conducted, nor were any individuals of these species observed incidentally.

5.3 Risk Assessment (Tier 3)

This section outlines potential risks to birds and bats related to the construction and operation of the Searchlight Wind Energy Project and supporting facilities; other effects are analyzed in the EIS. While golden eagles are mentioned in 5.3.1 for the sake of completeness, impacts to golden eagles are discussed solely in Section 5.3.2. Methods to avoid or minimize these risks through Project design, construction, and operation are provided in subsequent sections, and Section 9 outlines mitigation and adaptive management for unavoidable risks.

This section provides a qualitative risk assessment for the effect of a factor (e.g., collision, electrocution) on birds other than eagles and bats. The intention is not to predict the number of fatalities due to turbine collision as pre-construction data poorly predicts fatalities for birds (Ferrer et al. 2012), but to determine if any species is at high risk to inform post-construction fatality monitoring. The risk assessment is specific to the factor (e.g., turbine collision) and does not evaluate the effect on population dynamics because for most species, population trend data is not available. For wind turbine collisions, a risk profile was calculated using the following equation:

Risk profile = percent of surveys in which the species was observed x the percent flying x the percent flying in the RSA

The risk profile is scaled between 0 and 1. A risk profile between 0 – 0.33, 0.34 – 0.66, 0.67 – 1.0 is considered low, moderate, and high risk, respectively. Supplemental data from post-construction fatality monitoring studies is used to inform the final risk categorization. For example, a risk profile may indicate that risk to common raven is high, but common raven is not a common fatality at wind projects within their range and the risk categorization would be adjusted to low (Johnson and Erickson 2010). Wind energy fatality data is limited for the Mojave Desert, but it is not expected that collision risk varies regionally. For example, horned lark is a common fatality in the Columbia Plateau ecoregion in Washington and Oregon (Johnson and Erickson 2010), and horned lark is assumed to be at moderate to high risk of collision with wind turbines throughout its range.

5.3.1 Birds (Non-eagles)

5.3.1.1 Collision

Birds have been identified as a group at risk because of collisions with wind turbines and power lines (Erickson et al. 2005, Drewitt and Langston 2006, Arnett et al. 2007). Specifically, migrant passerines (e.g., songbirds) are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007). At newer generation wind energy facilities outside of California, approximately 80 percent of documented fatalities have been songbirds, of which 50 percent are often nocturnal migrants (Erickson et al. 2001, Drewitt and Langston 2006, Johnson et al. 2007, Strickland and Morrison 2008). It is estimated that less than 0.01 percent of migrant songbirds that pass over wind farms are killed, based on radar data and mortality monitoring (Erickson 2007). Locally breeding songbirds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine rotor heights during the breeding season. However, some breeding songbird species such as the horned lark have behaviors that increase their risk of collisions with turbines. Most songbirds are short-lived and have high reproductive output, and their population growth rates are more sensitive to reproductive failure than to adult survival (Stahl and Oli 2006, Arnold and Zink 2011). Therefore, collision mortality for most songbird species is expected to have negligible effects on population dynamics.

Results of 2 years of avian point count surveys revealed that the bird community within and surrounding the Project area is made up of species typical to the Mojave desert, and exhibits little change seasonally. Songbirds, gamebirds, and pigeon/doves are likely to use the Project area on occasion and were the most commonly observed species groups during the 2007-2009 avian point count surveys (Tetra Tech 2010). The three primary species dominating the community were black-throated sparrow, Gambel's quail, and mourning dove. Despite its presence within the Pacific Flyway (USFWS 2011b), the Project area does not receive a large influx of breeding birds in the spring, and migrants were detected during point counts infrequently and in low numbers. Although diurnal point counts are not optimal for detecting nocturnally migrating songbirds, the weather patterns in the Searchlight area rarely create collision risk situations such as a low cloud ceiling or precipitation that influence migrant songbird stopover. In 2008, approximately 6% of the weather observations in March, April, May, August, September, and October had a cloud ceiling lower than 1500m. High wind situations in which wind direction provides a strong head wind to migratory movement, however, may influence migratory "fall out" (Schakleford 2005). However, it is unlikely that the Project area is located in a major songbird migratory route due to the harsh desert conditions. Thus, migratory species making stopovers in the area are unlikely to concentrate within the Project area due to similar habitat being readily available throughout the region and more favorable habitat existing along the Colorado River near Lake Mohave. No surveys targeting nocturnal migrants were conducted pre-construction. The relatively low overall use rates observed during surveys combined with limited habitat availability suggest that there are unlikely to be major concentrations of non-raptors during the breeding season or during migration. Despite the observation that most avian fatalities at wind farms are songbirds, raptor mortality historically has received the most attention. Raptor mortality at newer wind projects has been low relative to older-generation wind farms, although there is substantial regional variation in raptor mortality rates (Erickson et al. 2002, 2004, Johnson et al. 2002, Kerns and Kerlinger 2004, Jain et al. 2007).

The Project area contains steep hills and mountains as well as flats, washes, and valleys that provide some suitable foraging and nesting habitat for raptors; however, raptor use within the Project area was low (<1.0 birds/20 min) over the course of the 2007-2009 avian point count surveys. Such levels of raptor use within the Project area suggest that raptor mortality is anticipated to be low (Young et al. 2003, Erickson 2007). Raptor species that are likely to be found on site primarily include turkey vulture and red-tailed hawk. However, other raptor species including northern harrier, sharp-shinned hawk, Cooper's hawk, golden eagle (see Section 3.2), American kestrel, and burrowing owl may occur within the Project area on occasion as well. Fatalities of turkey vultures and red-tailed hawks have occurred at wind farms (e.g., Kerns and Kerlinger 2004; Erickson et al. 2004),.

Of the 64 species detected during all surveys, only 10 (16 percent) had a risk profile value greater than 0.05 indicating risk to most bird species is low. Of the 10 species with a risk profile greater than 0.05, 1 species had a risk categorization of high (turkey vulture) and 4 species had a risk categorization of moderate (red-tailed hawk, American kestrel, house finch, and horned lark); the remaining 5 species had a risk categorization of low (Table 9).

Based on the summary above and information known on collision risk at other western U.S. facilities in arid environments (Table 9; mean fatality rate = 2.02 birds/MW/year), the collision risk for birds at the Project will likely be low. This risk will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 4-6).

Table 9. Risk Categorization for Birds at the Searchlight Wind Energy Project

Species	Percent surveys detected	Percent flying	Percent flying within RSA	Risk profile	Supplemental data used to adjust risk profile	Risk categorization
common raven	14.9	80.4	74.5	0.89	Few records as fatalities	Low
turkey vulture	9.6	100.0	83.1	0.80	None	High
red-tailed hawk	8.6	68.8	78.2	0.46	None	Moderate
house finch	15	56.5	41.1	0.35	None	Moderate
American kestrel	3.2	87.2	79.4	0.22	Common fatality	Moderate
horned lark	8.6	67.6	31.7	0.18	Common fatality	Moderate
northern rough-winged swallow	1.8	100.0	90.5	0.16	None	Low
northern harrier	0.8	100.0	83.3	0.07	Few records as fatalities	Low
loggerhead shrike	13.5	28.6	13.9	0.05	None	Low
Cooper's hawk	0.8	100.0	66.7	0.05	None	Low

5.3.1.2 Electrocution

Utility lines (transmission and distribution) can potentially result in electrocution of bird species (e.g., large raptors) that have wing-spans large enough that the bird can simultaneously contact two conductors or a conductor and grounded hardware. Therefore, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. To protect birds from possible electrocution, the APLIC recommends that lines in areas with eagles and other larger birds have a horizontal separation of 60 inches and a vertical separation of 40 inches between phase conductors or between a phase conductor and grounded hardware (APLIC 2006). The aboveground power lines will be built according to APLIC recommendations that are designed to reduce risk, thus the risk of electrocution to birds is expected to be low.

5.3.1.3 Disturbance/Displacement

In addition to mortality associated with wind farms, concerns have been raised that some bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines though the causal mechanism was not studied (Leddy 1999). Reduced abundance of grassland songbirds was found within 50 meters (m) of turbine pads for a wind farm in Washington and Oregon, but the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (Erickson et al. 2004). Research at two sites in North and South Dakota (Shaffer and Johnson 2008) suggests that certain grassland songbird species (2 of 4 studied) may avoid turbines by as much as 200 m, but these results have not been finalized nor verified at additional sites. None of these studies have addressed whether these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent. Pearce-Higgins et al. (2012) found little evidence for a post-construction decline for ten species of birds at 18 wind projects in upland habitats in the UK based on data from 1 to 10 years post-construction (more than half of the data was between 1 and 3 years post-construction). However, disturbance related effects were detected during construction.

Construction activities and the presence of turbines and other Project features may disturb or displace birds. Many of the species detected during avian surveys likely breed in the Project area, and burrows/nests were found in the Project area for both burrowing owl and red-tailed hawk, suggesting potential for impact to breeding birds. However, overall impacts to regional populations of birds from Project-related disturbance or displacement of local breeders are likely to be low based on the relatively low avian use in the Project. Human impacts near and within the Project area already include the town of Searchlight, distribution and transmission lines, recreational off-highway vehicle (OHV) use along two-tracks, U.S. Highway 95, Cottonwood Cove Road, a Nevada Department of Transportation gravel pit, and several abandoned mines, and the majority of raptor stick nests detected during surveys were found on man-made structures despite the availability of cliff habitat. Thus, the additional disturbance of 388.5 acres, of which only 155.3 will be permanently disturbed, is may affect birds locally, but is unlikely to cause disturbance birds breeding regionally. The risk of disturbance/displacement will be further reduced through avoidance and minimization measures taken during the design, construction, and operational phases of the Project (Sections 4-6).

5.3.1.4 Habitat Loss and Fragmentation

Habitat fragmentation can exacerbate the problem of habitat loss for birds by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce avian productivity through increased nest predation and parasitism and reduced pairing success of males. However, the increase in the amount of fragmentation as a result of Project construction will be minimized by using existing roads and OHV trails. Potential habitat fragmentation resulting from development of the Project will be reduced through avoidance and minimization measures taken during the design, construction, and operational phases of the Project (Sections 4-6). Additionally, at the end of the Project's life, the areas of permanent impact will be restored to their previous condition.

5.3.2 Eagles

5.3.2.1 Collision

Golden eagles are susceptible to wind turbine collisions. Although fatalities have been reduced at wind farms with newer generation turbines, golden eagle fatalities do still occur (Orloff and Flannery, 1992, Kerns and Kerlinger 2004, Kerlinger et al. 2006a). To date, 54 golden eagle fatalities have been reported for wind energy facilities (excluding Altamont Pass; Pagel et al. 2011). However, the presence of golden eagles does not equate to golden eagle fatalities when turbines are placed away from areas of high golden eagle use (Young et al. 2003).

Multiple seasons of avian surveys produced only 2 observations of golden eagles in fall 2007 (0.014 birds/20-min) for an overall use rate of 0.003 golden eagles/20-min (Tetra Tech 2010) indicating low use of the Project area by this species. This is supported by a comparison among seasonal use rates from other western wind facilities with pre-construction data (Figure 7). No bald eagles were observed during avian surveys, and neither bald nor golden eagles were observed during bald eagle monitoring in 2011 (Tetra Tech 2012). No golden eagle nests were detected within the Project area, and the nearest eagle nest was 4.3 miles from the Project area (Figure 5). Nesting eagles are unlikely to use the Project area based on research on golden eagle home range size and foraging distances in southwestern Idaho (Marzluff et al. 1997), which indicated that breeding golden eagles have an average maximum travel distance of 2.8 miles from the nest during the breeding season. Although prey densities in the Mojave Desert may be lower than in Idaho and could increase the distance traveled from nest during the breeding season, the lack of observations during the breeding season do not suggest the Project area receives high use. However, due to the lack of data regarding golden eagle home range size in the Mojave Desert, actual movement patterns are unknown.

