

2007-2009 Avian Surveys

Searchlight Wind Resource Area
Clark County, Nevada



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TETRA TECH EC, INC.

EXECUTIVE SUMMARY

Tetra Tech EC, Inc. (Tetra Tech) was contracted by Duke Energy (Duke) to undertake avian use surveys for the proposed Searchlight Wind Resource Area (WRA) in Clark County, Nevada. The studies were conducted to identify potential avian impacts associated with building and operating the wind conversion facility. Birds have been identified as a group potentially at risk because of collisions with wind turbines. Seasonal surveys between 13-15 weeks in duration were performed at the Searchlight WRA during fall 2007, spring 2008, fall and winter 2008-2009, and spring 2009. Therefore, two spring and fall migration periods were captured. Fixed point count surveys (800-meter [m] radius) were conducted at 10-16 points, which were distributed throughout the Searchlight WRA.

Over the course of four surveys, a total of 4299 birds were observed within the Searchlight WRA; 3954 birds from 64 species and 345 birds that could not be identified to the species level. Overall mean bird use within the Searchlight WRA for all surveys was 5.97 birds/20 minutes (min) and ranged from 0 to 44 birds/20 min. Overall mean use varied among surveys with the spring surveys (7.21 birds/20 min in 2008 and 8.46 birds/20 min in 2009) having a higher mean use than the fall (3.81 birds/20 min in fall 2007 and 4.08 birds/20 min in fall/winter 2008-2009).

Songbirds had the highest mean use out of all species groups observed (4.44 birds/20 min). The identified species with the highest overall mean use were the black-throated sparrow (1.26 birds/20 min), house finch (0.33 birds/20 min), ash-throated fly catcher (0.25 birds/20 min), and horned lark (0.24 birds/20 min). The black-throated sparrow is a widespread species in the arid and desert regions of the west, and has a relatively stable population in the Mojave Desert region. Black-throated sparrows tend to fly below the rotor swept area (RSA), thereby limiting the potential for negative turbine interactions. The house finch is widely distributed throughout the United States and the ash-throated fly catcher is a widespread species within the open and arid west; both have relatively stable populations and as a result, local mortality, should it occur, is unlikely to have population-level consequences. Horned larks were observed in all surveys and the overall encounter rate was 0.05 birds flying at RSA height/20 min. The low encounter rate, (a product of low mean use) and a tendency to fly below the RSA, suggests that turbine related mortality should be low for this species and also is unlikely to influence local population dynamics

The turkey vulture had the highest mean use among raptors (0.12 birds/20 min) and was most commonly observed raptor species. Red-tailed hawks had the second highest mean use among raptor species (0.11 birds/20 min) and were the most common nesting species within the Searchlight WRA. Both species are vulnerable to mortality from turbine collisions, based on mortality data from wind facilities. The overall low mean use of both turkey vultures and red-tailed hawks within the WRA coupled with wide distribution and stable to increasing populations makes it unlikely that mortality of either species will

have population-level impacts. Additionally, when analyzed by survey, these rates of raptor mean use are low relative to seasonal data available from other locations.

Listed and Sensitive Species

No federally endangered, threatened or candidate species were detected during avian surveys or as incidental observations. Nine species observed over all surveys were Nevada BLM, or Nevada state-sensitive species: burrowing owl, Swainson's hawk, phainopepla, verdin, loggerhead shrike, crissal thrasher, LeConte's thrasher, Bendire's thrasher, and Brewer's sparrow. With the exception of the Swainson's hawk, the project area falls within the breeding range of the above named 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 Searchlight WRA.

The golden eagle is protected by the Bald and Golden Eagle Protection Act (BGEPA). During the fall 2007 survey, 2 golden eagles were observed during point count surveys and 2 were observed incidentally, with an encounter rate of 0.01 birds/20 min flying within the RSA for fall 2007. No further observations of golden eagles occurred in subsequent surveys. Although golden eagles have been found during mortality searches at wind facilities, most notably at Altamont Pass in California, low mean use and encounter rates are suggestive of low risk of fatality.

Table ES-1. 4 Avian Use Summary for Four Surveys

Variable	Result	Details
Non-raptors		
Mean use	5.80 birds/20 min	
Number of species with high encounter rates (>1.0 birds/20 min)	None	
Federally listed ¹ species observed within the WRA	No	
Federally listed species flying at the height of the RSA	No	
State-listed species ² within the WRA	Yes	Nevada state-listed 6 Nevada BLM species (Section 4.3)
State-listed species observed nesting within WRA	Yes	loggerhead shrike, verdin
State-listed species flying at the height of the RSA	Yes	loggerhead shrike, verdin, phainopepla
Raptors		
Mean use	0.41 birds/20 min	
Number of species with high encounter rates (>1.0 birds/20 min)	None	
Eagles observed within the WRA	Yes	golden eagle
Eagles observed nesting within the WRA	No	
Federally listed species observed within the WRA	No	
Federally listed species observed nesting	No	
Federally listed species flying at the height of the RSA	No	
State-listed species within the WRA	Yes	burrowing owl (Section 4.3)
State-listed species observed nesting within the WRA	Yes	burrowing owl
State-listed species flying at the height of the RSA	No	

¹Federally listed species include species listed as endangered, threatened, or candidate species in the Endangered Species Act. List accessed 7/12/2009.

(http://www.fws.gov/Nevada/protected_species/nevada_species_list.html)

²The Nevada Department of Wildlife maintains a list of sensitive species, but does not maintain a list of threatened or endangered. The Bureau of Land Management, although a federal agency, maintains state specific lists of sensitive species and these are included here. State species listed are those in addition to federally listed species.

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1.0 INTRODUCTION

1.1 Wind Energy and Birds

Wind energy provides a clean, renewable energy source that is in high demand. As wind power has become more common, the need to address potential environmental impacts has increased. Birds have been identified as a group potentially at risk because of collisions with wind turbines and power lines and displacement due to the presence of the associated structures (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). In fact, at newer generation wind energy facilities outside of California, approximately 80 percent of documented mortalities have been songbirds, of which 50 percent are often nocturnal migrants (Erickson et al. 2001, Drewitt and Langston 2006, Johnson et al. 2007a, 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 fly at turbine heights during the breeding season. However, some breeding songbird species have behaviors that increase the risk of collisions with turbines. For example, horned larks have been commonly found as fatalities at wind farms (Erickson et al. 2002). Mortality may be partially attributed to the flight displays in which male horned larks fly to heights of 80 to 250 m (Pickwell 1931).

Despite the observation that most wind farm fatalities are songbirds, raptor mortality historically has received the most attention. A number of mortality monitoring studies at newer generation wind projects have found fewer raptor fatalities than at older generation farms, although there is substantial regional variation (e.g., Johnson et al. 2002, Erickson et al. 2004, Kerns and Kerlinger 2004, Jain et al. 2007). Although raptor mortality is reduced at newer generation facilities, mortality may not be eliminated by advances in turbine technology and local micro-siting; site evaluation efforts are still necessary.

