2011 Searchlight Raptor Nest Survey

Searchlight Wind Resource Area

Clark County, Nevada

Prepared for

Duke Energy

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TETRA TECH EC, INC.

Introduction

Wind energy provides a clean, renewable energy source that is currently in high demand. As the development of wind power generating facilities has increased, so has the need to address potential environmental impacts from those facilities. Birds have been identified as a wildlife group potentially at risk because of collisions with wind turbines and power lines, and displacement through development of wind energy infrastructure. Raptors have been a source of specific concern because of raptor mortality levels observed at certain wind energy sites and the fact that the lower reproductive rate of this group increases the likelihood that fatalities might have population-level impacts (Erickson et al. 2005, Drewitt and Langston 2006). Concern about potential impacts on raptors from wind energy projects extends to bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles, although eagle fatalities are generally low at wind energy projects in the United States.

Bald and Golden eagles are protected under the Bald and Golden Eagle Protection Act of 1962 (as amended), which prohibits "take" of the species. Take includes any action that causes harm or collects, molests or disturbs an individual. In 2009, the U.S. Fish and Wildlife Service (USFWS) published regulations for the issuance of eagle take permits under BGEPA (USFWS 2009). Draft implementing guidance was released in February 2011 and is currently undergoing revision, but the USFWS urges adherence to the draft guidance. Until the draft guidance is finalized, the USFWS has been using Avian and Bat Protection Plans to manage eagle issues. Under either process, risk assessment is based on how breeding eagles use the Project and surrounding areas. The federal Migratory Bird Treaty Act of 1918 affords additional protection to eagles.

Duke Energy is planning to develop a wind energy conversion facility in southern Nevada in Clark County. The Searchlight Wind Resource Area (WRA) is located on public land administered by the Las Vegas Bureau of Land Management (BLM) Field Office. The Searchlight WRA is located in the Mojave Basin and Range. The Mojave Basin within the WRA is characterized as a creosote bush-dominated basin with Joshua tree, banana yucca, white bursage and several species of cholla cactus as the primary plant species. The northern portion of the WRA is characterized by a higher variation in both topography and vegetation including Joshua Tree woodlands compared to the western portion, which is flat, primarily in the valley floor and contains a more uniform, creosote bush dominated habitat. Dry washes exist throughout the WRA. Fourth of July Mountain (elevation 3,809 feet) is found in the eastern portion of the WRA; mountains similar in elevation are found toward the northern extent of the WRA. The weather at the Searchlight WRA is characterized by extreme temperatures and dry conditions; the area receives approximately 10 inches of precipitation annually.

Several species of raptors nest in the Mojave Basin and Range including golden eagle, red-tailed hawk, American kestrel, and prairie falcon. Although not a raptor, common raven also nest in the area and build stick nests similar to that of hawks. Although all raptor nests were recorded, the focal species of the survey was the golden eagle.

Methods

In 2009, Tetra Tech EC (Tetra Tech) in conjunction with the Nevada Department of Wildlife (NDOW) conducted a helicopter survey for raptor nests within the project boundary and a 2-mile buffer (see 2007 – 2009 avian report for additional information); this area was not surveyed in 2011. Prior to the 2011 survey, a biologist with NDOW and experienced with aerial raptor nest surveys, mapped a targeted habitat survey route that included suitable nesting habitat between a 2-mile and a 10-mile buffer of the project area. Habitat surveyed included cliffs, rocky outcrops, and transmission line towers. Unsuitable habitat such as creosote scrub was not surveyed for raptor nests.

The survey was conducted in an AStar helicopter on April 23rd 2011 from 0730 to 1430, skies were clear; temperature was between 80 and 89 degrees Fahrenheit, and winds ranged from 5 to 25 mph. Survey participants included Chuck Robbins (pilot, Sundance Helicopter), Christy Klinger (lead observer, NDOW), Karl Kosciuch (second observer seated behind pilot, Tetra Tech), and Amelia Savage (third observer seated behind lead observer, BLM).

The predetermined route was flown and areas of potential nesting habitat were thoroughly investigated. When suitable nesting habitat was identified, linear transects parallel to each cliff at a distance of approximately 300 feet from the cliff face were flown to achieve complete coverage. In some instances, multiple elevation bands of survey along a cliff face were required to complete survey the cliff face. Airspeed in suitable habitat was slow; approximately 50 mph, slower speed and hovering were used when checking the status of nests.