Eagles might use the Project area during the non-breeding season based on research on golden eagle home range size and foraging distances in southwestern Idaho (Marzluff et al. 1997), which indicated that breeding golden eagles have an average maximum travel distance of 5.9 miles from the nest during the non-breeding season. Although prey densities in the Mojave Desert may be lower than in Idaho and could increase the distance traveled from nest during the non-breeding season, the few of observations during the non-breeding season do not suggest the Project area receives high use. However, due to the lack of data regarding golden eagle home range size in the Mojave Desert, actual movement patterns are unknown.

New generation wind facilities in the west that have had golden eagle fatalities have typically had noticeably higher use rates than those recorded at the Project (Figure 7). Together, these results suggest that the risk of turbine collision at the Project is low for golden eagles, and nonexistent for bald eagles, assuming that use is proportional to risk.

The collision risk analysis uses a weight-of-evidence approach to estimate the risk of eagle fatalities at the Project. In the sections that follow, we use a comparative analysis of other western wind Projects that have pre-construction eagle use data and post-construction eagle fatality data.

5.3.3 USFWS Fatality Model Design

To estimate the potential number of annual golden eagle fatalities at the Project, Searchlight Wind worked with the USFWS to use the Bayesian analysis model recommended in the 2012 ECP Appendices (USFWS 2012). The risk of collision was modeled as the mean number of fatalities per year resulting from a Bayesian analysis of the input data, which assumes that risk is proportional to use (USFWS 2012). Bayesian models use existing information to estimate the statistical distribution (called prior probabilities in Bayesian analysis) of variables of interest in a hypothesis test, and then use new data to update the distribution. The USFWS Bayesian model attempts to predict collision risk at a wind farm based on the exposure of eagles to turbines as measured by point count surveys.

In this model, the total annual eagle fatalities (F) as the result of collisions with wind turbines are predicted as the product of the rate of eagle exposure (λ) to turbine hazards, the probability that eagle exposure will result in a collision with a turbine (C), and an expansion factor (ε) that scales the resulting fatality rate to all daylight hours over the entire project (equation 1).

$$F = \varepsilon\ \lambda\ C \qquad \text{Equation 1}$$

Within the Bayesian estimation framework, prior distributions for exposure rate and collision probability are derived by the USFWS from previous studies. The expansion factor is a constant based on the proportion of daylight hours and hazardous area around turbines that is sampled by the point counts. The analysis calculates the exposure posterior distribution from its prior distribution and observed point count data. The expanded product of the posterior exposure distribution and collision probability prior yields the predicted number of annual fatalities.

The exposure rate λ is the expected number of exposure events (eagle-minutes) per daylight hour per square kilometer (hr km^2). In the 2012 ECP Appendices (USFWS 2012), the USFWS defined the prior distribution for exposure rate for golden eagles based on information from a range of projects under USFWS review and others described with sufficient detail in Whitfield (2009). The posterior probability distribution for exposure is produced by the model using the prior distribution and the minutes of eagle exposure measured during point counts (t). The new posterior λ parameters are the sum of the mean of the prior distribution and the eagle minutes observed (t), with the standard deviation of the posterior distribution determined by the number of point counts (N).

Collision probability (C) is the probability of an eagle colliding with a turbine given an eagle's exposure to turbine collisions (1 minute of flight in the hazardous area). For the purposes of the model, all collisions are considered fatal. The USFWS provided a prior distribution for this variable based on a Whitfield (2009) study of avoidance rates of golden eagles from four independent sites.

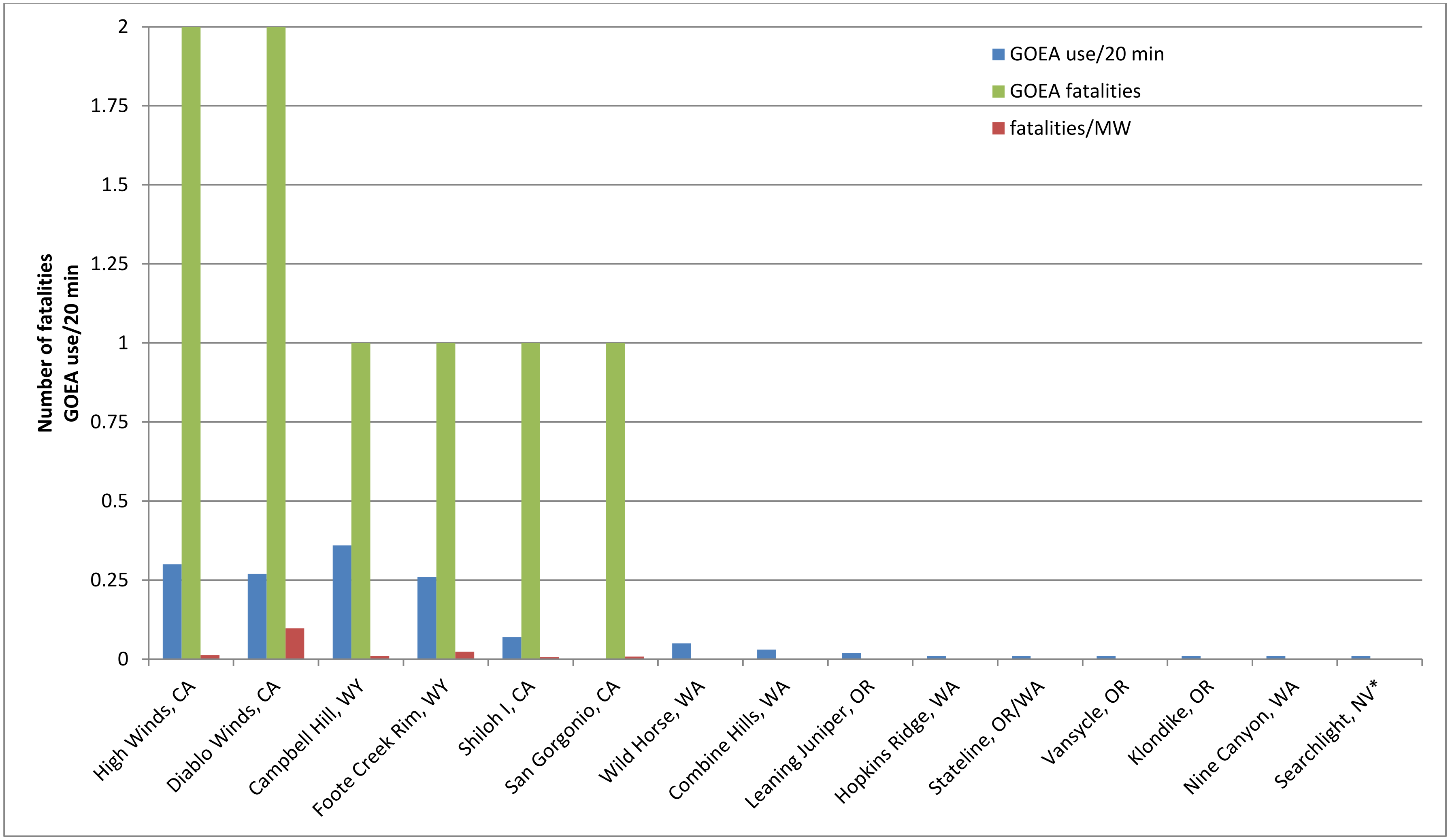
The expansion factor (ε) scales the resulting per-unit fatality rate (fatalities per hr-per km^2) to the daylight hours, τ, in 1 year (or other time period if calculating and combining fatalities for seasons or stratified areas) and total hazardous area (km^2) within the project footprint (equation 2):

$$\varepsilon = \tau \; {}_{i=1}^{n_t} \delta_i \qquad \text{Equation 2}$$

where n_t is the number of turbines, and δ is the circular area centered at the base of a turbine with a radius equal to the rotor-swept radius of the turbine (USFWS defines this as the hazardous area surrounding a turbine). The model assumes both eagle use and hazardous area occur in 2-dimensional areas. The units for ε are $hr \cdot km^2$ per year (or season).

To determine the distribution for the predicted annual fatalities, the exposure and collision risk distributions need to be multiplied by each other and expanded. The resulting distribution cannot be calculated in closed form so the model generates it through 100,000 simulations. The iterative calculation of annual fatality predictions, using eagle minutes of exposure as an input, was calculated according to equation 1 starting with the USFWS-provided, uninformative prior.

Using the Bayesian model described above, the USFWS estimates that one golden eagle fatality will occur every five years. This result represents a worst case scenario based on the turbines being operational during all daylight hours and does not reflect the anticipated turbine operational hours. Adjusting the daylight hours based on the likelihood of a turbine operating will result in a reduced fatality estimate. Searchlight Wind will work with the USFWS to provide data to adjust the daylight hours and produce a revised fatality estimate, which will be incorporated into a revised BBCS.



***Pre-construction use data only**

Figure 7. Mean Use by Eagles (Eagle Use/20 min; Pre-construction), Total Eagle Fatalities, and Eagle Fatalities/MW (Post-construction) at Wind Energy Projects in the Western U.S. Compared to Mean Use at the Searchlight Wind Energy Project

5.3.3.1 Electrocution

Fatalities of golden eagles have occurred as a result of electrocution and collisions with utility lines and structures, particularly distribution lines (APLIC 2006). Due to their large size, eagle species are able to bridge conductive elements to complete the circuit, and electrocutions of golden eagles are more common than bald eagle (Harness and Wilson 2001, APLIC 2006). However, the risk of eagle electrocution due to the Project is likely to be low because all collection lines will be buried where possible and design of overhead lines will follow APLIC guidelines.

5.3.3.2 Disturbance/Displacement

Bald eagles do not appear to use the Project area for foraging, nesting, or roosting based on avian, nest, and winter bald eagle surveys, thus risk of disturbance or displacement of bald eagles is expected to be negligible. Golden eagle disturbance or displacement is possible during construction or operation of the Project, particularly during the nesting season (February through July in Nevada). The potential for displacement or disturbance for eagles is somewhat offset by the background disturbance pre-existing in the Project area, which includes recreational uses such as OHV use, and local and highway traffic. Project construction may disturb golden eagles if they are nesting within line-of-sight of the Project or if the areas under active construction are preferred foraging areas. Project operations may disturb golden eagles if the presence of the operational turbines causes golden eagles to avoid using the Project area. However, evidence of fatalities at other wind farms suggests that golden eagles do not avoid operational facilities (Pagel et al. 2011). Recommendations for appropriate buffer distances to minimize disturbance vary by geographical location and by activity, but are not explicitly stated in current USFWS guidance (USFWS 2011a). Buffers based on research relative to nest disturbance range from 0.12 mile to 2 miles, with distances <1 mile being the most common recommendation (Table 11).

Few studies have examined raptor nest densities and nesting activity before and after project construction, and most of these have produced descriptive, rather than experimental data. Several studies conducted at western wind energy facilities produced somewhat equivocal results, but generally suggest that wind energy facilities do not displace nesting raptors or reduce nest densities post-construction (Erickson et al. 2003a, 2004; Johnson et al. 2003; Young et al. 2006; Gritski et al. 2008). For example, post-construction studies at the Leaning Juniper Wind Farm in Oregon suggest that raptor nests > 0.5 miles from turbines were not disturbed by the facility (Gritski et al. 2008), whereas other studies have found no clear relationship to distance from turbines (Johnson et al. 2003, Young et al. 2006), and some have suggested differences among species in their response to construction activities (Johnson et al. 2000a; Erickson et al. 2003a, 2004). However, most publically available studies are limited to one to two years of post-construction monitoring; therefore, inference is limited to short term effects.