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. It was suggested that the reduced density may be due to avoidance of turbine noise and maintenance activities, and reduced habitat quality due to the presence of access roads and large gravel pads surrounding the turbines (Leddy et al. 1999). Reduced abundance of grassland songbirds was found within 50 m of a turbine pad 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 (WEST and NWC 2004). Recent research at two sites in North and South Dakota (Shaffer and Johnson, unpublished data) suggests that certain grassland songbird species (2 of 4 studied) may

avoid turbines by as much as 200 meters, but these results have not been finalized nor verified at additional sites. None of these studies have addressed whether or not these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent.

1.2 Study Description

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 (Figure 1). Duke is committed to environmental due diligence and has contracted Tetra Tech EC, Inc. to conduct avian surveys at the Searchlight WRA over the course of 2 years to quantify local avian use in the area and to identify potential avian impacts associated with building and/or operating the proposed facility.

The Searchlight WRA encompasses approximately 20,180 acres and 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.

Nevada has over 467 documented bird species (Nevada WAP 2006) and is situated within the Pacific Flyway, one of the main bird migratory routes (USFWS 2008). The Pacific Flyway runs through the western portion of the U.S. and, as a consequence, the Searchlight WRA. Millions of birds and waterfowl use the Pacific Flyway to migrate each spring and fall. Most birds moving along the Pacific Flyway travel from Alaska through the western states and eventually reach Mexico and Central America.

2.0 METHODS

To evaluate avian risk at wind energy facilities, standardized protocols for pre-construction point counts have been established and were used here. Data collected from these counts can then be used to identify species or species groups of concern and may provide additional information for micro-siting to minimize impacts to birds. To facilitate identifying species at risk, results in this report are presented in terms of species groupings, and highlight federally listed species, state-listed species, and species of concern.

2.1 Avian Surveys

Fixed-point Surveys

Surveys were conducted over two years to document bird activity and diversity during the primary migration periods in fall (August – November) and spring (March – June). The surveys in spring also capture breeding birds in early summer, and winter residents were documented during surveys in December and January. Surveys were conducted in fall 2007, spring 2008, fall 2008 through winter 2009, and spring 2009 for a total of four seasonal surveys (Table 1). Experienced field biologists conducted 20-minute (min) point count surveys weekly within the Searchlight WRA to evaluate avian use, behavior, and species composition. Tetra Tech distributed the survey locations throughout the WRA and chose locations that maximized the 360-degree sight distance for the observer and covered a diversity of habitats. The number and locations of these points varied among surveys (Figure 2). Ten points were surveyed in fall 2007 and 2 points were added after discussions with the Bureau of Land Management Nevada Field Office (BLM) and the Nevada Department of Wildlife (NDOW) for a total of 12 points in spring 2008. Four more points were added in October of fall 2009 for a total of 16 points which were surveyed for the remainder of the fall-winter 2008-2009 survey and the entire spring 2009 survey.

Experienced field biologists collected data on all birds detected within an 800-meter (m) radius centered on the point count location. Surveys at each point lasted for 20 minutes, during which time biologists continuously scanned for birds and recorded any visual or auditory observations. Biologists collected the following data: species, number of individuals, time, height above ground, behavior, and flight direction. Data on flight direction can be found in Appendix 1a-d. The biologists estimated flight heights and distances using existing meteorological towers, local transmission lines, and topographic maps for reference.

The survey protocol used in this study is designed to collect data on all bird species and to provide results that are comparable with other studies of avian use at wind farms rather than to target specific taxa. The benefit of using this method is that it estimates avian use throughout the day and captures activity by a variety of bird species. During the breeding season, and to a lesser extent in the fall and winter, songbirds are most active in the morning and can be difficult to detect during the afternoon. In contrast, raptors become active as the sunlight heats the air and creates thermals, which individuals use for soaring (Ballam 1984). Thus, raptors are more readily detected several hours after sunrise. Therefore, the survey method used in this study is appropriate for characterizing the bird community using the WRA during this time of year.

Tetra Tech chose 20-min survey periods because they provide adequate time to detect both raptors and non-raptors. However, time periods of 20 min may lead to double-counting of songbirds (i.e., counting the same individual more than once) because individuals may appear and disappear from view. For example, if a horned lark is detected perched on a fence then disappears from view and, 6 minutes later, a horned lark is seen flying, these birds are recorded as separate observations because it is not possible

to distinguish individuals. Double-counting of birds is not problematic for this type of survey because the objective is to document use in terms of number of birds noted per 20-min survey, not number of distinct individual birds.

Detectability varies among species and potentially not all individuals within the 800-m survey were counted. This variation in detectability results in an overestimate of mean use in conspicuous species and an underestimate of mean use in reclusive species (Thompson 2002). Birds not easily identifiable, such as those seen under low light conditions or small birds seen at a distance, were identified to the lowest taxonomic level possible. Hence, unidentified birds are included in the results.

Raptor Nest Surveys

The purpose of raptor nest surveys is to estimate the number of active and inactive raptor nests in the project area. Biologists looked for raptor nests while traversing the Searchlight WRA and during point counts. In addition, formal raptor nest surveys were conducted across the WRA in May, 2008 and April – May, 2009. In 2008, biologists surveyed the project area by vehicle and by foot to locate raptor nests. The activity status (i.e., active or inactive) was determined by the presence of an adult or young, active territory defense by an individual, or the presence of feathers, egg shells or droppings underneath the nest. In addition, biologists determined the nest condition and substrate. In April 2009, biologists conducted an aerial survey from a helicopter of the project area and 2-mile buffer. Ground-based follow up surveys of active nests located during the helicopter survey within the project boundary that were not located on transmission lines (due to the inability to see the nest from the ground) were conducted in May 2009. Nests located during the aerial survey were revisited to collect additional data on species, location, and activity status. In addition, nests located in 2008 were also checked to determine activity during the ground survey in 2009. In 2009, biologists visited active nests a minimum of two times, first to determine the nest location and document activity status, if possible, and secondly to check status later in the breeding season.

Incidental Observations

Incidental observations included observations that occurred 1) during travel between points, 2) before or after the official 20-min survey period, and 3) outside of the 800-m radius circular plot. Biologists recorded these observations on separate data sheets and these data were not used in the formal analysis; however, a summary of incidental birds is presented to provide additional information about species found in the local area.

Listed Species

The US Fish and Wildlife Service maintains a list of threatened and endangered species listed under the Endangered Species Act (ESA). This list was reviewed to determine if a federally listed species was observed in the Searchlight WRA. The Nevada Natural Heritage Program maintains an inventory and current database on the management status of all threatened, endangered, sensitive, and at-risk species in the state. Both the Nevada BLM and NDOW maintain a list of sensitive species (Nevada Natural Heritage Program

2007) based on population trend, population size and habitat rarity. These lists were reviewed to determine if NDOW or BLM sensitive species were observed.

Data Quality Assurance/Quality Control

Tetra Tech implemented quality assurance and quality control measures during all stages of data collection, analysis, and report preparation. To ensure legibility and completeness of data sheets, each biologist reviewed, and clarified if needed, all data sheets before data entry into a Filemaker™ relational database for data storage and analysis. Prior to analysis, an independent reviewer conducted a 100-percent quality review of the data entries. Any questions that arose at this time were directed toward and answered by field personnel.

2.2 Analysis

Species Groupings

Tetra Tech considered two primary groups of interest: raptors and non-raptors. Tetra Tech defined raptors as vultures, hawks, eagles, falcons, and owls. As turkey vulture flight behavior is similar to raptors and as they are often included as raptors in other studies, Tetra Tech has included them with raptors for the purpose of our analyses. Non-raptors were defined as all other species groups.