Data collection

At each nest a location was taken GPS (global positioning system) location in the universal transverse Mercator (UTM) grid NAD 83, the nest was noted as active or inactive, the species associated with the nest was determined when possible, the nesting substrate was recorded, and the condition of inactive nests was noted; active golden eagle nests and those assumed to be golden eagle nests were photographed. A nest was considered active if there was evidence of an adult at the nest (either on the nest or in close proximity to the nest) or eggs, young, or fresh nesting material in the nest. If an adult was on or near the nest, it was assigned to the species observed.

Several lines of evidence were used to determine the activity of a nest and the species associated with the nest these qualifiers could not be determined by the presence of an adult. In some instances, an active nest with young in the nest was located, but an adult was not associated with

the nest. For these nests, we used a weight of evidence approach to assign a probable species. In the survey area, golden eagle nests are constructed of sticks and the bowl of the nest can be lined with a wide variety of vegetation types, including shredded yucca (*Yucca* spp.), grasses, dry yucca leaves (Slevin 1929, Dixon 1937), strips of inner bark, dead and green leaves, soft mosses and lichens (Gabrielson and Lincoln 1959). Golden eagle nests are large, and the pair often adds material to the nest prior to use each year. Other common species in the area build medium sized stick nests including red-tailed hawk and common (Steihl 1985, Preseton et al. 2009). Medium size stick nests on cliffs with 2 or 3 grayish young were considered probable red-tailed hawk nests based on known reproductive parameters and nesting tendencies in the area (Preston et al. 2009).

We considered a nest inactive if we did not find evidence of an adult at or in close proximity of a nest or the nest did not contain eggs, young, or fresh nesting material. Assigning an inactive stick nest to a species is challenging because a nest might be used by different species in each year and the characteristics of nests overlap for some species. We classified each inactive nest as large, medium, or small. Nests that were golden eagle size were classified as large, nests that were red-tailed hawk or common raven size were classified as medium. All other stick nests were classified as small.

For each nest, the nest substrate and the condition of the nest was recorded. In this survey nests were located in one of two substrates, cliff or transmission tower. Inactive nest condition was characterized as good, fair, or poor. A good condition nest had a relatively intact and identifiable nest bowl, was structurally sound but did not have evidence of use this year. This nest would require minimal refurbishment to be suitable for nesting. A fair condition nest had a broken down nest bowl, was structurally sound, and would require major refurbishment to be suitable for nesting. A poor condition nest had a dilapidated nest bowl resembling a flattened pile of sticks, was generally structurally unsound, and would require extensive refurbishment (basically a new structure would need to be added on top of the existing structure) to be suitable for nesting.

Results

We located 26 active raptor nests during the survey in 2009 and 2011. We found 10 active raptor nests (all red-tailed hawk) in 2009 within the project boundary and 2-mile buffer. Ninety-percent were located on transmission line towers with one nest located on a cliff. We located 16 active raptor nests in 2011, which consisted of 1 golden eagle nest, 2 probable golden eagle nests, 12 red-tailed hawk nests, and 1 probable red-tailed hawk nest. All golden eagle nests (confirmed and probable) were located on cliffs, 15-percent of red red-tailed hawk nests (1 confirmed and 2 probable) were located on cliffs, the remaining 85-percent were located on transmission line towers. We located 9 inactive stick nests in 2009. We located 49 inactive stick nests in 2011. Of the inactive nests located in 2011, 23 were classified as large, 22 as medium, 3 as small, and for 1, size was not recorded. Of the 48 inactive nests in 2011 with a size class, all

large nests (n = 23), 38-percent (6/16) of medium nests, and all small nests (n = 3) were located on cliffs.

The distribution of nests did not show a distinct spatial pattern as most nests were associated with transmission line towers. One nest (4-percent) was located inside the project boundary, 10 (38-percent) nests were located between the project boundary and 2-miles, 7 nests (27-percent) were located between 2- and 5-miles from the project boundary, and 8 (31-percent) were located between 5- and 10-miles from the project boundary. The golden eagle nests were located approximately 4.3 miles (nest 11), 10 miles (nest 23), and 10.2 miles (nest 65) from the project boundary.