Raptor and golden eagle nest surveys detected a total of 3 active golden eagle nests within a 10-mile radius of the Project area. The closest nest (#11) was 4.3 miles from the Project boundary (nest #11; Figure 5). The view of the Project from nest #11 and #23 (10.0 miles from the Project boundary) will likely be partially if not completely blocked by topography. Nest #65, however, is within line-of-sight to the Project, but risk of disturbance is likely minimized by distance from the Project (10.2 miles). Golden eagles are unlikely to avoid using the Project area for foraging based on the presence of golden eagles as fatalities at wind energy projects (e.g., Smallwood and Karas 2009).

Table 10. Summary of Research or Policy-based Buffer Distances for Golden Eagles

Restrictions		Location	Activity	Notes	Reference
Spatial	Temporal				
Research-Based Literature					
1.0 mile	Unknown	CO and WY	Pipeline		Olendorff and Zeedyk 1978
0.19 mile	Winter	CO	Any	Approach distance within which 90% of birds flushed	Holmes et al. 1993
2 miles	All year	AK and Alberta	Pipeline	No construction	Jacobson 1974
2 miles	March 1 to September 1	AK and Alberta	Pipeline	No ground activity	Jacobson 1974
0.25 to 0.5 mile	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Fuller cited in Suter and Joness 1981
0.5 mile	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Howard cited in Suter and Joness 1981
0.12 to 0.31 miles	Unknown	Unknown	General	Response to questionnaire provided to raptor experts	Woffinden cited in Suter and Joness 1981
0.5 mile	February 1 to August 1	CO	Noise		Call 1979
0.31 to 0.5 miles	Any	Spain	Any	Imperial eagle, not golden eagle	Gonzalez et al. 2006
0.12 to 1 miles	March 1 to September 1	Western U.S.	Visual and audible disturbance		Suter and Joness 1981
Policy-Based Literature					
0.5 mile	February 1 to July 15	CO	Unknown		Craig 1995
0.6 mile	Unknown	UT	Geothermal drilling	No drilling	ERDA 1977
0.47 to 0.68 miles	Incubating and chick rearing period	United Kingdom	Any	Derived from a poll of expert opinion (n=32)	Ruddock and Whitfield 2007
0.19 miles	Breeding and winter	OR	Any	Buffer expected to prevent 90% of flushing	Watson and Whalen 2004
0.5 miles	January 15- July 31	WY	Wind energy	No disturbance	WGFD 2009

5.3.4 Bats

5.3.4.1 Collision

Bat mortality occurs at wind farms due to collisions with turbine blades and barotrauma (Kunz et al. 2007); barotrauma is the tissue damage to air-containing structures (lungs) that results from the rapid air-pressure reduction near moving turbine blades (Baerwald et al. 2008). Although studies of turbine-related bat fatality at wind energy sites are still in their infancy and comparisons among projects, particularly in the western U.S., are limited, migratory foliage- or tree-roosting bat species appear to be most susceptible to collision with wind turbines. These species have experienced the highest fatality rates at wind energy facilities in North America, particularly during the late summer/early fall season when activity levels increase as these species migrate southward (Cryan 2003, Kunz et al. 2007, Arnett et al. 2008). Western-specific studies document *Myotis lucifugus, Lasiurus blossevillii*, *Lasiurus cinereus, Lasionycteris noctivagans*, *Eptesicus fuscus,* and *Tadarida brasiliensis* as fatalities during mortality surveys (Table 11). Few among these studies occurred within the range of *T. brasiliensis*, but of the 2 that did, *T. brasiliensis* averaged 63.5 percent of fatalities (Arnett et al. 2008). Specific details about the causal factors that influence high bat mortality at a particular wind farm remain unknown (Cryan and Barkley 2009).

Acoustic monitoring at the Project revealed the presence of 16 species of bats, including 4 which are commonly found as fatalities at wind projects (*L. cinereus, L. noctivagans, T. brasiliensis,* and *E. fuscus*). The relatively high species richness reflects the topographical diversity found at the Project, which includes a diversity of foraging and roosting habitats (O'Farrell 2010). The level of species richness may also be a result of intensive sampling over 2 full years, unlike many acoustic monitoring studies which are limited to certain seasons. In addition to the 4 species known to occur as turbine-related fatalities, 3 other high-flying species (*Eumops perotis*, *Nyctinopmops femorosaccus,* and *Nyctinomops macrotis*) were detected, and use at the Met High stations by various other species suggest some risk of collision to bat species using the Project area. Although the Project area contains attractant topographic and/or habitat features such natural springs and rocky outcrops, study results demonstrate that bats tend to move across the Project as if it were a landscape, generally moving toward Lake Mohave on a nightly basis for foraging and drinking. Overall bat use at the Project area can be described as low when compared to the potential bat activity at attractant features (e.g. washes). Although the data presented in Table 12 was collected at areas known to attract bats, it is provided as context for interpreting the bat activity (index of activity) in the Project area.

Table 11. Estimates of Mean Bat Fatalities Per Turbine and Per Megawatt at Wind Facilities in the Southwest or Arid Northwest

Wind Facility and State	Habitat	Estimated mean fatality/turbine/year	Estimated mean fatality/MW/year	Documented bat species fatalities
Biglow Canyon II, OR (Strickland et al. 2011)	Agriculture, Columbia Basin shrub-steppe	6.24	3.78	*L. cinereus*, *L. noctivagans,* unidentified *Myotis* spp.
High Winds, CA (Kerlinger et al. 2006a)	Agriculture, desert grasslands	3.63	2.02	*L. cinereus*, *T. brasiliensis, L. blossevillii, L. noctivagans*
Biglow Canyon I, OR (Jeffrey et al. 2009)	Agriculture, Columbia Basin shrub-steppe	3.29	1.99	*L. cinereus*, *L. noctivagans*
Nine Canyon, WA (Erickson et al. 2003a)	Agriculture, shrub-steppe, grassland	3.23	2.48	*L. cinereus*, *L. noctivagans*
Big Horn I, WA (Kronner et al. 2008)	Grassland, Agriculture	2.86	1.91	*L. cinereus*, *L. noctivagans, E. fuscus,* unidentified
Klondike III, OR (Gritski et al 2009)	Agriculture, Columbia Basin shrub-steppe	2.24	1.26	*L. cinereus*, *L. noctivagans, E. fuscus*
Elkhorn, OR (Jeffrey et al. 2009)	Agriculture, Columbia Basin shrub-steppe	2.07	1.26	*L. cinereus*, *L. noctivagans, M. lucifugus, E. fuscus*
Klondike, OR (Johnson et al. 2003)	Agriculture, Columbia Basin shrub-steppe	1.16	0.80	*L. noctivagans, L. cinereus*, unidentified *Myotis* spp.
Hopkins Ridge, WA (Young et al. 2007)	Agriculture, Mixed-grass prairie	1.13	0.63	*L. cinereus*, *L. noctivagans, E. fuscus, M. lucifugus*
Stateline, OR/WA 2003 (Erickson et al. 2004)	Agriculture, Columbia Basin shrub-steppe	1.10	1.70	*L. cinereus*, *L. noctivagans, M. lucifugus, E. fuscus*
Vancycle, OR (Erickson et al. 2000)	Agriculture, Columbia Basin shrub-steppe	0.74	1.12	*L. cinereus*, *L. noctivagans, M. lucifugus*
Stateline, OR/WA 2006 (Erickson et al. 2007)	Agriculture, Columbia Basin shrub-steppe	0.63	0.95	*L. cinereus*, *L. noctivagans*
Wild Horse, WA (Erickson et al. 2008)	Mixed grass prairie	0.70	0.39	*L. cinereus*, *L. noctivagans, M. lucifugus*

Table 12. Summary of Index of Activity (IA) from Acoustic Monitoring Results in Clark County, Nevada

Location	Total IA	*L. blossevillii*	*L. cinereus*	*T. brasiliensis*
Table Mountain *	75-345	0	1-11	1-83
Virgin River **	46,583	311	17	6,792
Halfway Wash **	17,420	44	0	1,986
Overton Wildlife Area **	254,487	29	128	63,456
LV Wash Downstream 2004 † 2005 †	101,614 76,134	123 13	1,069 296	26,872 32,065
LV Wash Midstream 2004 † 2005 †	66,127 28,594	23 240	13 9,852	5,620 4,353
LV Wash Upstream 2004 † 2005 †	168,428 95,305	58 85	900 258	60,779 43,706
Ash Meadows NWR 2007 †† 2008 ††	11,416 10,404	19 30	314 37	549 788
Searchlight Wind Energy Project‡				
MET 1 High 2008-2009 2009-2010	190 100	0 0	3 2	175 76
MET 1 Low 2008-2009 2009-2010	118 326	0 0.3	0.3 0.3	41 64
MET 3 High 2008-2009 2009-2010	117 119	0 0	3 1	83 102
MET 3 Low 2008-2009 2009-2010	333 497	0 0	1 1	137 146
MET 6 High 2008-2009 2009-2010	140 140	0 0.3	3 1	94 49
MET 6 Low 2008-2009 2009-2010	802 614	0 0	1 2	140 53
Stake 1 2008-2009 2009-2010	363 497	0 0.3	3 1	187 92
Stake 2 2008-2009 2009-2010	460 259	0 0	4 0	267 57
Stake 4 2008-2009 2009-2010	543 687	0 0	8 0.3	342 176
Total 2008-2009	2,985	0	26.3	1,466
Total 2009-2010	3,239	0.9	8.6	815

* O'Farrell 2007; values are the range for eight MET towers. Site considered devoid of conspicuous attractant features.
** O'Farrell 2006a; Halfway Wash considered devoid of conspicuous attractant features.
† O'Farrell 2006b
†† O'Farrell 2009b
‡ O'Farrell 2010; Project area considered devoid of conspicuous attractant features.

5.3.4.2 Disturbance/Displacement

Disturbance and displacement have not been identified as risks associated with bats and wind farms in reviews of bat/wind impacts (Kunz et al. 2007). The absence of concern with respect to wind development is likely due to the ability of bats to habituate to anthropogenic structures (Keeley and Tuttle 1999); however, one species detected at the Project, *M. thysanodes,* is known to be highly susceptible to human disturbance (O'Farrell and Studier 1980). There are known roosts at abandoned mine complexes within the Project as well as potential roosts within cliff-faces and rock crevices, both of which may be susceptible to human disturbance, particularly during construction. The Project does have potential to disturb roosting habitat, but is less likely to disturb foraging habitat based on the lack of attractant features, the preference by some species to forage outside the Project, and the small area of permanent disturbance. This risk will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 5.4, 6.1, 7.1).

5.3.4.3 Habitat Loss and Fragmentation

The impacts of habitat fragmentation from wind development on bats are not well-known (Kuvlesky et al. 2007). Both roosting and foraging habitat is available for several species of bats within the Project, but is mostly absent for other species (e.g. roosts for foliage-roosting bats, riparian foraging areas). Similarly, foraging habitat is less suitable for some species than areas outside of the Project like Lake Mohave. However, the Project has a relatively small footprint of temporary and permanent disturbance, and these areas are largely outside of suitable bat roosting and foraging habitat. Risk of habitat loss and fragmentation will be further reduced through measures taken during the design, construction, and operational phases of the Project (Sections 5.4, 6.1, 7.1).

5.4 Best Management Practices Implemented during Siting

Mitigation and minimization measures to avoid or significantly reduce impacts to avian and bat species that are incorporated into the planning and design for the Project (Table 13) are described in this section. These measures were derived from the USFWS (2011a) Draft Eagle Conservation Plan Guidance, the Searchlight Wind Energy Project DEIS (BLM 2011), and industry best management practices. The mitigation measures taken from the Project DEIS (e.g., MM-BIO or MM-VIS) are in draft form and will be updated accordingly when final measures are available. Measures derived from the DEIS (BLM 2011) include measures recommended or required by the BLM (e.g., MMVIS, MMBIO). BBCS measures are new measures proposed within this document. All mitigation measures proposed during the planning and design phase demonstrate and provide reliable and effective means to reduce impacts to avian and bat species and their habitats.