Avian Use of the Searchlight WRA

Tetra Tech derived avian use (mean use) of the Searchlight WRA by calculating the average number of birds observed per 20-min survey at each point. To evaluate the diversity and composition of avian species using the Searchlight WRA, Tetra Tech first summarized the number of individuals (birds/20 min) and species. Tetra Tech also calculated a measure of variability (90 percent confidence intervals) for all mean use values. In addition, the number of observations is also presented, where an observation can be either an individual bird or a discrete flock of birds. This information helps evaluate whether high mean use is driven by a single event (e.g., a large flock of birds moving through the WRA on migration). Because individual birds are not uniquely marked and identified, actual population size or abundance cannot be determined. One individual may be counted multiple times during a survey period or across survey periods. Therefore, avian mean use does not equate to abundance.

Flight Behavior

Tetra Tech evaluated flight behavior by calculating the proportion of flying birds observed below, within, or above the height of the anticipated turbine rotor swept area (RSA). Turbines proposed for the Searchlight WRA are Siemens 2.5 MW; therefore, a general turbine size with an 80-m hub height and 101-m rotor diameter was used to calculate the RSA. With these specifications, the estimated RSA was between 29.5 and 130.5 m aboveground. Tetra Tech considered a bird to have flown within the height of the anticipated RSA if any of its recorded heights fell within the upper or lower limits of the anticipated RSA.

Encounter Rate

To estimate the rate at which a species flew at the height of the anticipated RSA, Tetra Tech applied the following equation to every species observed in the WRA:

$$\text{Encounter Rate} = A * P_f * P_t$$

where A is the mean number of birds/20 min for a given species, P_f is the proportion of all activity observations for a given species that were flying; and P_t is the proportion flying observations that were at the height of a turbine RSA for a given species. The encounter rate provides information on the rate at which a species may move at a height that is consistent with the RSA of the proposed turbines. This information is an important component in evaluating risk of collisions; however, this number alone does not indicate risk to a species. Species with a high encounter rate are at a higher risk of collision than species with a low encounter rate, but it does not mean that mortality is certain. Other factors such as turbine location or a species ability to detect turbine blades, flight maneuverability to avoid blades, and habitat selection also influence mortality (Orloff and Flannery 1992). Values are sensitive to large flocks of birds flying within the RSA; that is, a species will have a high encounter rate even if only seen a few times in large flying flocks. Encounter rate also does not account for migrating behavior of nocturnal migrants.

Mortality Risk

The relationship between pre-construction avian use and post-construction mortality is not yet completely defined due to a paucity of pre- and post-construction data from sites with moderate to high use. Based on the available data, although limited, it appears that low raptor use equates to low mortality and the few sites with very high raptor use also experience high raptor fatalities. There are not yet any publicly available use and fatality data from sites with intermediate raptor use. Other factors that contribute to the uncertainty in predicting fatality rates is the highly regional nature of avian mean use across North America (Arnett et al. 2007) and the scarce data on avian mortality at wind farms in many parts of North America. The most comprehensive source of regional information on avian fatality rates is the Avian and Bat Fact Sheet (NWCC 2004) which is being revised and expected later in 2009. As a result of this uncertainty, Tetra Tech will not attempt to derive mortality estimates from mean use data but will highlight those species or groups that may experience mortality or displacement that could significantly affect local or regional populations, based on the data provided in this report and other information sources.

Sensitive Species Use of the Searchlight WRA

To evaluate the composition and spatial distribution of sensitive avian species using the Searchlight WRA, Tetra Tech summarized the number of individuals for each sensitive species observed at any given point within the WRA (birds/number of times the point was surveyed during the survey season). This analysis was completed for each sensitive species detected during either the spring 2008 or spring 2009 survey season and had a breeding range which overlapped location of the WRA. Sensitive species observed

incidentally were excluded. Additionally, the encounter rate, as calculated above, for each sensitive species was determined for all sensitive species in each season regardless of breeding status.

3.0 RESULTS

3.1 Avian Use and Frequency of Occurrence

Biologists surveyed 7945 acres of the Searchlight WRA during the four seasonal surveys covering 30.6 percent of the WRA. Point count locations were surveyed between 18 and 55 times each, resulting in 720 total 20-min surveys. During surveys, 4299 birds were observed within the Searchlight WRA with 3954 birds identified from 64 species and 345 birds that could not be identified to species (Table 2). Overall mean bird use within the Searchlight WRA was 5.97 birds/20 min and ranged from 0 to 44 birds/20 min. Variability in mean use occurred over the course of the seasonal surveys. Fall surveys had 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). Overall, only 11 of the 64 species (17%) detected occurred in more than 10% of the surveys. More species were detected during spring surveys (42 in 2008 and 45 in 2009) compared to fall and winter (33 in 2007 and 30 in 2008-2009), but >80% were detected in fewer than 10% of the surveys.

Overall mean use by non-raptors was 5.66 birds/20 min and, among species groups, mean use was highest for songbirds (4.44 birds/20 min; Table 3); songbirds were observed in the majority of surveys and were widely distributed throughout the Searchlight WRA. The songbirds with the highest overall mean use were the black-throated sparrow (1.26 birds/20 min, 51.7 percent of all surveys), house finch (0.33 birds/20 min; 15.0 percent of all surveys), the ash-throated flycatcher (0.25 birds/20 min; 19.2 percent of all surveys) and the horned lark (0.24 birds/20 min; 8.6 percent of all surveys). Additionally, unidentified songbirds had the second highest overall mean use of any species or unidentified group (0.39 birds/20 min; 26.4 percent of all surveys). Other frequently observed species were the cactus wren (18.2 percent of all surveys), rock wren (16.0 percent), common raven (14.9 percent), and verdin (14.3 percent; Table 4). Each other songbird species was detected in less than 13 percent all surveys.

Among gamebirds, the second highest mean use among species groups (0.53 birds/20 min), Gambel's quail had a relatively high mean use (0.54 birds/20 min; 15.1 percent of all surveys). Among the remaining species groups, pigeons and doves, and raptors/vultures/owls had the next highest mean use values of 0.47 birds/20 min and 0.31 birds/20 min, respectively.

Non-raptor mean use varied among seasonal surveys, with the highest mean use occurring in spring 2009 (8.16 birds/20 min; Figure 3a). Mean use by survey date can be found in Appendix 2. The black-throated sparrow was detected in all seasonal surveys and ranked in the top two species for mean use in each seasonal survey. The highest

mean use of the black throated sparrow was 2.10 birds/20 min in spring 2009 (Table 2). Gambel's quail, also detected in all seasonal surveys, was in the top five species for mean use. Gambel's quail had a maximum mean use of 0.99 birds/20 min in fall 2007 (Table 2). Conversely, mourning dove, which ranked third in overall mean use, was scarce in fall and abundant in spring surveys. The mourning dove's high ranking was influenced by a mean use of 1.01 birds/20 min in spring 2009.