Discussion

The most common nesting raptor within the project area and 10-mile buffer was red-tailed hawk. Despite available cliff nesting habitat in the survey area, most active red-tailed hawk nests were located on transmission line towers. The spatial distribution pattern of active nests is in contrast to the pattern of inactive medium size nests with most inactive nest located on cliffs. Transmission towers are regularly used as nesting substrate in other parts of the U.S, and the transmission towers might provide a stable nesting area and reduce the risk of predation by mammalian predators (Steenhoff et al. 1993).

Golden eagle nests were discovered on cliffs at least 4 miles from the project boundary with 2 of the 3 nests being approximately 10 miles away. One nest was confirmed a golden eagle by the presence of an adult with a chick in the nest. The other two nests were classified as probable golden eagle nests based on the size of the single chick and the size and location of the nest. Golden eagle eggs hatch asynchronously resulting in a size difference between the two chicks. In areas were food is scarce, the larger chick might force the smaller chick from the nest (Kochert et al. 2002).

Golden eagles will often have more than one nest in a territory with between 2 and 3 alternative nests sites most common (Kochert et al. 2002). The spacing between nests varies with terrain features and the proximity to other eagle pairs and can range from < 3 feet to >10 feet (McGahan 1968, Boeker and Ray 1971). We found 2 large inactive nests associated with a probable golden eagle nest (nest 11) approximately 0.5 miles away. We did not find large inactive nests in close proximity to the other two golden eagle nests (nests 23 and 65), which might be a result of the limited survey effort in the area of the nests due to the nest location near the survey buffer. We found two areas of large inactive nests approximately 6.5 miles from nest 65 and 8.5 miles from nest 23 at the closest. It is unknown if these nests are part of the territory containing the active nests or are part of a historical territory that is inactive.

The most detailed reporting of golden eagle home range size and foraging distances is reported in Marzluff et al. (1997). They studied the spatial use of 8 to 9 golden eagle territories from 1992 to 1994 in the Snake River Birds of Prey National Conservation Area in Idaho. Eagles

traveled 0.64 ± 0.22 miles, (*n* = 121) on average from the nest during the breeding season. Marzluff et al. (1997) reported behavior-specific distances and found that golden eagles traveled furthest from the nest during hunting forays and to kills (2.17 – 2.48 miles) over all seasons. Using a convex polygon analysis, Marzluff et al. (1997) found breeding season home range size in Idaho varied from 336 ha to 9,759 ha making the minimum home range radius from a nest 0.64 mi and the maximum 3.46 miles. The convex polygon method includes all observations, and Marzluff et al. (1997) states that concave polygons best describe the area used by eagles as do core areas (clusters) that remove extreme travelers and define high use areas. Using the maximum concave breeding season home range estimate of 8331 ha, the radius from a nest is 3.2 miles. Distances might differ in the Mojave Desert, but those data are not available.

Conclusions

Red-tailed hawk was the most common nesting raptor in the study area and 20 of 23 active nests were located on transmission line towers. The towers appear to be the preferred nesting substrate despite the majority of inactive medium sized nests located on cliffs. Thus, it can be assumed that distribution of red-tailed hawk nests does not depend on suitable cliff habitat in this area and is now primarily driven by the location of transmission towers and the territories of other red-tailed hawks and common ravens occupying the towers.

Golden eagle nests were restricted to cliffs and were located at least 4 miles from the project boundary with 2 of the nests being approximately 10 miles from the project boundary. Based on data from Idaho, golden eagle home range size should not overlap with the project boundary. However, data from a more xeric environment such as the Mojave Desert is lacking and the home range size of golden eagles detected during this study cannot be estimated from the nest data alone.