Table 13. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures During Project Planning and Design (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS/BBCS Reference
Macro-siting			X		BBCS-1
Minimize Lighting	X	X	X	X	MMVIS-5
Transmission Line Design Following APLIC Guidelines	X	X	X	X	MMBIO-7
Collection Line Burial	X	X	X	X	BBCS-2
Bird Diverters on New Transmission Line	X	X	X		BBCS-3
Met Tower Design	X	X	X	X	BBCS-4

5.4.1 Macro- and Micro-siting

BBCS-1: Micro-siting to Avoid Eagle Impacts. Point count surveys indicate that golden eagles rarely fly through the Project (2 golden eagles seen flying in RSA in fall 2007, no eagles observed in any other survey season, Tetra Tech 2010). The Project was sighted in an area with a low density of golden eagle nests based on USFWS data and further confirmed by additional nest surveys (Tetra Tech 2011; Table 8).

5.4.2 Facility Design

MMVIS-5: Minimize Lighting**.** Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the Federal Aviation Administration (FAA). The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

MMBIO-7: Transmission Line Design. All overhead power lines will be designed using the Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006 manual (APLIC 2006) and Mitigating Bird Collisions with Power Lines: The State of the Art in 1994 (APLIC 1994).

BBCS-2: Collection Line Burial. Electrical collection lines will be buried underground to the extent practicable which will minimize bird collisions with the power lines.

BBCS-3: Met Tower Design. The permanent met towers (if needed) will be free-standing to avoid the collision risk associated with guy wires.

6.0 SITE CONSTRUCTION

6.1 Best Management Practices Implemented During Construction

This section identifies mitigation and minimization measures that will be incorporated during construction of the Project (Table 14). These measures were derived from the industry best management practices, the Searchlight Wind Energy DEIS (BLM 2011), and the USFWS Land-Based Wind Energy Guidelines USFWS (2012). These recommendations are thought to provide effective measures to reduce impacts to wildlife and their habitats during the construction of a wind energy facility. Measures derived from the DEIS (BLM 2011) include measures recommended or required by the BLM (e.g., MMWATER, MMBIO), as well as Applicant Proposed Measures (APM) which were voluntary measures proposed by Duke Energy Renewables. BBCS measures are new measures proposed within this document.

Table 14. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures During Construction (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS Reference
Erosion Control	X				APM-1, MMWATER-2
Stormwater Pollution Prevention Plan	X	X	X	X	APM-4
Spill Prevention and Countermeasures Plan	X			X	APM-5
Waste Management Plan	X	X			APM-8
Weed Control Plan	X	X	X	X	APM-9
Develop BBCS	X	X	X	X	MMBIO-5
Avoid Bird Nesting Impacts	X	X	X		MMBIO-5
Burrowing Owl Survey		X			MMBIO-6
Minimize Lighting	X	X	X	X	MMVIS-5
Trash and Litter Control	X	X	X		BBCS-4
Carrion Control		X	X		BBCS-5
Annual Wildlife Training	X	X	X	X	BBCS-6
Speed Limits	X	X	X	X	BBCS-7
Monitoring of Overnight Hazards	X	X	X	X	BBCS-8
Environmental Manager	X	X	X	X	BBCS-9
Special-status Species Monitor	X	X	X	X	BBCS-10
Special-status Species Consultation	X	X	X		BBCS-11
Marking of Sensitive Areas	X	X	X	X	BBCS-12
Pre-construction Surveys	X	X			BBCS-13
Monthly Compliance Reports	X	X	X	X	BBCS-14
Minimize Disturbance Impacts	X	X	X	X	BBCS-15
Pesticide Use Per Recommendations	X	X	X	X	BBCS-16
Removal of Hollow Plastic Mine Markers	X				BBCS-17

The APMs, although not specific to wildlife, will provide broad benefits in the form of minimizing disturbance to the area. The APMs for construction are:

APM-1: Erosion Control

APM-4: Stormwater Pollution Prevention (SWPP) Plan

APM-5: Spill Prevention and Countermeasures Control (SPCC) Plan

APM-8: Waste Management Plan

APM-9: Weed Control Plan

In addition to the APMs, mitigation measures in the DEIS and provided in this document will further minimize impacts to wildlife.

MMWATER-2: Construction phase erosion and sedimentation control measures. The Applicant will develop and implement erosion and sedimentation control measures to be used to minimize impacts during the construction of the Project. At a minimum, this plan will include the following:

- Implement soil stabilization measures to offset loss in vegetation including the following best management practices (BMPs):
  - Install silt fences
  - install temporary earthen berms,
  - install straw bale barriers to reduce water velocity and flows,
  - install temporary water bars,
  - install sediment traps,
  - install stabilized entrances from public roads to minimize track-out
  - stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) as necessary;
- Maintain or reduce salt yields originating from public lands to meet State-adopted and Environmental Protection Agency-approved water quality standards for the Colorado River (BLM 1998);
- Implement BMPs, as identified by the state of Nevada, to minimize contributions from both point and non-point sources of pollution (including salts) from public lands (BLM 1998);
- Ensure that any nonpoint source BMPs and rehabilitation techniques meet state and local water quality requirements (BLM 2005);
- Implement BMPs such as locating waste and excess excavated materials outside drainages to avoid sedimentation;
- Conduct regular site inspections during the construction period to see that erosion-control measures were properly installed and are functioning effectively;
- Consider use of landscape for buffering, erosion control, and stormwater runoff control for maintaining acceptable water quality conditions (Clark County 2008);
- Obtain and comply with necessary permits in accordance with the Clean Water Act Section 404 (dredge and fill) and Section 401 (water quality) from the USACE and NDEP (NDEP 2010; and
- Implement adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site (any changes must be approved by the BLM).

<u>MMBIO-5: Bird and Bat Conservation Strategy.</u> A BBCS will be developed for the proposed Project. The BBCS will provide for pre-construction surveys, post-construction monitoring, and adaptive management measures. During pre-construction surveys, biological monitors will also

look for bird nests within the proposed Project area. If an active nest is located, Duke will notify BLM and/or NDOW to determine an appropriate buffer distance for avian species found, typically at around 30 m (100 feet) from the nest. As it is not possible to quantify effects on bats and birds based on pre-project surveys, post-construction monitoring will be implemented. The BBCS will define thresholds of adverse effects; for every threshold that is exceeded, a mitigation strategy will be employed.

<u>MMBIO-6: Burrowing Owl Protection During Construction.</u> For burrowing owls, biological monitors will use USFWS survey methods and mitigation measures presented in Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region (USFWS no date specified).

<u>MMVIS-5: Minimize Lighting.</u> Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the FAA. The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

<u>BBCS-4: Trash and Litter Control (also contained in MMBIO-3).</u> Trash and food items will be disposed of properly in predator-proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.

<u>BBCS-5: Carrion Control:</u> Dead animals or animal parts (e.g., gut piles or carcass remains) will be removed immediately to prevent the attraction of vultures, GOEAs or other scavengers.

<u>BBCS-6: Annual Wildlife Training.</u> See Section 9.2

<u>BBCS-7: Speed Limits (also contained in MMBIO-3).</u> A speed limit of 15 miles per hour will be maintained while on the construction site, access roads, and storage areas April 1 – May 30, and September 1 – October 31. Vehicular speed limits will not exceed 20 miles per hour during other times of the year.

<u>BBCS-8: Monitoring of Overnight Hazards (also contained in MMBIO-3).</u> No overnight hazards to wildlife (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards would be eliminated each day prior to the work crew and biologist leaving the site. All excavations will be inspected for trapped wildlife at the beginning, middle, and end of the work day, at a minimum, but will also be continuously monitored by the authorized biologist. Should wildlife become entrapped, the authorized biologist will remove it immediately.

<u>BBCS-9: Environmental Manager.</u> See section 6.2.

<u>BBCS-10: Special-status Species Monitor.</u> Qualified biologists shall monitor all construction activities where prior surveys have documented the occurrence of one or more special status species. In conjunction with the Environmental Manager, the biologist shall have the authority to

halt all non-emergency actions that might result in harm to a special status species, and shall assist in the overall implementation of protection measures for such species during proposed Project operations. Emergencies are defined as situations or issues involving human health and safety.

BBCS-11: Special Status Species Consultation. If a special status species is located during construction, and a contingency for avoidance, removal, or transplant has not been approved by the appropriate agency, contractors and employees shall not proceed with the proposed Project activity until specific consultation with the appropriate agency is completed and work continuance has been approved by the appropriate agency.

All encounters with special status species shall be reported to the qualified biologist. The observer is responsible for providing the following information to the biologist, who shall record it:

Species name;
Location (narrative and maps) and dates of observations;
General condition and health, including injuries and state of healing; and
Diagnostic markings, including identification numbers or markers.

Upon locating a dead or injured special status species, an authorized biologist shall be notified. The biologist will notify the appropriate agency. Verbal communication to the wildlife agencies shall take place as soon as possible, and written notification must be made within 15 business days of the date and time of the finding or incident (if known). The notification must include: location of the carcass, a photograph, cause of death (if known), and other pertinent information such as corrective measures implemented to avoid future injury/death.

BBCS-12: Marking of Sensitive Areas. Prior to construction, environmentally sensitive areas (e.g., Joshua trees, aquatic resource areas, nests, etc.) that are to be protected in place and remain undisturbed during construction shall be staked, flagged, fenced, or otherwise conspicuously demarcated in the field.

BBCS-13: Pre-construction Surveys. A pre-construction survey of each proposed Project activity located within areas identified during surveys as special status species habitat shall be conducted by a qualified biologist no more than 7 days prior to the onset of activities.

BBCS-14: Monthly Compliance Reports. Monthly compliance reports shall be provided to the BLM during the construction phase of the proposed Project. Within 90 days of completion of construction, a post-construction report shall be prepared and submitted to the BLM. The report shall include photographs taken before, during, and after construction and a discussion of the proposed Project's compliance with the biological mitigation measures.

BBCS-15: Minimize Disturbance Impacts. Vegetation removal shall be limited to the minimum area needed to construct the proposed Project and shall be restricted in environmentally sensitive areas. During construction, travel and equipment staging shall be restricted to designated access roads and work areas to minimize vegetation disturbance. The extent of these areas shall be shown on the construction plans and clearly demarcated in the field with stakes, flagging, or fencing. Any straying outside of the approved construction footprint shall be reported to the BLM as soon as possible after occurrence.

BBCS-16: Pesticide Use per Recommendation. Use of pesticides, herbicides, fertilizers, and other chemicals will be in strict accordance with federal and state laws.

BBCS-17: Removal of Hollow Plastic Mine Claim Markers. Upon detection of an uncapped hollow plastic mine claim marker found within the Project area, construction personnel will inform a Special Status Species Monitor or the Wildlife Coordinator, of the location of the marker. The Monitor or Coordinator will remove the marker and place it on the ground at the location from which it was removed.

6.2 Environmental Manager during Construction

BBCS-9: Environmental Manager. An Environmental Manager or Compliance Inspection Coordinator shall be hired by Duke Energy Renewables and be responsible for overseeing the proposed Project's environmental protection measures throughout the construction phase. At least one qualified biologist approved by BLM and USFWS shall also be available and responsible for identification of habitat and individual special-status species as needed during construction and operation. The biologists shall, if needed, hold the required permits or MOUs with appropriate Federal and State agencies for the survey for or handling of any listed species. The Environmental Manager shall be responsible for ensuring that Duke Energy Renewables and its contractors comply with environmental (including wildlife) laws and regulations, as well as monitor compliance with all avoidance and minimization measures. This includes posting signs and ensuring that workers respect sensitive biological areas, such as desert tortoise burrows and raptor nests.