Mean use for non-raptors over the four seasonal surveys was highest at points 3a and 2b. Points 3a and 2b had high mean use rates of 9.52 birds/20 min and 9.05 birds/20 min, respectively. These points were added 6 weeks into the fall/winter 2008-2009 survey and were surveyed 23 and 20 times, respectively. At point 3a, Gambel's quail (56 individuals) and mourning dove (61 individuals) were observed in the highest numbers. At point 2b, species with the highest number of individual included black-throated sparrows (43 individuals) and phainopepla (42 individuals; Tables 5c-d). Of point count locations that remained consistent throughout the study and were surveyed 55 times, points 5 and 10 had the highest non-raptor mean use, both at 7.89 birds/20 min. At point 5, species with the highest number of observations included house finch (60 individuals) and black-throated sparrow (57 individuals); at point 10, species with the highest number of observations included Gambel's quail (88 individuals) and black-throated sparrows (47 individuals; Tables 5a-d).

Raptors are a group of special interest because of their propensity to fly at heights similar to those encompassed by a turbine RSA. Overall mean use for all surveys for raptors was 0.31 birds/20 min (Table 3). Raptors were not amongst the most frequently observed species groups during the surveys. The raptors with the highest mean use over all surveys were the turkey vulture (0.12 birds/20 min; 9.6 percent of all surveys), red-tailed hawk (0.11 birds/20 min; 8.6 percent of all surveys), and American kestrel (0.05 birds/20 min; 3.2 percent of all surveys; Tables 3 and 4). Each other raptor species, including northern harrier, Cooper's hawk, golden eagle, burrowing owl, and sharp-shinned hawk had a mean use of 0.01 birds/20 min or less.

Mean raptor use varied slightly by seasonal survey. The highest mean use by raptors occurred in spring 2008 (0.49 birds/20 min; Figure 3b). Raptor mean use by survey can be found in Appendix 2. The more common raptor species, the turkey vulture, red-tailed hawk and American kestrel, also demonstrated variability in mean use among seasonal surveys. Turkey vultures had a higher mean use in fall 2007 and spring 2008 (0.29 and 0.17 birds/20 min, respectively) than in the subsequent two surveys, whereas mean use for red-tailed hawks was highest spring 2009 (0.14 birds/20 min) and mean use for American kestrels was highest in spring 2008 (0.13 birds/20 min, Table 3).

Mean use by raptors was highest at point count location 16 (0.93 birds/20 min; Figure 5). American kestrels contributed to the high mean use at this point (28 individuals in 17 observations). Point count locations 9, 6 and 1 had the next highest mean uses by raptors at 0.60 birds/20 min, 0.40 birds/20 min, and 0.35 birds/20 min respectively. Red-tailed hawks and turkey vultures contributed to the high mean use at each of these points. At

point 9, 21 red-tailed hawk individuals were seen in 14 observations, the highest concentration of red-tailed hawks among all points.

BLM and NDOW sensitive species are of special interest due to their occurrence within the project area and low detectability through standard point count methodology. Mean use per point was calculated for sensitive species with breeding ranges that overlapped the project area (Bendire's thrasher, LeConte's thrasher, crissal thrasher, Brewer's sparrow, loggerhead shrike, verdin, phainopepla and burrowing owl (Tables 10a and b). Three LeConte's thrashers were observed in spring 2008 with a mean use of 0.23 birds/20 min at point 1, the only point and season in which observations of this species occurred. During spring surveys, the crissal thrasher had a mean use of 0.08 birds/20 minutes at 3 separate points in the northern portion of the WRA. The Bendire's thrasher had a mean use of 0.15 birds/20 min at point 16, the only point in which this species was observed. Brewer's sparrows were detected at several points throughout the project area during both spring surveys. The highest mean use for Brewer's sparrows occurred at point 10 (2.08 birds/20 min) in spring 2008. The loggerhead shrike and verdin were detected at most points throughout the WRA during spring surveys. Highest mean use for the loggerhead shrike occurred at point 6 in spring 2008 (1.08 birds/20 min), and highest mean use for the verdin occurred at point 5 in spring 2008 and at point 12 in spring 2009 (0.38 birds/20 min and 0.69 birds/20 min, respectively). Phainopeplas were observed at points distributed throughout the northern portion of the WRA, with the highest mean use occurring at point 6 in spring 2009 (0.23 birds/20 min). Lastly, the burrowing owl was only detected in spring 2008 at point 1 and 8. The mean use for the burrowing owl at both points was 0.08 birds/20 min.

3.2 Flight Height and Encounter Rate

During the four seasonal surveys, biologists collected behavioral data for 96 percent of all birds observed. Biologists observed 41.3 percent of birds flying and collected flight height data for 96.6 percent and flight direction 94.4 percent of observations. Over all surveys 80.8 percent of non-raptor species observed flying flew below the height of the anticipated RSA, 19.1 percent flew at the height of the anticipated RSA, and 0.1 percent flew above the height of the anticipated RSA (Table 6). Of raptor species observed flying in all surveys, 9.3 percent flew below the height of the anticipated RSA, 79.3 percent flew at the height of the anticipated RSA, and 11.4 percent flew above the height of the anticipated RSA. Data on flight direction are sorted by seasonal survey and located in Appendix 1a-d.

Over all surveys, common raven had the highest encounter rate with 0.15 birds flying at RSA height/20 min; Table 7e). The turkey vulture has the second highest encounter rate with 0.10 birds flying at RSA height/20 min. All other species had encounter rate values of ≤ 0.10 birds flying at RSA height/20 min. When encounter rate is analyzed by each seasonal survey, the common raven, with top encounter rate overall, showed little variability among seasons with the exception of a rate below 0.10 birds flying at RSA height/20 min in fall 2007 (Table 7a-7d). The turkey vulture, with the second highest encounter rate overall, demonstrated seasonal variability with a high encounter rate of

0.26 birds flying at RSA height/20 in the fall of 2007. The only other raptor species that had an encounter rate higher than 0.10 birds flying at RSA height/20 min in any survey was the American kestrel (0.12 birds flying at RSA height/20 min in spring 2008). Additionally, the house finch with the third highest encounter rate overall, demonstrated seasonal variability, with a high encounter rate in spring 2009 of 0.20 birds flying at RSA height/20 min.

Over all surveys, the encounter rate of BLM and NDOW sensitive species (LeConte's thrasher, crissal thrasher, Bendire's thrasher, Brewer's sparrow, loggerhead shrike, burrowing owl, verdin, and phainopepla,) was below 0.01 birds flying at RSA height/20 min. Low encounter rates are the result of low mean use of these species as well as the tendency for most of these species to fly below the RSA. Additionally, when broken down into individual survey season, again, all sensitive species with the exception of phainopepla had an encounter rate of 0.01 birds flying at RSA height or less in each of the four seasonal surveys.

3.3 Raptor Nest Surveys

Raptor nest surveys were conducted over the course of the two year study. One active red-tailed hawk nest and 5 inactive raptor nests were found in 2008. Three burrowing owl burrows were observed, with two of the three burrows occupied by owl pairs. One barn owls pair was found utilizing an abandoned mine shafts (Tetra Tech 2008). In spring 2009, an aerial survey conducted in April and follow-up ground surveys in May located 9 active red-tailed hawk nests. One red-tailed hawk nest was location within the boundary of the WRA, all other nests were located within the 2 mile survey buffer. Additionally, one breeding barn owl pair utilizing a mine shaft and 8 inactive nests were located within the WRA and surrounding 2 mile buffer (Appendix 4). No active burrowing owl burrows were found in 2009.