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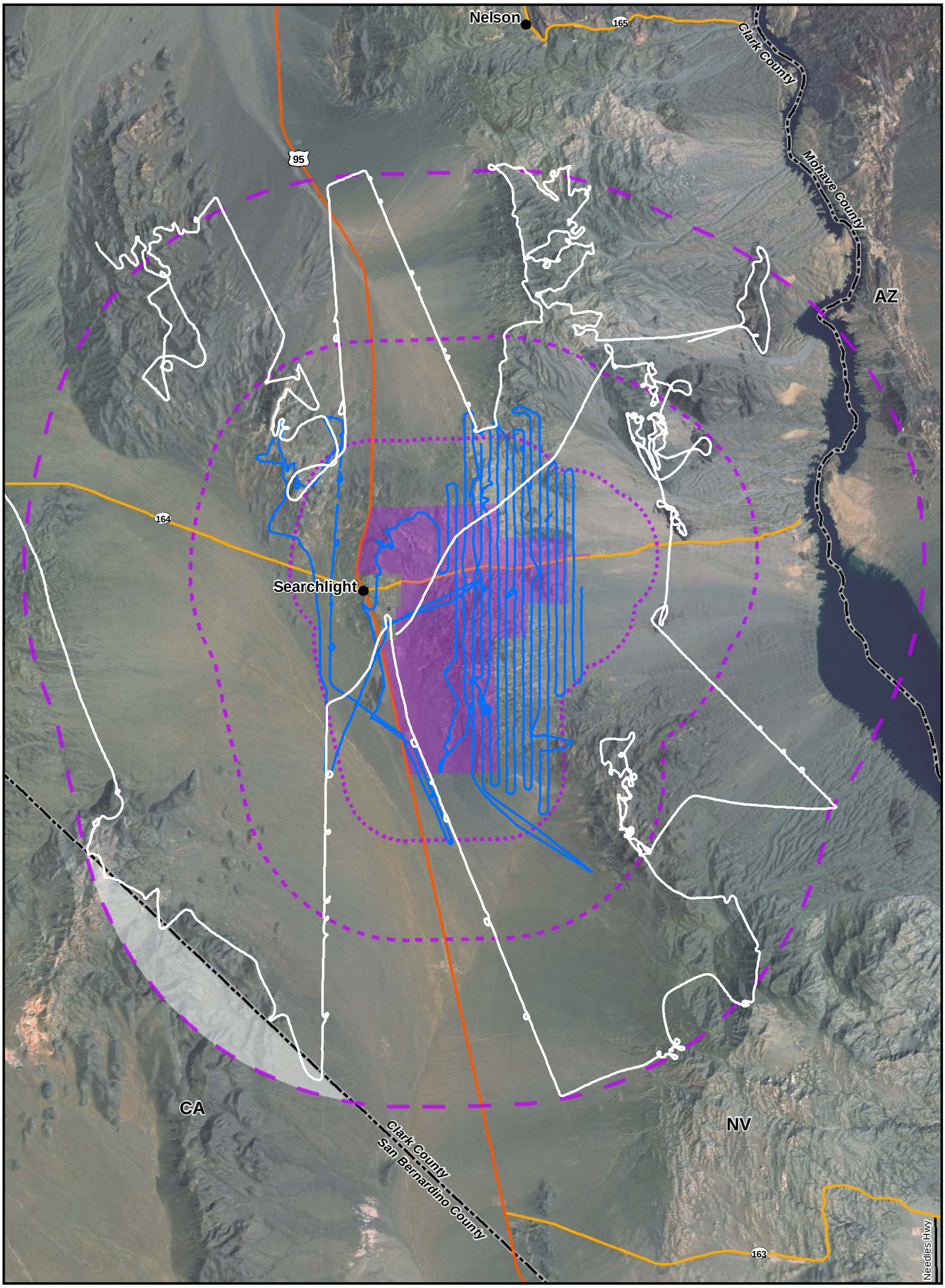

Figure 1

Searchlight

Raptor Nest Flight Path
2009, 2011

Duke Energy

N

1:175,000
NAD 1983 UTM 11

0 1 2 3 4
Miles

Clark County, NV **May 25, 2011**

Project Boundary (12-21-2009)
Project Buffers
2 miles
5 miles
10 miles

Raptor Survey Flight 2009
Raptor Survey Flight 2011
Not Surveyed **
State Boundary
County Boundary