7.0 POST-CONSTRUCTIONAL/OPERATIONAL PHASE

The purpose of post-construction monitoring is to compare data collected post-construction to data collected pre-construction in order to evaluate the effectiveness of mitigation measures, and assess fatalities. Additional objectives are to: 1) compare observed/corrected fatality rates to the assessed risk to species based on results of pre-construction surveys risk, and 2) determine if avoidance, minimization and mitigation measures were appropriate and adequate.

7.1 Best Management Practices during Operation

This section summarizes measures that will be taken to avoid and minimize impacts to wildlife during long-term operation of the Project (Table 15) and are applicable to operations and maintenance staff only.

The APMs, though not specific to wildlife will provide broad benefits in the form of minimizing disturbance to the area. The APMs during operation are:

APM-9: Weed Control Plan
APM-10: Site Rehabilitation Plan and Facility Decommissioning Plan

In addition to the APMs, mitigation measures in the DEIS and provided in this document will further minimize impacts to wildlife.

Table 15. Species that Would Benefit from Searchlight Wind Energy Project Avoidance and Minimization Measures during Operations (with cross-reference to the Searchlight Wind Energy Project DEIS [BLM 2011])

Avoidance and Minimization Measures	Non-raptors	Raptors	Eagles	Bats	DEIS Reference
Weed Control Plan	X	X	X	X	APM-9
Site Rehabilitation Plan	X	X	X	X	APM-10
Minimize Lighting	X	X	X	X	MMVIS-5
Trash and Litter Control	X	X	X		BBCS-4
Carrion Control		X	X		BBCS-5
Annual Wildlife Training	X	X	X	X	BBCS-6
Speed Limits	X	X	X	X	BBCS-7
Monitoring of Overnight Hazards	X	X	X	X	BBCS-8
Environmental Inspector	X	X	X	X	BBCS-9
Pesticide Use Per Recommendations	X	X	X	X	BBCS-16
Removal of Hollow Plastic Mine Markers	X				BBCS-17
Prohibit Pets	X	X	X	X	BBCS-18
Annual Biological Report	X	X	X	X	BBCS-19
Minimize Wildfire Potential	X	X	X	X	BBCS-20
Disposal of Carcasses		X	X		BBCS-21

<u>MMVIS-5: Minimize Lighting.</u> Efforts will be made to minimize the need for and amount of lighting on ancillary structures. When possible, lighting will be associated with motion sensors to minimize constant lighting effects. The only exterior lighting on the WTGs will be the aviation warning lighting required by the FAA. The warning lighting will be the minimum required intensity to meet the current FAA standards. Outdoor night lighting at the O&M facility will be the minimum necessary for safety and security. All lights will be shielded to reduce offsite light pollution. Motion sensor lights will be used when possible.

<u>BBCS-4: Trash and Litter Control (also contained in MMBIO-3).</u> Trash and food items will be disposed of properly in predator-proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.

<u>BBCS-5: Carrion Control:</u> Dead animals or animal parts (i.e. gut piles or carcass remains from harvested big game) will be removed immediately to prevent the attraction of vultures, GOEAs or other scavengers.

<u>BBCS-6: Annual Wildlife Training.</u> See Section 9.2

<u>BBCS-7: Speed Limits (also contained in MMBIO-3).</u> A speed limit of 20 miles per hour during operation with further restriction to 15 mph April 1- May 31, and September 1- November 1.

BBCS-8: Overnight Hazards (also contained in MMBIO-3). No overnight hazards to wildlife (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and biologist leaving the site. All excavations will be inspected for trapped wildlife at the beginning, middle, and end of the work day, at a minimum, but will also be continuously monitored by. Should wildlife become entrapped, the authorized biologist will remove it immediately.

BBCS-9: Environmental Inspector. See Section 10.5

BBCS-16: Pesticide Use per Recommendation. Use of pesticides, herbicides, fertilizers, and other chemicals will be in strict accordance with federal and state laws.

BBCS-17: Removal of Hollow Plastic Mine Claim Markers. Upon detection of an uncapped hollow plastic mine claim marker found within the Project area, construction personnel will inform a Special Status Species Monitor or the Wildlife Coordinator, of the location of the marker. The Monitor or Coordinator will remove the marker and place it on the ground at the location from which it was removed.

BBCS-18: Prohibit Pets. Domestic pets shall be prohibited from proposed Project work areas.

BBCS-19: Annual Biological Report. An annual report shall be submitted to the BLM, NDOW, and USFWS discussing continued implementation of biological mitigation measures.

BBCS-20: Minimize Wildfire Potential. Fire prevention measures will be implemented during operation to minimize wildfire potential.

BBCS-21: Disposal of Road-killed Animals and Other Carcasses. Road-killed animals or other carcasses (non-bird) detected by personnel on or near roads within the Project will be reported and removed promptly to avoid attracting eagles and other raptors to the Project

7.2 Proposed Fatality Monitoring Study (Tier 4a)

7.2.1 Avian and Bat Fatality Study

The primary objective of the fatality monitoring study is to estimate avian and bat mortality at the Project and determine whether the estimated mortality is lower, similar, or higher than the average mortality observed at other regional projects or if species of concern are impacted. The monitoring study will begin after all the turbines in each phase are fully operational. The study will be conducted for two years, followed by a Technical Advisory Committee (TAC) review of findings and recommendations on additional monitoring. Twenty-six turbines will be searched. Searches are proposed to be conducted weekly during the spring and fall migration and every 10 days during the remainder of the year. Experimental bias trials will be conducted to account for searcher efficiency and carcass removal rates. More details of the fatality monitoring protocol can be found in Appendix B.

The scope and duration of the fatality monitoring study was developed to be consistent and within the range of monitoring programs that have or will be conducted at other wind projects in the western United States. The proposed methods for estimating avian and bat mortality from the Project: 1) conform to the industry standard in the western US; 2) provide much more accurate and less variable estimates of avian and bat mortality, especially during migration seasons, due to increased frequency of surveys; and 3) will provide the NDOW and USFWS with good baseline data on avian and bat fatality rates at the Project.

7.3 Role of Technical Advisory Committee

A Technical Advisory Committee has been established to act as an advisory group on the wildlife post-construction monitoring studies. The TAC is comprised of representatives from BLM, USFWS, NDOW, and Duke Energy Renewables. The TAC will review the technical procedures of the monitoring studies, assess the scientific findings, and recommend various practices or measures, as necessary, to Duke Energy Renewables.

The TAC's responsibilities include the following:

- Reviewing and commenting on the raptor nest study;
- Reviewing and commenting on the avian and bat fatality monitoring study;
- Reviewing and commenting on the avian point count and bat acoustic monitoring studies;
- Providing input to Duke Energy Renewables on additional monitoring needs, adaptive management and mitigation, based on the post-construction monitoring results and fatality estimates.

The TAC will use a collaborative process to reach understanding and consensus on reviews and recommendations. The TAC does not replace regulatory authority or responsibility of the various agencies or groups. A third-party coordinator may assist Project with planning and arrangements for meetings, and with briefing and reporting to TAC members.

Duke Energy Renewables will submit quarterly fatality updates to the TA for up to three years of post-construction, including prior to commencement of formal mortality monitoring. In addition to reporting mortality monitoring progress, the quarterly fatality updates will inform of large bird and/or bat fatalities detected by Project personnel outside of established dates of formal mortality monitoring. In addition, an annual report of findings will be prepared at the end of each year of monitoring and will be distributed to the members of the TAC. The TAC will meet after the first monitoring report is submitted to discuss the results. The need for further study or changes to the current protocol will be based on reasonable criteria proposed by the TAC. A final report on study results will be submitted to the TAC, as appropriate, for review and subsequent discussion on mitigation recommendations.

Draft meeting minutes will be completed within two weeks of each meeting. Minutes will be forwarded to TAC members for review and comment. Minutes will be approved and finalized at the subsequent meeting. Depending on the group's preferences, meetings may be in person or by conference call. Monitoring findings (summarized per season or semi-annually) and other pertinent information (unusual findings or events) will be transmitted via hard copy, e-mail, or phone call, as necessary.

7.4 Adaptive Management

Duke Energy Renewables has implemented adaptive management at the Project throughout the pre-construction baseline data collection, siting, construction and operation planning, and planning of post-construction monitoring efforts. Duke Energy Renewables, in coordination with the BLM, NDOW, and the USFWS, has used the results of the baseline wildlife studies to implement wildlife avoidance measures (e.g., setbacks and timing stipulations). Duke Energy Renewables has also implemented BMPs during siting, and will continue to do so during construction, and operation of the Project. The effectiveness of the management decisions made to date (e.g., siting decisions, wildlife avoidance measures, and BMPs) will be evaluated throughout the Tier 4 post-construction monitoring efforts.

Adaptive management will focus on ‘species of concern’ as identified in the Wind Energy Guidelines. Species of concern refer initially to those with special status designation and are identified in Tables 4 and 6. However, if fatalities resulting from the Project operation are determined to significantly affect a species not identified in Tables 4 and 6, it will be considered a species of concern; and adaptive management measures will be implemented. Depending on the results of the Tier 4 post-construction monitoring studies, no further action may be warranted if impacts are negligible and/or determined to be at an acceptable level. If impacts are determined to be at an unacceptable level, an assessment of why impacts are occurring will be conducted to aid in developing appropriate actions to further avoid, minimize or mitigate the impacts. If causation for impacts is unknown, further monitoring efforts may be implemented to help understand impacts. The determination of acceptable level of impact will be discussed by the TAC. The TAC will help to determine the appropriate mitigation measures to implement to address impacts. Once measures to avoid, minimize and mitigate impacts are put into place, additional monitoring to determine the effectiveness of these measures will be conducted, and, depending on the results, further remedial measures may/may not be necessary.

Based on the Tier 3 pre-construction evaluation and design measures implemented during siting, construction, and operation, Duke Energy Renewables anticipates the impacts to birds and bats will be low. Based on the anticipated impacts, Duke Energy Renewables has developed a suite of adaptive management measures to avoid, minimize and mitigate impacts to birds and bats particularly as a result of turbine related fatalities. The objective is to provide a ‘basket’ of options from which the TAC can select to address higher than expected impacts to species of concern. The potential adaptive management measures to avoid, minimize and mitigate impacts include:

<u>Curtailment</u>

- Curtailment will be considered if, after 2 years of PCMM data, significant temporal or spatial patterns of fatalities of species of concern are detected. Data will be evaluated to determine if there are specific time periods or turbines when larger numbers of fatalities are detected. A large fatality event will be subjective, but by using both years of data, we can determine if the pattern is consistent.

- If specific time periods or turbines have higher than normal fatalities, curtailment during those periods or at specific turbines will be implemented.
    - For bat species of concern – cut-in speed will be increased to 5.0 m/s during identified times or turbines from dawn until dusk and will not exceed 500 hours of cut-in speed curtailment.
    - For bird species of concern – shutdown curtailment will be developed to address large fatality events at specific turbines, time periods or weather conditions and will not exceed 500 hours of shutdown curtailment.

Other Technologies

- Other technologies will be evaluated and considered. Technologies such as radar, cameras, visibility monitors, acoustic deterrents (for bats) or a combination of such technologies will be evaluated to determine their efficacy for the specific issue.

7.4.1 Eagles

Searchlight Wind has taken several steps to reduce risk to golden eagles (see Tables 13-15 above), and based on the weight of evidence from field data, fatalities are predicted to be low. However, due to the uncertainty of these types of estimates, Searchlight Wind will adaptively manage potential impacts. During the first two years of operation in conjunction with the Tier 4a mortality studies, eagle use surveys will be conducted following the methods described in the Eagle Conservation Plan Guidance Technical Appendices (USFWS 2012b). If golden eagle use increases significantly, Duke Energy Renewables will notify BLM, USFWS, and NDOW for coordination. Collectively, a plan will be implemented to try to determine the cause of the increased eagle use and if this increase in use is presenting a higher risk to golden eagle. If a golden eagle fatality occurs, Searchlight Wind will notify BLM, USFWS, and NDOW within 24 hours and will work with the TAC to determine the appropriate adaptive management strategies to be implemented. Searchlight Wind will follow the steps outlined in Table 16 to address adaptive management of eagles.