3.4 Incidental Observations

Biologists documented 22 species and 3 species groupings as incidental observations over all surveys (Table 8). Six species – western wood-pewee, Swainson's hawk, osprey, Harris' hawk, great horned owl, and Costa's hummingbird – were not detected during point count surveys in any survey. Biologists observed other raptor species both incidentally and during the course of all point count surveys including the turkey vulture, red-tailed hawk, American kestrel, Cooper's hawk, sharp-shinned hawk, and northern harrier. The Swainson's hawk is designated as a sensitive species by the BLM.

4.0 DISCUSSION

4.1 Non-Raptor Use and Encounter Rate

Overall mean use for the Searchlight WRA is not comparable to any publicly available data. However, seasonal survey results are comparable to numerous publicly available

studies. We limited our comparison to a subset of data for studies conducted in arid environments in the western states of Washington, Oregon, California, Idaho, Wyoming, and Arizona. When compared to non-raptor use rates reported for existing wind energy facilities throughout the west, the Searchlight WRA ranked 14th out of 16 studies in fall 2007, and 16th out of 22 studies in spring 2009 (Table 9). Because data from both fall and winter of 2008-2009 were combined into one season, no comparative information is available for that survey season. Each of these rankings places the seasonal avian mean use at the Searchlight WRA in the lower third portion of ranked publicly available data from existing wind farms, demonstrating a comparatively low seasonal mean use in the WRA. However, it should be noted that because studies of avian use do not share identical methodologies (e.g., length of survey period) and there is variance associated with the mean values, comparisons of avian use represent generalizations only.

Songbirds had the highest mean use out of all groups in all surveys, a value that was driven by black-throated sparrows, house finches, ash-throated flycatchers, common ravens, and horned larks. Of these species, only the house finch, common raven, and horned lark had encounter rates between 0.06 and 0.20 birds flying at RSA height/20 min, a value that is low when compared to the maximum possible encounter rate for the study, which would result when the most abundant bird flew in the RSA 100% of the time (2.10 possible birds flying at RSA height/20 min). All three species may breed in the area and are likely permanent residents of the Searchlight WRA. Additionally, all three species were distributed throughout the WRA and not associated with any specific point count location within the WRA. Mortality of house finches and common ravens has been documented at other wind energy facilities (Thelander et al. 2003, Erickson et al. 2004, Anderson et al. 2005). However, if fatalities, which are expected to be low based on the propensity of these species to fly below the RSA, occur at the Searchlight WRA, they are unlikely to have population-level impacts because regional populations of both species appear to be stable (Sauer et al. 2008). Additionally, mortality of horned larks has been widely documented at wind energy facilities (Thelander et al. 2003; Erickson, et al. 2004; Kerlinger, et al. 2006; NWC, et al. 2007). Horned lark were observed in all surveys and the overall encounter rate was 0.05 birds flying at RSA height/20 min. The low encounter rate, which is the product of low mean use and a tendency to fly below the RSA, suggests that turbine related mortality should be low for this species and is unlikely to influence local population dynamics.

Although species with the highest mean use were distributed throughout the WRA, overall mean use by all species tended to be higher in the northern portion of the WRA. The northern portion of the WRA has greater topographical variation, and is characterized by Joshua trees and other yucca species in higher abundance than in the central and southern portions of the project area. The vegetation characteristic in the plant community in this area could be attractive to birds by providing more foraging and nesting opportunities than other locations in the WRA. Another feature on the landscape in the northern area of the WRA that might be attractive to birds is the presence of dry washes, which tend to be less numerous in the southern area. Because of the low encounter rates of species observed, turbine related mortality in the northern area of the WRA is unlikely to be higher than in other portions of the WRA.

4.2 Raptor Use and Encounter Rate

When comparing raptor mean use by season to raptor use rates reported for existing wind energy facilities throughout the country, the Searchlight WRA ranked 15th out of 24 in fall 2007, and 21st out of 30 studies in spring 2009 (Table 9). The fall/winter 2008-2009 survey is excluded from comparison due to the combination of two seasons of data. Relative to other wind energy facilities, the Searchlight WRA demonstrates a comparatively low rate of raptor mean use when ranked against publicly available data. The raptor mean use in spring 2008 ranked higher than other seasonal survey. The higher mean use during this seasonal survey can be attributed to observations of American kestrels concentrated at point 16 in addition to red-tailed hawks and turkey vultures distributed throughout the WRA. Although not directly observed, it is likely that an American kestrel nest occurs within the point count circle. High raptor use has been associated with high raptor mortality at wind farms (Erickson 2007). Conversely, raptor mortality appears to be low when raptor use is low, as defined by Erickson (2007) as <1.0 birds/20 min. Based on this threshold, the raptor use at the Searchlight WRA is low.

Turkey vultures, red-tailed hawks and American kestrels were the most commonly observed raptor species during avian surveys. Red-tailed hawks were confirmed as nesting within the WRA (Appendix 4). All three species had a low mean use (≤ 0.38 birds/20 min) in any survey. Results from post-construction monitoring studies, primarily at older generation wind farms suggest that all three species are vulnerable to mortality from turbine collisions (Thelander, et al. 2003; Kerns and Kerlinger 2004; Erickson, et al 2004; Anderson et al. 2005, Kerlinger et al. 2006, Jain et al. 2007). The low encounter rate of the turkey vulture, red-tailed hawk and American kestrel in all surveys (≤ 0.26 birds flying at RSA height/20 min) suggests a low potential for turbine collision.

Burrowing owls, northern harriers, Cooper's hawks, golden eagles, and sharp-shinned hawks were also observed at the Searchlight WRA but with the low mean overall mean use values of <0.01 birds/20 min (Table 3). Additionally, mean use by raptors was highest at point count locations 16, 9, 6 and 10. Although wind turbines are likely to be located near these point count locations, these low values suggest a low potential for negative turbine-related impacts to these species.

4.3 Listed and Sensitive Species

No species listed as threatened or endangered under the ESA were observed during surveys. Six Nevada BLM sensitive species were observed during avian surveys or as incidental observations: burrowing owl, Swainson's hawk, phainopepla, loggerhead shrike, crissal thrasher, and LeConte's thrasher. In addition to those listed by the Nevada BLM, verdin, Brewer's sparrow, and Bendire's thrasher are listed as Nevada state sensitive species or species of conservation priority in Nevada. Of these listed species, only the verdin and loggerhead shrike were observed flying at the RSA height. The

encounter rate for the loggerhead shrike and verdin, however, is ≤ 0.01 birds flying at RSA height/20 min, primarily due to the low percentage of birds observed flying at RSA height. This low value is suggestive of low risk of mortality due to turbine collisions for these species.

In addition to the verdin and loggerhead shrike, phainopepla and Brewer's sparrow were among the top 20 species of highest mean use observed within the Searchlight WRA. Both species, however, had encounter rates of 0.00 birds flying at RSA height/20 min because no birds flew at RSA height, which is suggestive of low mortality risk due to turbine collision. All other listed species had an overall mean use value of ≤ 0.02 birds/20 min and encounter rates of 0.00 birds flying at RSA height/20 min.