Federal Highway
State Highway
Local Road
City/Town

** **Not surveyed due to California Department of Fish and Game restrictions**

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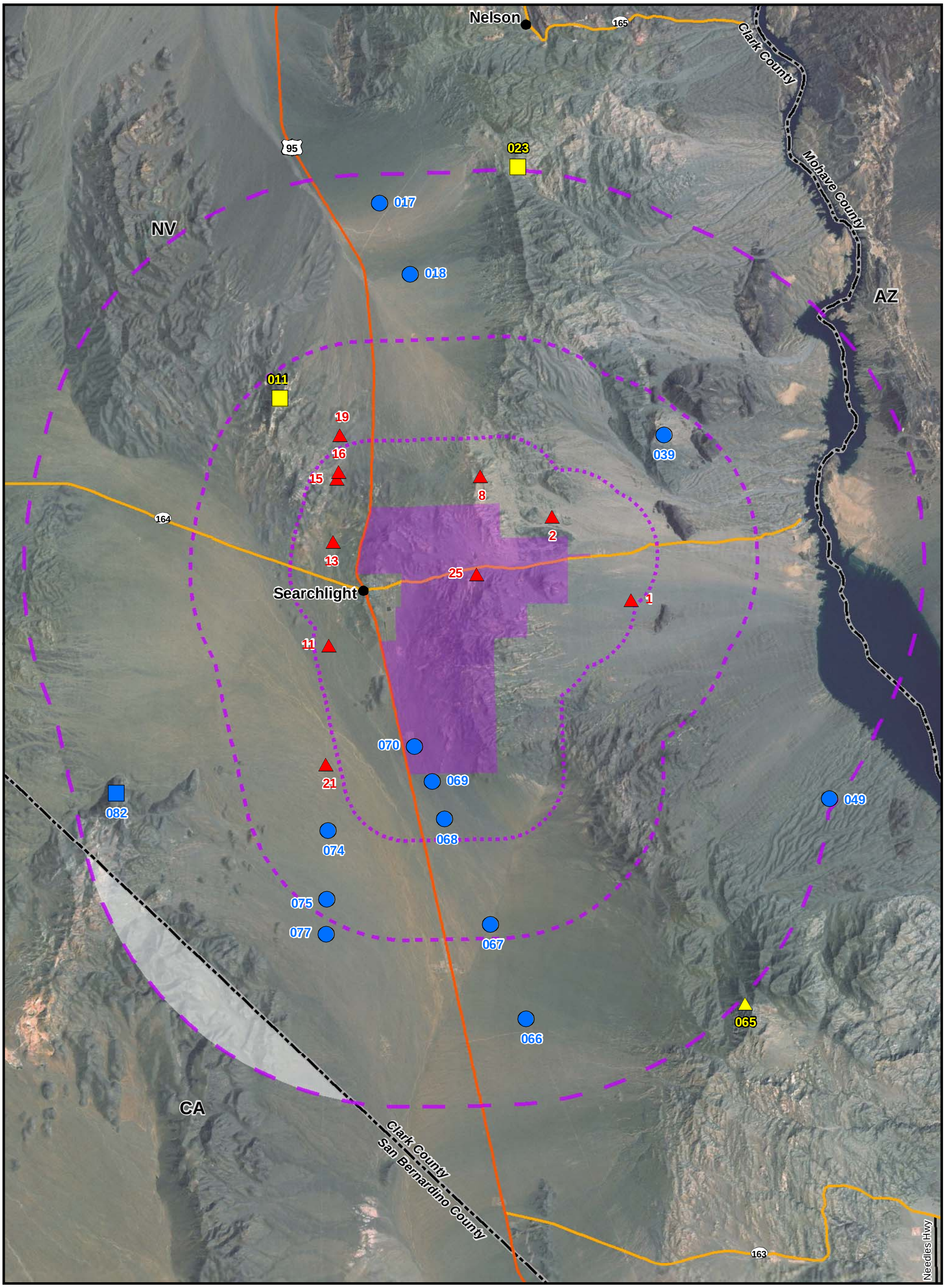

Figure 2

Searchlight
Active Raptor Nests
2009, 2011

Duke Energy

N

1:175,000
NAD 1983 UTM 11

0 1 2 3 4
Miles

Clark County, NV **May 25, 2011**

2009 Survey
- Red-tailed Hawk Nest

2011 Survey
- Golden Eagle Nest
- Probable Golden Eagle Nest
- Red-tailed Hawk Nest
- Probable Red-tailed hawk nest

- Not Surveyed **
- Project Boundary (12-21-2009)

Project Buffers
- 2 miles
- 5 miles
- 10 miles

- State Boundary
- County Boundary
- Federal Highway
- State Highway
- Local Road
- City/Town