7.4.2 Other Birds

After the completion of post-construction mortality monitoring, a report summarizing the number and species found as fatalities; the estimates of total fatalities for the Project adjusted for carcasses removal rates and searcher efficiency; and any incidental fatality observations will be provided to the TAC. The TAC will review this report and provide guidance to Searchlight Wind LLC on whether additional years of post-construction mortality monitoring surveys or species-specific mitigation are recommended based on the observed fatality rates.

7.4.3 Bats

After the completion of post-construction mortality monitoring, a report summarizing the number and species found as fatalities; the estimates of total fatalities for the Project adjusted for carcasses removal rates and searcher efficiency; and any incidental fatality observations will be provided to the TAC. The TAC will review this report and provide guidance to Searchlight Wind LLC on whether additional years of post-construction mortality monitoring surveys or species-specific mitigation are recommended based on the observed fatality rates.

Table 16. Summary of Advanced Conservation Measures using a Step-wise Approach: to be implemented when eagle take occurs

Step	Advanced Conservation Measures	Threshold or Trigger
Step I	Initiate consultation with the TAC to illuminate appropriate conservation measures to minimize likely hood of existing take. Mortality monitoring, using approved protocol for 3 consecutive years.	One eagle taken.
Step II	Initiate advanced conservation measures involving visual and/or auditory deterrence procedures and consultation with TAC to design a protocol to evaluate effectiveness of these methods. Intensify eagle monitoring studies to define seasonal and diurnal flight patterns within the project area to inform development/ implementation of future ACPs. Conduct three years mortality monitoring to evaluate effectiveness of deterrence methods.	Two eagles taken within any 12 month period or three eagles taken within a 5 year period.
Step III	Biological Monitors or a radar system(s) will be employed on site during day light hours and have the ability to curtail turbine(s) when an eagle/large raptor approaches the RSA. A sufficient number of qualified monitors/ radar units will be stationed throughout the site, so as to provide unimpeded views of eagles/large raptors that may approach within one mile of any turbine. Additionally, monitors will be employed to report/remove carrion located on site and report any eagle take. Initiate consultation with TAC to refine and evaluate the curtailment protocol utilizing data from monitoring efforts initiated in Phase II Extend or reinitiate eagle movement studies and mortality monitoring by three years.	Three eagles taken within any 12 month period or four eagles taken within any 5 years period.
Step IV	Deploy radar system(s) designed to curtail turbine blade rotation as eagle(s)/large raptors approach. In consultation with the TAC design and implement a protocol for determining the effectiveness of a radar system(s). Conduct a minimum of three years mortality monitoring to evaluate effectiveness of radar system at reducing eagle take.	Four eagles taken within any 12 month period or five eagles taken within any 5 years period.
Step V	In consultation with the USFWS and BLM, determine other appropriate actions necessary to minimize and compensate for additional impacts to eagle populations.	Five eagles taken within any 24 month period or six eagles taken within the first 5 years of operations.

7.5 Other Proposed Post-Construction Studies (Tier 5)

7.5.1 Golden Eagle Nests

Searchlight Wind will monitor the activity of golden eagle nests during construction and for 2 years following construction to determine the occupancy and productivity of golden eagles nesting within the vicinity of the Project. Follow up nest monitoring surveys will include coverage of the entire Project area in order to locate and document nesting activity that may have been missed during initial surveys or can be attributed to new golden eagle pairs or existing pairs that have moved to a new nesting location. The follow up survey will be conducted by helicopter given the limited access and topography. Two confirmed golden eagle nests and 1 probable golden eagle nest located in 2011 will be visited during construction and post-construction. The nest monitoring effort is to provide data for the USFWS and NDOW and is not intended to determine if the Project affects golden eagle nesting. Golden eagles might not nest every year and nesting activity is driven by rainfall and food availability. If available, and in lieu of post-construction nest monitoring, Searchlight Wind will provide monetary support for a larger-scale research effort that addresses golden eagle nesting success.

7.5.2 Bird Point Counts

Post-construction bird point count surveys will be conducted for two years to develop an understanding of bird activity patterns and how they relate to bird fatality patterns. Counts will be conducted at points 1, 2b, 3a, 6, 8, 19, 14a, and 16, which occur in areas of turbine development. Surveys will be conducted in the spring and fall following the same methods used to collect pre-construction data.

7.5.3 Bat Acoustical Monitoring

Post-construction bat acoustic surveys will be conducted for two years to develop an understanding of bat activity patterns and how they relate to bat fatality patterns. Acoustic detectors will be placed on two Met towers, one in the northern area (Met 6) of the project and southern end of the project area (Met 3). If these Met towers are removed, alternative sampling locations will be selected. Data will be collected using the same methods used to collect pre-construction data. After a year of post-construction bat activity and bat fatality monitoring, the TAC will review the results to determine if a second year of acoustic monitoring surveys is warranted. However, at this date, the conditions that would warrant a second year of surveys have not yet been determined.

8.0 REPORTING

8.1 Pre-Construction

Duke Energy Renewables has met with the BLM, NDOW, and USFWS on multiple occasions since 2008 to discuss proposed baseline wildlife study protocols, wildlife study results, implications for Project impacts to wildlife and habitats, and potential mitigation measures (Table

1). In addition, results of the final wildlife baseline study efforts were made publicly available within the DEIS (BLM 2011).

8.2 Construction

Monthly compliance reports shall be provided to the BLM during the construction phase of the proposed Project. Within 90 days of completion of construction, a post-construction report shall be prepared and submitted to the BLM (BBCS-14). The report shall include photographs taken before, during, and after construction and a discussion of the proposed Project's compliance with the biological mitigation measures.

8.3 Post-Construction

An annual report shall be submitted to the BLM, NDOW, and USFWS discussing continued implementation of biological mitigation measures (BBCS-18). Fatality summaries will be provided seasonally to the TAC.

9.0 TRAINING OF PERSONNEL

9.1 New Employee Orientation Program

The workforce at the Project is required to attend a new employee orientation program. Employees are provided information to enhance wildlife awareness, minimize impacts to wildlife, and understand their role in compliance with the Project permit conditions and commitments. Additionally, personnel are instructed on what to do when encountering dead or injured wildlife.

9.2 Annual Wildlife Training (BBCS-6)

All wind site personnel and contractors, except temporary contractors that are escorted by trained personnel, are required to have Duke Energy's Wildlife Incident Monitoring and Reporting System training (see Section 10; BBCS-6). This training is based on the Migratory Bird Treaty Act training given to Duke Energy generation and distribution employees but has been tailored to the special needs of the wind sites. The training will consist of an initial instructor led training with an annual refresher CBT. Instructor led training will be required every three years or as necessary. Special emphasis will be placed on protection measures developed for the desert tortoise and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet documenting their participation.

Wildlife Coordinators and Operations technicians (those performing the turbine surveys) will be required to have instructor-led field training. This will consist of on-the-job training with a Duke Energy Scientific Services biologist and the Operations technician performing turbine surveys in the field.

10.0 WILDLIFE INCIDENT MONITORING AND REPORTING SYSTEM (WIMRS)

The Wildlife Incident Monitoring and Reporting System (WIMRS) has been developed to provide the Duke Energy Renewables operating wind facilities with the tools to support a responsible wildlife management program through adaptive management measures as necessary to reduce impacts (see Section 7.4). WIMRS is not a static program but will evolve as information is provided by the site personnel and the wind industry on data collection methods, frequency of surveys, and the value provided by the program to the wind site and the industry in general.

WIMRS, through operational monitoring is intended to build on the baseline of data provided by post construction monitoring. The data gathered through WIMRS provides further information on trends, approximations on the number of fatalities, the location of those fatalities and the overall species composition of the wildlife at risk. This information will provide data to allow the wind sites to adapt to wildlife issues and prevent them in the future.

Operational monitoring is a series of long-term (five-year increments) standardized surveys using Operations personnel. It systematically monitors and reports wildlife fatalities and incidents to assess long-term operational impacts (trends) of the Project. At approximately five-year intervals, an analysis of trends will be conducted to assess impacts of the Project and evaluate the value of continued monitoring.

The surveys will consist of both incidental observations as well as structured observations timed to coincide with the sites Spill Prevention, Control and Countermeasures (SPCC) inspections. They will be tracked through an in-house environmental data management system using an electronic incident reporting form (Appendix C). Information will be gathered using GPS, cameras, trained operations technicians, and Duke Energy Environmental Services biologists and biological consultants.

10.1 Wildlife Coordinator

A key resource for implementation of the operational monitoring is the onsite operations technician that is designated as the Wildlife Coordinator (WC) or Wildlife Lead. The WC acts as the on-site environmental representative for wildlife issues and implementation of the WIMRS at the site. The duties of the WC include supporting the Site Manager and Operations personnel with wildlife related issues at the Project. The WC will work with a Duke Energy biologist or the EHS Coordinator on wildlife issues. Over time, the WC will be trained and become more familiar in bird and bat identification, reporting, and other procedures to comply with state and federal permits. The WC will be supported with various job aids and access to technical assistance from Duke Energy biologists or biological consultants.

Duke Energy biologists or biological consultants shall coordinate the reporting and collection of state endangered, threatened, sensitive, or other state-protected species with local wildlife agencies. Duke Energy biologists or biological consultants shall coordinate the reporting and collection of federally listed endangered or threatened species and Migratory Bird Treaty Act protected avian species with the USFWS.

The WC will obtain a scientific collecting permit for the project so that bat carcasses found as fatalities can be collected and used in trails (see Appendix B).

10.2 Voluntary Operational Monitoring Reporting Criteria

Depending on the type of incident, reporting may simply consist of a WIMRS report. The following criteria should be used to determine whether a Wildlife Hotline (refer to section 10.7 for Wildlife Hotline numbers) call is necessary or not:

Note: Handling of dead birds is prohibited unless the site has first obtained all necessary State and Federal permits. Handling of any dead birds (if permitted) or bats should be done with proper PPE (gloves).

Call the Wildlife Hotline for the following incidents (all incidents should be reported to the site manager and wildlife coordinator):

- Dead or injured eagles, raptors or owls,
- Any uncertainty about a rare, threatened, endangered, or species of concern (RTE),
- A dead or injured RTE,
- A sighting of an RTE that is not commonly seen on the site,
- More than 3 dead or injured birds or bats found at a single turbine,
- Any large scale fatality event at the site, e.g. 5 or more fatalities site wide,
- Newly constructed raptor nests,
- Old, historically inactive raptor nests that have recently become active,
- Raptor activity at raptor nest structures or other manmade habitat enhancements.

Complete the WIMRS form and submit with photographs for the following wildlife incidents (all incidents should be reported to the site manager and wildlife coordinator):

- Incidental bird and bat fatalities, defined as a single fatality that does not meet a requirement described above,
- Observations of fox or coyote dens, prairie dog towns (that didn't exist before), active nests that are not hazardous to operations, etc.

10.3 Incidental Observations

All personnel shall be familiar with the wind site and the wildlife that may be expected on the site. All travels on the site and visits to wind turbines should include a visual scan of the area keeping an eye out for dead birds or bats. Turbine visits should include a visual scan of the gravel area and access road. When conditions permit (no crops or other vegetation blocking view) a visual scan of the surrounding area should also be performed.

Large raptors and eagles are generally easy to spot and require immediate reporting to the Wildlife Hotline. All bats and smaller birds should be reported to the site manager, the WC and the WIMRS reporting process per the guidance above.