Sensitive species that could breed within the WRA were not uniformly distributed among points when analyzed by mean use per point during the breeding season. Thrasher species were detected in low numbers at points that were characterized by preferred habitat. LeConte's thrasher was detected only at point count location 1, characterized by relatively flat, uniform habitat of mixed creosote scrub (Sheppard 1996). Both the crissal and Bendire's thrashers were detected at points in the north and central portion of the WRA. The habitat in these areas of the WRA are marked by varied topography, elevation, and vegetation including mixed creosote scrub and yucca species with catclaw. The burrowing owl was detected at points 1 and 8 with equal mean use. Both points are characterized by creosote-bursage and Mojave mixed scrub. The burrowing owl can occupy a range of open and arid habitat, though, and the presence of available nest burrows as the critical habitat requirement (Haug 1993). Although nest burrows might exist throughout the WRA, no other observations of the burrowing owl were made, either during surveys or incidentally. Brewer's sparrows were detected primarily at points within the central WRA, which included mixed creosote scrub as the predominant vegetation. Phainopepla are associated with mistletoe found on acacia species within desert washes, and during the spring surveys, phainopepla were detected primarily at points with varied topography and Joshua tree woodlands in the northern portion of the WRA, the preferred late spring and summer habitat (Walsberg 1999). Finally, the loggerhead shrike and verdin were detected at most points in the north and central portion of the WRA, utilizing a diversity of habitats.

The golden eagle is protected by the Bald and Golden Eagle Protection Act (BGEPA). During the fall 2007 avian use survey, golden eagles were observed 2 times in the Searchlight WRA. Overall mean use for this species over all surveys was < 0.01 birds/20 min and the encounter rate during the survey in which the species was observed was 0.01 birds flying at RSA height/20 min. Although golden eagles have been found during mortality searches at wind facilities, most notably Altamont Pass in California, low mean use and encounter rates within the Searchlight WRA are suggestive of low risk of fatality events for the golden eagle.

4.4 Searchlight WRA Conclusions

The core bird community at the Searchlight WRA exhibited relatively little change during the surveys and contains species typical of the Mojave Desert. The community is comprised of three primary species, the black-throated sparrow, Gambel's quail, and mourning dove. Species richness was higher in spring compared to fall, but many of these species were detected on fewer than 5 percent of the surveys. For example, in spring 2009, a total of 55 species were observed, but 25 species were detected in less than 5 percent of the surveys. Thus, the Searchlight WRA does not receive a large influx of breeding birds during spring, and migrants pass through infrequently and in low numbers. The overall low mean use and low encounter rates for all non-raptor species suggest that birds are not abundant at the Searchlight WRA and most fly below the RSA. These results suggest a low likelihood of interactions with turbines and a low overall risk to birds.

Raptor use at the Searchlight WRA in fall 2007 ranked in the lower half of mean use studies when compared to data from other wind generation facilities. Raptor use in spring 2009 ranked in the lower third. The level of raptor use at the Searchlight WRA suggests that raptor mortality is anticipated to be low, especially based on the results of Young et al. (2003). Turkey vultures, red-tailed hawks and American kestrels were the most common raptors observed at the Searchlight WRA and fatalities of each species have occurred at wind farms (Thelander et al. 2003; Kerns and Kerlinger 2004; Erickson et al 2004; Anderson et al. 2005, Kerlinger et al. 2006, Jain et al. 2007). However, the overall numbers of and encounter rates for turkey vultures, red-tailed hawks and American kestrels detected at the Searchlight WRA were low, thereby minimizing the probability of negative interactions with turbines.

BLM and NDOW listed sensitive species were distributed within the preferred habitat of each of the species. The overall mean use for each potentially breeding sensitive species (LeConte's thrasher, crissal thrasher, Bendire's thrasher, Brewer's sparrow, loggerhead shrike, burrowing owl, verdin, phainopepla) was low, as was the encounter rate for each of these species in any given season. Thus, risk of mortality of sensitive species due to negative turbine interactions is low.

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Revised 1/7/10

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2/18/09

Peer Review #1

Date

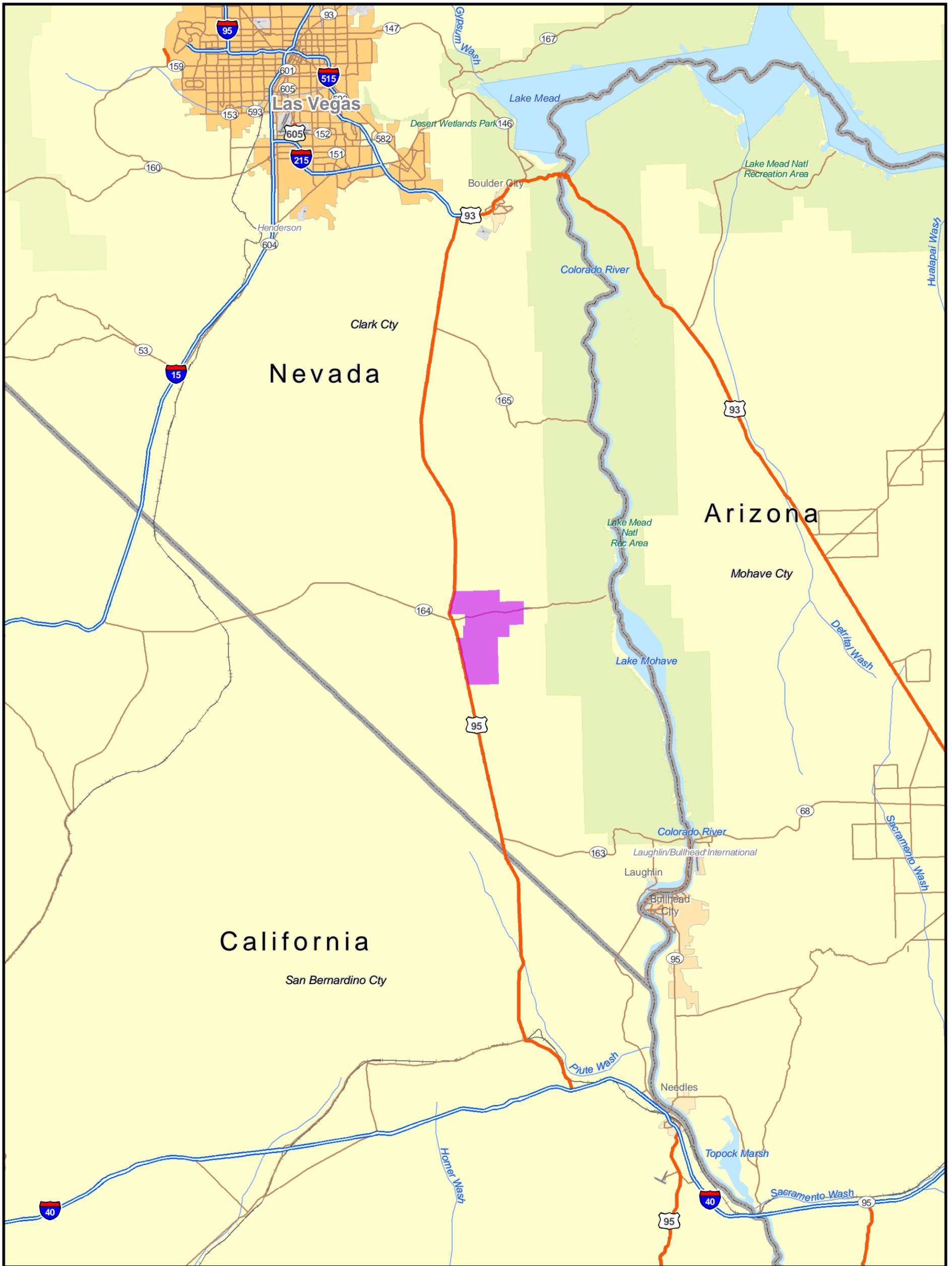


Figure 1

Duke - Searchlight
Wind resource area
vicinity map
Clark County, NV



1:500,000
 NAD 1983 UTM 11



- | | | |
|---|---|--|
|  Project Area |  River/Stream |  Interstate Highway |
|  State Boundary |  Lake/Pond |  Federal Highway |
|  County Boundary | |  Major Road |