** Not surveyed due to California Department of Fish and Game restrictions

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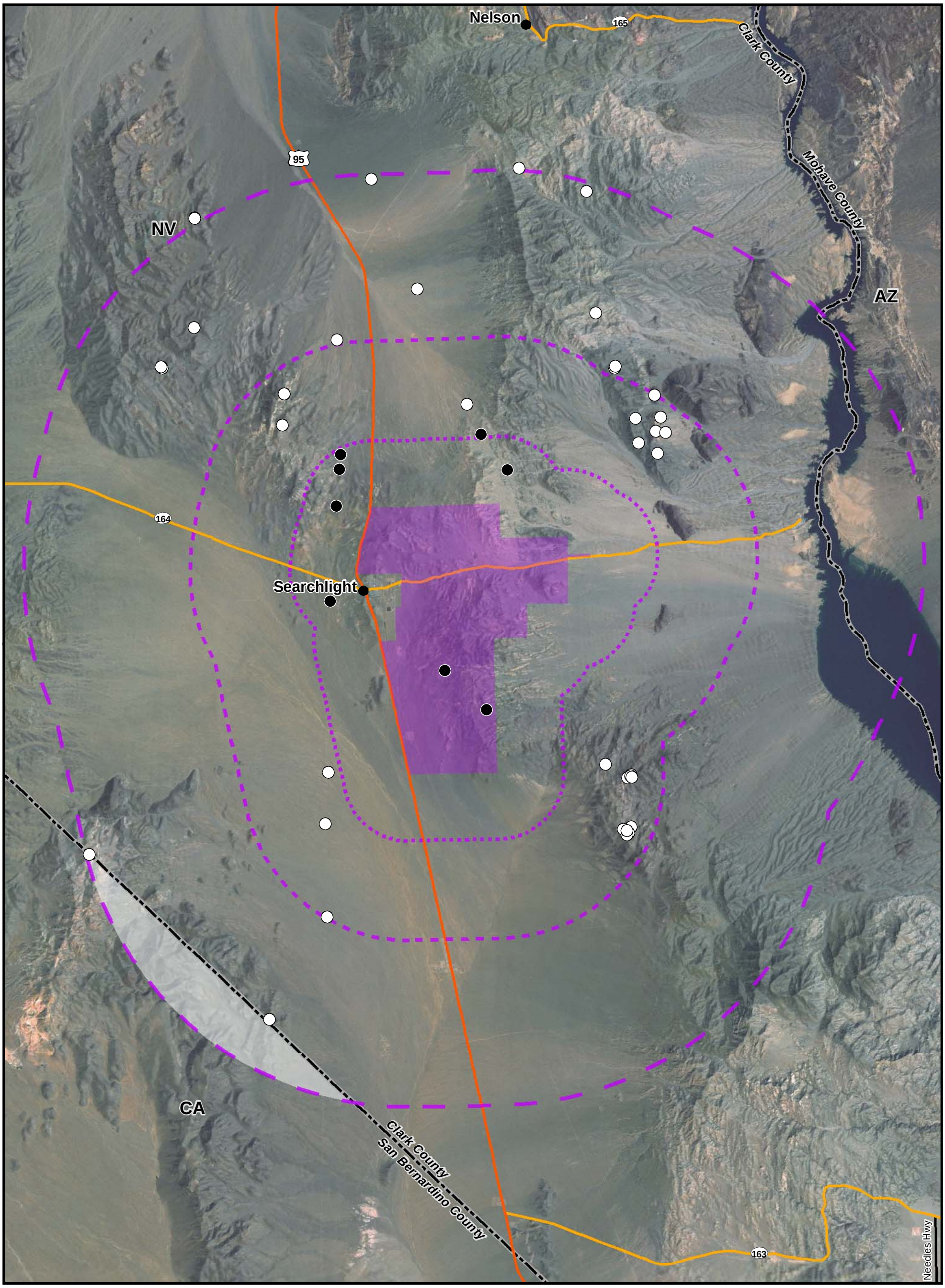

Figure 3

Searchlight
Inactive Raptor Nests
2009, 2011

Duke Energy

N

1:175,000
NAD 1983 UTM 11

0 1 2 3 4
Miles

Clark County, NV **May 25, 2011**

- 2009 Inactive Stick Nest
- 2011 Inactive Stick Nest
- Project Boundary (12-21-2009)
- Not Surveyed **

Project Buffers
- 2 miles
- 5 miles
- 10 miles

- State Boundary
- County Boundary
- Federal Highway
- State Highway
- Local Road
- City/Town

** Not surveyed due to California Department of Fish and Game restrictions

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