10.4 Turbine Surveys

Trained Operations technicians will perform a pad check during monthly SPCC inspections. This will consist of a check around the turbine pad, transformer and access road. Turbine surveys should be more thorough than incidental observations. Large raptors and eagles should be reported to the Wildlife Hotline as soon as possible. All bats and smaller birds should be reported to the site manager, the WC and the WIMRS reporting process per the guidance above.

The recommended method of performing a turbine survey is to walk around the base of the turbine, the transformer, the outside edge of the pad and approximately 60 meters of the access road. A visual scan should be performed to approximately 4 meters on the outside of the pad and both sides of the road.

Always ensure safety prior to performing the pad check. All turbines generally have an open area that can be searched with little difficulty. Technicians need not walk through brambles, briars; risk a snake encounter or other site hazards. Seasonal hazards (e.g. ice) may make some turbines too dangerous to search and some areas may be considered unsearchable for safety reasons.

Note that turbine surveys will not begin at a wind site until post-construction monitoring is complete. However, incidental observations by site personnel will be performed. Incidental finds are an important part of the post-construction monitoring.

10.5 Environmental Services Inspections (BBCS-9)

A biologist from Duke's Environmental Services group may inspect the turbines. Some sites will be inspected more frequently depending on data gathered through the incidental observations, turbine checks or other wildlife issues/incidents at the site. These inspections will be more thorough and formal than the regular turbine checks. Protocols for these inspections will follow best practices and standards as prescribed by state and federal agencies and the wind industry.

10.6 Poster

In addition to formal training, Project buildings will have a poster (Appendix D) displayed in prominent places. The purpose of this poster is to remind employees of their personal responsibility and the corporation's responsibility to comply with migratory bird and other wildlife-related laws. Posters also list a phone number to call for assistance when encountering avian or bat issues.

10.7 Contact Information

The Wildlife Hotline should be contacted per the reporting criteria given above.

Greg Aldrich (704) 430-7946 (call or text)
(Primary Contact)

Scott Fletcher (704) 956-1315
(Secondary Contact)

The Duke Energy Renewables' reporting process is documented in a flowchart (Appendix E). Each employee receives detailed instruction on the process when trained and receives a copy of the flowchart.

11.0 INTERNAL AUDITING

Project will be subjected to auditing by Duke Energy Corporate EHS auditing group. This group will audit various aspects of the Project by examining training records, ensuring posters are visible, and quizzing employees about their knowledge of bird and bat reporting requirements. This audit may also include examination of the record keeping of reported bird mortalities. Any audit findings will follow Duke Energy Corporate EHS audit procedures that include follow-up and corrective action measures.

12.0 PUBLIC OUTREACH AND EDUCATIONAL PLANS

It is continually important that Duke Energy Renewables operates its facilities in an environmentally responsible manner. This includes siting, engineering, constructing, and operating its electric generation system in a manner that minimizes its impact on wildlife. Fatalities or injuries of birds or bats, or public displays of indifference toward wildlife by Duke Energy Renewables employees, will not be tolerated by Duke Energy Renewables or the public, and could result in negative media coverage and/or regulatory action by the agencies. This is particularly true with high-profile raptors, such as golden eagles, and hawk and owl species. During migratory bird training sessions, instructors discuss public awareness issues with Duke Energy Renewables employees. Examples of how to effectively handle high-profile bird problems are discussed.

Duke Energy Renewables will continue to strive to educate the public on the benefits of renewable wind energy. This may include partnerships with local academia to develop educational programs related to wind energy facilities. Duke Energy Renewables may allow tours or field trips with local schools, host open houses, and/or invite the public for visits to Project. Duke Energy Renewables may distribute material in the media, such as local newspapers or radio stations. In addition, Duke Energy Renewables will strive to continue to work closely with resource agencies, conservation organizations, the media, and the general public on bird and bat conservation projects.

13.0 KEY RESOURCES

<u>Key avian and bat resource personnel involved with Searchlight include the following:</u>
Tetra Tech EC, Inc.
Karl Kosciuch, PhD
Senior Biologist and Project Manager
Cell Phone: 503-432-7093

Duke Energy Migratory Bird Hot Line for Wind Sites
Greg Aldrich (704) 430-7946 (call or text)

United States Fish and Wildlife Service (USFWS) - Office of Law Enforcement
USFWS Region 8 (CA and NV)
Office of Law Enforcement
2800 Cottage Way, W-2928
Sacramento, California 95825
Phone: 916-414-6660 Fax: 916-414-6715

USFWS - Southern Nevada Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5230

USFWS - Nevada Fish & Wildlife Office
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
(775) 861-6300

<u>Nevada Licensed Bird Rehabilitators Near Searchlight:</u>
Donald Inskeep
126 Crestview Dr
Las Vegas, NV 89124
Phone: 702-872-9309

Lisa Ross - Wild Wing Project
4232 Tuffer Ln
Las Vegas, NV 89130
Phone: 702-238-0570

Joanne Stefanatos - Animal Kingdom Veterinary Hospital
1325 Vegas Valley Dr
Las Vegas, NV 89109
Phone: 702-735-7184

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APPENDIX A. SITE-SPECIFIC PRE-CONSTRUCTION DATA

APPENDIX B. FATALITY MONITORING PROTOCOL

FATALITY MONITORING PROTOCOL

1 TECHNICAL APPROACH

The objective of post-construction mortality monitoring at the Project is to study the avian and bat mortality associated with Project operation over the course of two years. Wind farm-related fatality estimation is based on the number of carcasses found during carcass searches conducted under operating turbines. Both the probability that a carcass persists onsite long enough to be detected by searchers (carcass persistence), and the ability of searchers to detect carcasses (searcher efficiency) can lead to imperfect detection of carcasses during standardized searches. In other words, not all birds or bats killed are found, thus fatality estimates are biased. Therefore, this post-construction monitoring plan includes: 1) methods for conducting standardized carcass searches to monitor potential injuries or fatalities associated with wind farm operation; 2) carcass persistence trials to assess seasonal, site-specific carcass persistence time; and 3) searcher efficiency trials to assess observer efficiency in finding carcasses. Annual fatality rates of bats, large birds, and small birds will then be calculated by correcting for the bias (i.e., underestimation) due to searcher efficiency and carcass persistence.

The field and analytical methods proposed below are consistent with post-construction monitoring being conducted, or proposed, for other wind projects elsewhere in the U.S. (Johnson et al. 2003; Young et al. 2003; Erickson et al. 2004; Arnett et al. 2005, 2009a, 2009b; Kerns et al. 2005; Jain et al. 2007; Huso 2011) but have been adapted to the specific characteristics of the Project. The protocol outlines the surveys and trials to be conducted. Methods and timing outlined in this protocol may be modified over the course of the study year as Project-specific information is gained to maximize the effectiveness and efficiency of the monitoring program (e.g., search interval, number of turbines searched, plot size).

A scientific collecting permit will be obtained from NDOW so that bat carcasses can be collected and used in field trials.

2 STANDARDIZED CARCASS SEARCHES

The objective of the standardized carcass searches is to systematically search turbine locations for avian and bat fatalities that are attributable to collision with Project facilities or, in the case of bats, also due to barotrauma. Collectively, all turbine fatalities will be referred to as collision-related fatalities. The following subsections describe survey timing, the sampling design, and field procedures.

2.1 Sampling Duration and Intensity

Carcass searches will begin after construction is completed and the Project is operational, and will continue for one year. Post-construction monitoring will consist of systematic searches of 30 percent of the 87 turbines, for a total of 26 turbines. The subset of turbines to be monitored will be a representative sample of available topographic and habitat variation at the Project. To be most efficient and encompass all potential Project impacts, survey effort will incorporate observed seasonal patterns in bird and bat use, and level of sampling will vary accordingly.

Seasonal sampling intervals will be as follows:

Spring: March 16 to May 31 – approximately 8 searches
Summer: June 1 to August 15 – approximately 8 searches
Fall: August 16 to November 15 – approximately 13 searches
Winter: November 16 to March 15 – approximately 11 searches

Surveys will be conducted every 7 days during spring and fall and every 10 days during summer and winter. One quality assurance/quality control (QA/QC) visit will be conducted during the year of surveys.

2.2 Search Plot Size and Configuration

The Project consists of 87 turbines. For this proposal, Tetra Tech assumes that turbines have a hub height of approximately 80 m (262 feet) with a total tip height of 130.5 m (428 feet). Tetra Tech will create a survey plot that is approximately 75 percent of the turbine tip height in width centered on the turbine. That is, the search area will extend 100 m (328 feet) from the turbines on each side to create a 200 m x 200 m search plot. Search areas will encompass maintained turbine pads and access roads, as well as adjacent unmaintained areas. The actual area searched will ultimately be dependent on the configuration of the maintained areas, as well as the portion of the unmaintained area that can be realistically searched as determined during initial surveys. Tetra Tech anticipates that the turbine pads will extend out to approximately 12 m (40 feet) from the base of turbines and roads will remain clear of vegetation.

During all seasons, linear transects will be established within search plots approximately 6 m (20 feet) apart and the searcher will walk along each transect searching both sides out to 3 m (10 feet) for fatalities. Personnel trained and tested in proper search techniques will conduct the carcass searches. The proposed protocol for documenting any fatalities or injuries is provided below.

2.3 Fatality Documentation

Carcasses found during standardized carcass searches will be labeled with a unique number, and searchers will record species, sex and age when possible, date and time collected, location (Global Positioning System [GPS] coordinate, and distance/direction from the turbine), condition (e.g., intact, scavenged, feather spot), observer, turbine number and any comments that may indicate cause of death. If a carcass of a listed species is found, searchers will follow the Project Wildlife Reporting System (Section 8.2) and contact the appropriate agencies.
Fatalities will be photographed as found and GPS locations will be plotted on a detailed map of the study area showing the location of the wind turbines. A copy of the field forms for each

carcass will be kept with the carcass at all times in a separate outer bag if the carcass is removed from the ground.

Carcasses of any special-status species will be handled as directed by USFWS or NDOW. Carcasses of non-listed species will be left in place and marked by trimming feathers, kept for searcher efficiency and/or carcass removal trials, or disposed of at an approved location, as appropriate. Individual carcasses collected during the study will be housed in a freezer on or near the Project site. Individual carcasses will be maintained until after the final analysis and report are prepared in case questions about identity or cause of death should arise. The final disposition of individual carcasses will be based on direction from the agencies, the legal status of individual fatalities, and direction of the USFWS Law Enforcement Agent in Charge, if appropriate.

Searchers may discover carcasses incidental to formal carcass searches (e.g., outside of a search plot or of a scheduled survey date). For each incidentally discovered carcass, the searcher will identify, photograph, and record data for the carcass as would be done for carcasses found during formal scheduled searches, but will code these carcasses as incidental discoveries.

3 CARCASS PERSISTENCE TRIALS

Carcass persistence is the disappearance of a carcass from the search area due to scavenging, predation, or other means (e.g., due to forces such as wind and rain or decomposition beyond recognition). The objective of the carcass persistence trials is to document the length of time carcasses remain in the search area, and thus are available to be found by searchers, and to subsequently determine the appropriate frequency of carcass searches within the search plots. As previously discussed, fatality searches must be conducted at a frequency that minimizes loss due to carcass removal in order to minimize bias. Seasonal differences in carcass persistence (i.e., changes in scavenger population density or type) and possible differences in the size of the animal being scavenged are taken into account when evaluating carcass persistence by conducting trials in multiple seasons.

Carcasses used in the trials will be selected to best represent the size and proportions for a range of species. For large birds, carcasses may include legally obtained waterfowl, pheasant, or similar species obtained from game farms. For small birds, carcasses may include European starlings, house sparrows, or similar species. For bats, carcasses may include black or grey mice that superficially resemble bats. Whenever possible, actual bird or bat carcasses of species expected to occur in the area will be used, including the carcasses of previously collected fatalities.