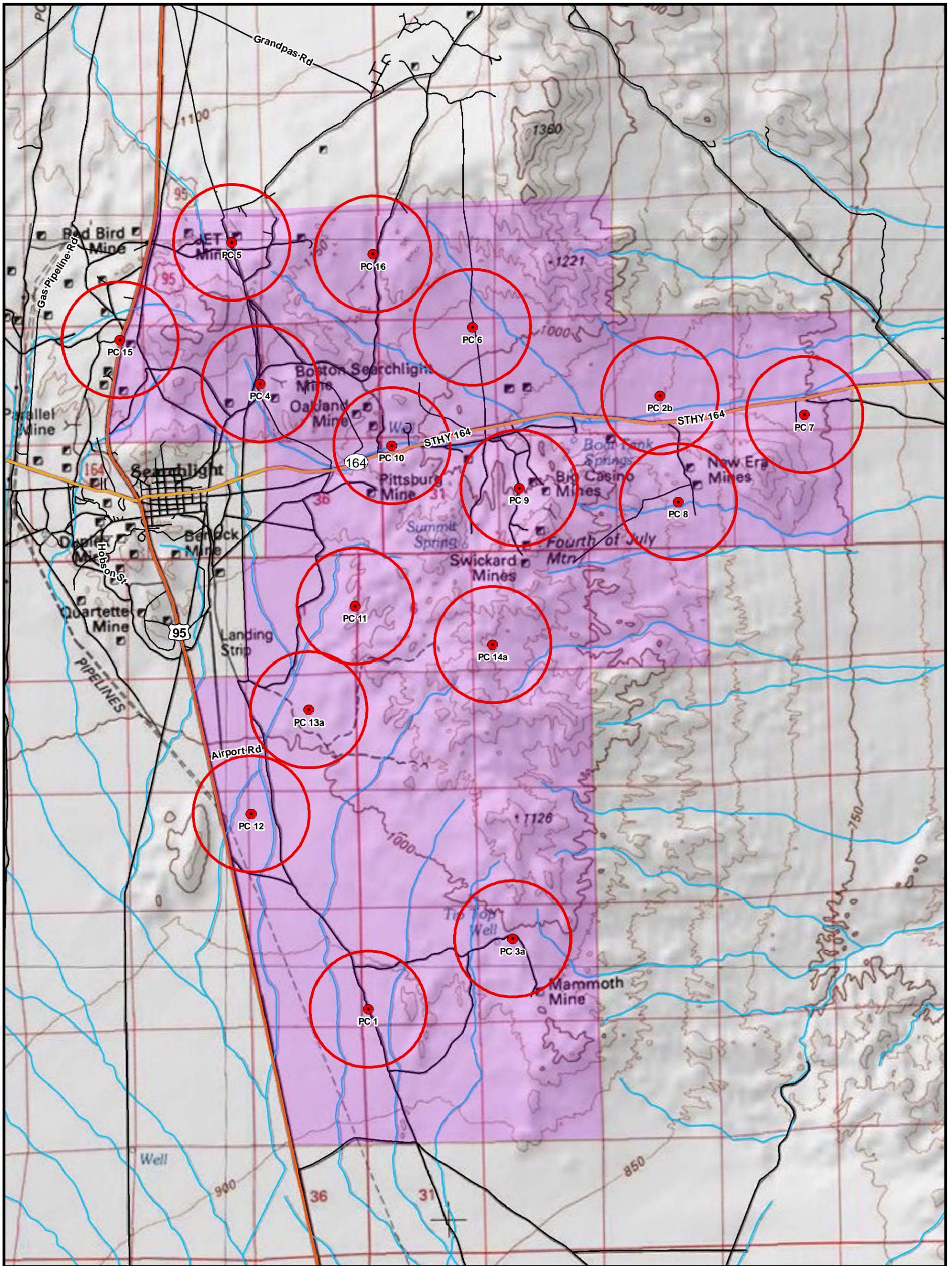


Figure 2

Duke - Searchlight
 Avian survey point count
 location map
 Clark County, NV



1:50,000
 NAD 1983 UTM 11
 Last Modified: 01/06/2010



- Avian Survey Point
- Avian Survey Point 800m Radius
- Project Area
- PC# Point Count Number
- River/Stream
- Lake/Pond
- Federal Highway
- State Highway
- Other Road