3.1 Sampling Intensity

Assuming adequate carcass availability, one carcass removal trial will be conducted during spring, summer, winter, and fall seasons with up to 15 carcasses of each bird size class (large bird, small bird, bat/mouse) placed per season, resulting in a total of up to 135 trial carcasses used in carcass removal studies for the entire year for the Project. Trials will be spread throughout the year to incorporate the effects of varying weather, climatic conditions, and scavenger densities.

3.2 Conducting the Trial

Each carcass used for the carcass persistence trial will be placed randomly within the area beneath non-searched turbines. Random locations will be generated and loaded into a GPS as waypoints to allow the accurate placement of the carcasses by field personnel. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass if it is found by other searchers or wind facility personnel. Personnel will monitor the trial birds on days 1, 2, 3, 4, 7, 10, 14, 21, and 30. When checking the carcass, searchers will record the condition as intact (normal stages of decomposition), scavenged (feathers pulled out, chewed on, or parts missing), feather spot (only feathers left), or completely gone. Changes in carcass condition will be cataloged with pictures and detailed notes; photographs will be taken at placement and any time major changes have occurred. At the end of the 30-day period, any evidence of carcasses that remain will be removed and properly disposed of.

3.3 Estimation of Carcass Removal Rates and the Probability of Persisting

The mean carcass persistence will be derived from the carcass persistence trials and will be used to adjust the search interval. Estimates of the probability that a carcass was not removed in the interval between searches (probability of persistence) and therefore was available to be found by searchers, will be used to adjust carcass counts for removal bias (Huso 2011). Huso (2011) presents the most bias-free equation for determining the average probability of persistence, which takes into account the length of the search interval and the carcass persistence:

$$\hat{r} = \frac{\hat{\bar{t}}(I - e^{-I/\hat{\bar{t}}})}{I}$$

Where *t* is the estimated mean persistence time and *I* is the length of the interval.

4 SEARCHER EFFICIENCY TRIALS

The ability of searchers to detect carcasses is influenced by a number of factors including the skill of an individual searcher in finding the carcasses, the vegetation composition within the search area, and the characteristics of individual carcasses (e.g., body size, color). The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. Estimates of searcher efficiency are then used to adjust carcass counts for detection bias. Searcher efficiency trials will be conducted all seasons for all searchers to account for seasonal differences in searcher efficiency.

4.1 Sampling Intensity

Searcher efficiency trials will begin when standardized carcass searches start. Personnel conducting the searches will not know when trials are conducted or the location of the efficiency-trial carcasses. Trials will be conducted multiple times throughout each season and will incorporate testing of each member of the field crew. At least 15 carcasses from both bird size classes (large and small) and bats or bat surrogates (mice) will be included in the trials.

4.2 Conducting the Trial

Carcasses will be placed at random locations within areas being searched prior to the carcass search on the same day. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass after it is found. The number and location of the carcasses found during the carcass search will be recorded. The number of carcasses placed prior to the search (i.e., the number available for detection during each trial) will be verified immediately after the trial by the person responsible for distributing the trial carcasses. Any carcasses not found will be collected after the trial.

4.3 Searcher Efficiency Rate Estimation

Searcher efficiency rates, or the probability of a carcass being observed given persistence, are expressed as p, the proportion of trial carcasses that are detected by searchers in the searcher efficiency trials. These rates will be estimated by carcass size (large bird, small bird, bat) and season.

5 FATALITY RATE ESTIMATION

The estimation of fatality rates will incorporate observed fatalities documented during standardized carcass searches, as well as unobserved mortality, or individuals that may have been killed by collisions with Project components but were not found by searchers for various reasons. Specifically, fatality estimates will take into account:

- search interval
- observed number of carcasses found during standardized searches during the monitoring year for which the cause of death can be attributed to facility operation
- carcass persistence, expressed as the probability that a carcass is expected to remain in the study area (persist) and be available for detection by the searchers during carcass removal trials
- searcher efficiency, expressed as the proportion of planted carcasses found by searchers during searcher efficiency trials.

To estimate fatalities, Tetra Tech will use the Huso estimator (Huso 2011) according to the following equation: $f_{ijk} = \frac{c_{ijk}}{p_{jk} * r_{jk} * v_{jk}}$ where f_{ijk} is the estimated fatality at the i^{th} turbine during the j^{th} search in the k^{th} category and c_{ijk} is the observed number of carcasses at the i^{th} turbine during the j^{th} search in the k^{th} category. The variable r_{jk} is a function of the average carcass persistence time, which was described earlier, and the length of the search interval preceding a carcass being discovered. The variable r_{jk} is calculated using the lower value of *I*, the actual search interval when a carcass is found or I, the effective search interval, and is estimated through searcher efficiency trials previously described. v_{jk} is the proportion of the effective search interval sampled where v = min (1, I I). p_{jk} is the estimated probablity that a carcass in the k^{th} category that is available to be found will be found during the j^{th} search. The variables p_{jk}, r_{jk}, and v_{jk} are assumed not to differ among turbines but can differ with carcass type, size class, and season. To obtain an estimate of the number of fatalities the following equation is used: $f = \frac{\sum_{i=1}^{12} \sum_{j=1}^{n_i} \sum_{k=1}^{3} f_{ijk}}{t}$ where n_i is the number of searches at turbine *i* (*i* = 1,…, n) and t is the effective number of turbines searched.

6 REPORTING

This monitoring study will summarize information on bird and bat fatalities associated with development of the Project. Seasonal reports will simply provide information on the search schedule and the species and number of each species found. The annual report will provide a summary of the carcasses found, searcher efficiency, carcass persistence and the total estimated fatalities for the Project. Any incident involving a federally listed threatened or endangered species or golden eagle will be reported to the USFWS within one business day of identification.

During the set-up for carcass surveys, a sweep survey will be conducted in order to remove any fatalities that occurred before the study is initiated. These fatalities will be summarized as incidental finds in the report, but will not be included in the overall fatality estimates. Based on previous experience managing post-construction monitoring field crews, there are a number of subtleties related to data collection that are best conveyed in-person by those involved in the data analysis, report preparation, and subsequent coordination and communication. These important lessons learned will be emphasized during the training to ensure a seamless transition between data collection, analysis, and reporting.

APPENDIX C. REPORT FORM

Duke Energy

Wildlife Incident Monitoring and Reporting System - WIMRS

Completing and submitting this form is required by your sites Avian and Bat Protection Plan (ABPP). This form can also be found in your sites ABPP.

Instructions:

After completing the form to the best of your knowledge, attach a photo(s) of the bird/bat by using the button at the bottom of the form and then submitting by clicking the submit button. Multiple photos from different angles is best. The form will be delivered to the appropriate a Scientific Services biologist.

Note: Phone calls may also be required in addition to this form.

Wind Site: Select...

Briefly describe the incident if not a dead bird or bat (e.g. nest, sighting):

Observer(s): **Phone Number:**

Time: : **Date:**

City: **County:** **State:**

UTM Coordinates (Obtain from handheld GPS):

Zone: **Easting:** **Northing:** **NAD:**

OR

Latitude: **Longitude:**

OR

General Location on the Wind farm:

Nearest Turbine # **Distance to nearest turbine:**

Approximate direction from nearest turbine: Select...

INJURY OR MORTALITY OBSERVATION

Was this found: ☐ During a Scheduled Turbine Survey ☐ Incidental Find

How many photos were taken: elect...

Type of Incident: *(Check each that apply)*

☐ Bird ☐ Bat

☐ Live ☐ Fatality

If live: ☐ Euthanized ☐ Released ☐ Taken to Rehab. Facility

Carcass condition:

☐ Complete ☐ Partial ☐ Just Feathers ☐ Scavenged ☐ Fresh ☐ Decomposed

Additional Carcass Notes:

What is the species (if known):

Age (if known): ☐ Immature/Juvenile ☐ Adult ☐ Unknown

Estimated time of death (if known): ☐ < 1 day ☐ > 1 day

GENERAL HABITAT DESCRIPTION: Habitat Type/Vegetation Cover:

☐ Sagebrush ☐ Grassland ☐ Crops ☐ Grass ☐ Bare Ground *(road, gravel, dirt, etc.)*

☐ Large Rock/Boulders ☐ Shrubs/Brush ☐ Woods/Trees ☐ Other (describe)

Describe:

Additional Habitat Notes:

IF A HAZARDOUS NEST: Describe the situation:

BALD EAGLE and GOLDEN EAGLE: Do not bury or dispose of carcass. There are specific laws concerning eagles. Notify the site operational manager and contact Greg Aldrich at 704.430.7946 for all eagle incidents. If the primary contact is not available notify your secondary or EHS contact as soon as possible and wait for guidance.

DISPOSITION: (What you did with the bird, bat, carcass, nest, etc.)

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This section for use by Duke Energy Scientific Services personnel:

Wind Farm Code: elect...

Species Code: (if unknown use UNID for birds and UNBA for bats)

Incident ID:

Example Incident ID: 022311-TOTW-53-HOBA-1 (date - wind farm - nearest turbine # - species code - sequential number if more than one individual of same species found at turbine).

Additional Notes:

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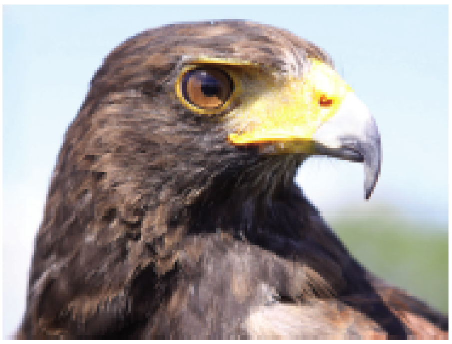
le Attachment

Note: Remember to report this incident to your Operations Manager. If you need assistance, call or text Greg Aldrich at 704.430.7946.

APPENDIX D. POSTER

Wildlife Incident Monitoring and Reporting System (WIMRS)

Duke Energy Wind Facilities



Duke Energy is committed to protecting the environment and creating a sustainable future. This includes conserving and minimizing our impact on wildlife and their habitats.

The production of wind energy has the potential to harm wildlife resources. To reduce our environmental impact, the Wildlife Incident Monitoring and Reporting System (WIMRS) is designed to promote environmental responsibility and provide information to better manage wildlife issues.

About WIMRS

- **Incidental Observations –** Employees should be aware of their surroundings and observant of wildlife at wind sites, report any dead or injured wildlife and unusual wildlife encounters.
- **Turbine Surveys –** Trained site personnel conduct monthly turbine pad checks, including structured surveys around turbines and report any dead or injured wildlife found.
- **Environmental Services Inspections and Audits –** Biologists inspect/audit the sites as necessary to maintain a quality program.

Report all wildlife incidents to your site manager and the Duke Energy Wind Wildlife Hotline using the following guidance:

Call the Wildlife Hotline for the following:

- Dead or injured eagles, raptors or owls
- Any uncertainty about a rare, threatened, endangered or species of concern (RTE)
- A dead or injured RTE
- A sighting of an RTE that is not commonly seen at the site
- More than 3 dead or injured birds or bats found at a single turbine
- Any large scale fatality event at the site, e.g. 5 or more fatalities site wide
- Newly constructed raptor nests
- Old, historically inactive raptor nests that have recently become active
- Raptor activity at raptor nest structures or other manmade habitat enhancements

Complete the WIMRS form and submit with photographs for the following wildlife incidents:

- Incidental bird and bat fatalities, defined as a single fatality that does not meet a requirement described above
- Observations of fox or coyote dens, prairie dog towns (that didn't exist before), active nests that are not hazardous to operations, etc.

Primary Contact:
Greg Aldrich
704-430-7946 (call or text)

Secondary Contact:
Scott Fletcher
704-956-1315

EHS Contact:
Grayling Vander Velde
828-421-9205

APPENDIX E. FLOWCHART

Wildlife Incident Monitoring and Reporting System (WIMRS) Flow Diagram