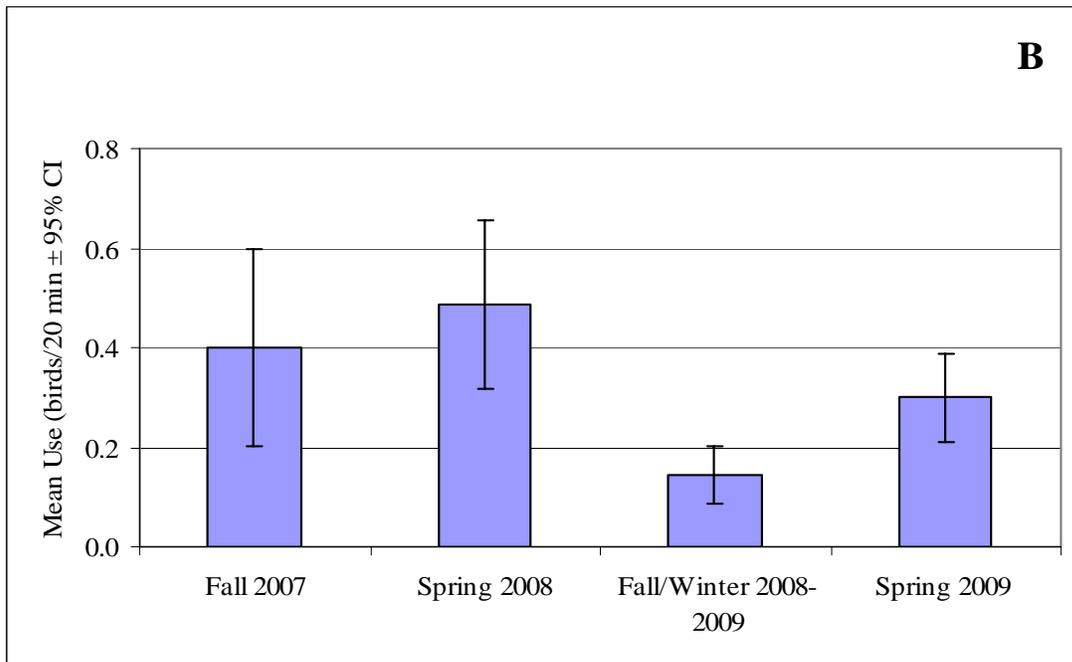
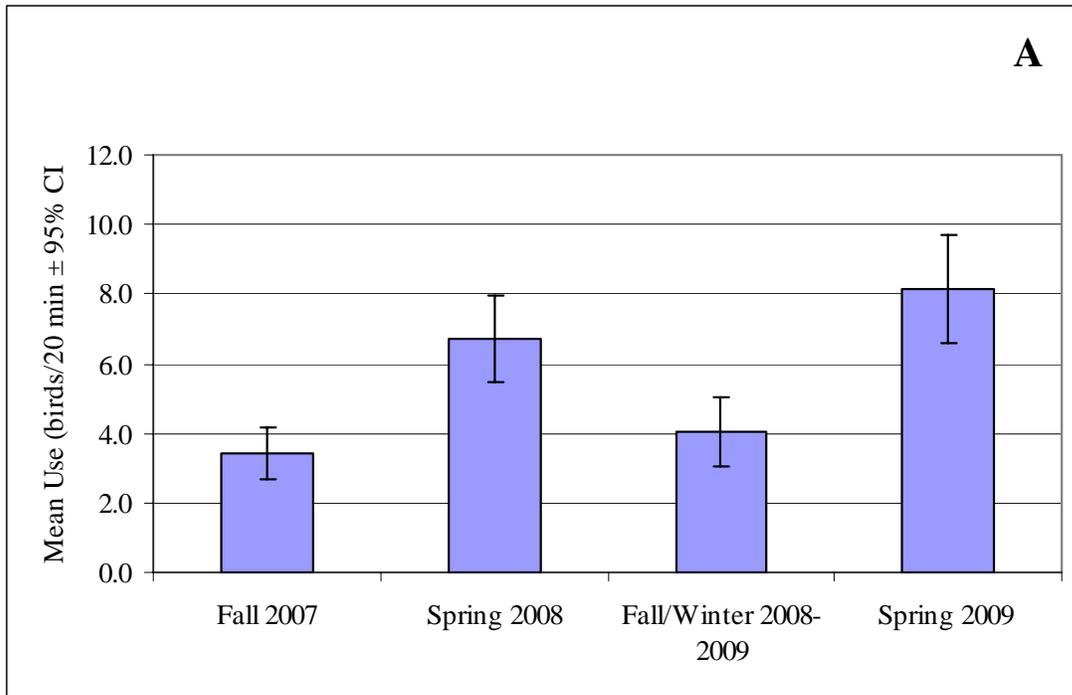


Figure 3. Seasonal mean use figures for non-raptors [A] and raptors [B] at the Searchlight Wind Resource Area

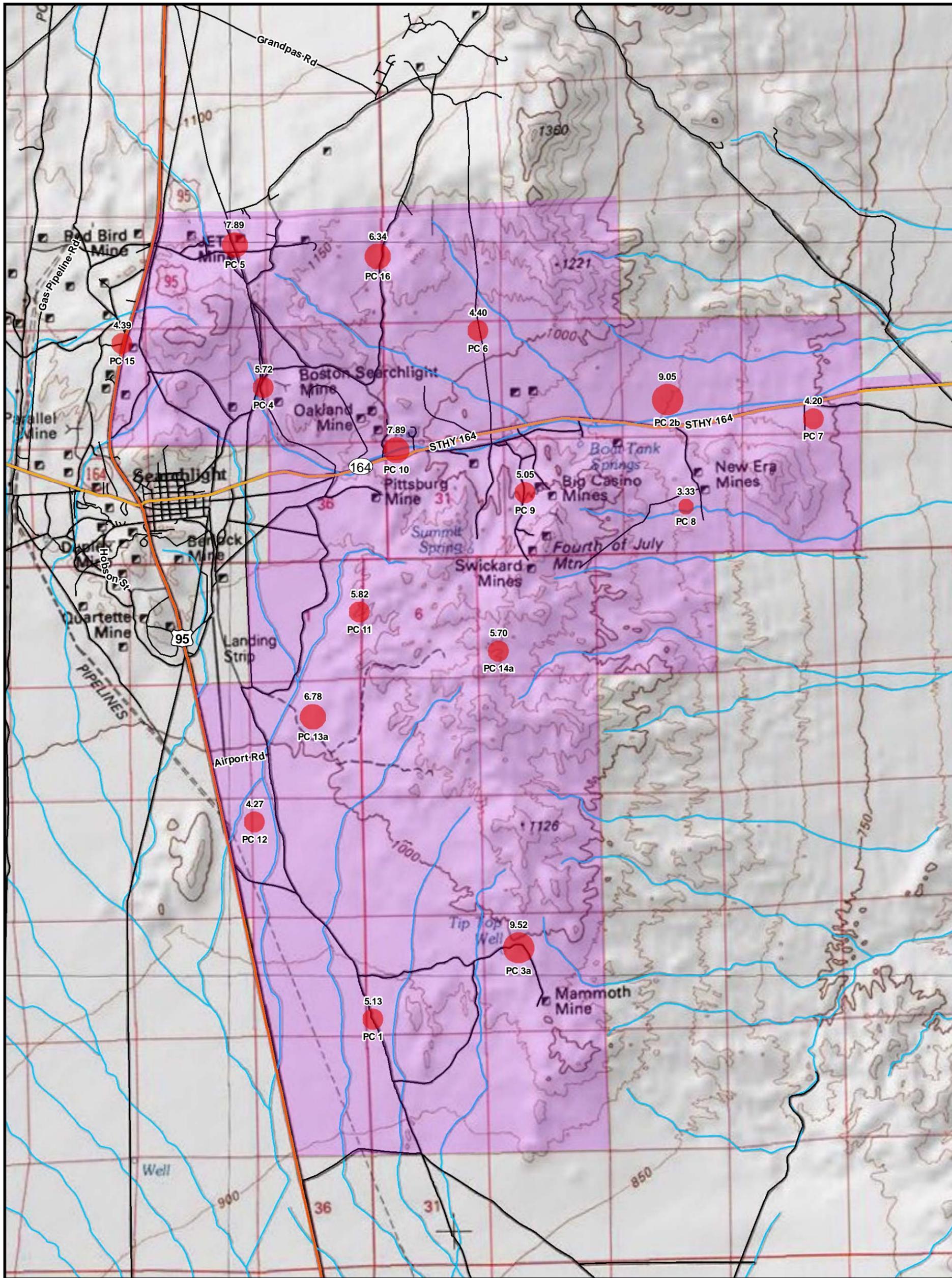


Figure 4

Duke - Searchlight
 Overall non-raptor mean use
 by point count location
 Clark County, NV



1:50,000
 NAD 1983 UTM 11
 Last Modified: 01/06/2010



Non-Raptors per 20 Minutes

- 0.01 - 2.00
- 2.01 - 4.00
- 4.01 - 6.00
- 6.01 - 8.00
- 8.01 - 10.00

Mean Use Value
 PC# Point Count Number

- Project Area
- Federal Highway
- State Highway
- Other Road
- ~ River/Stream
- ~ Lake/Pond



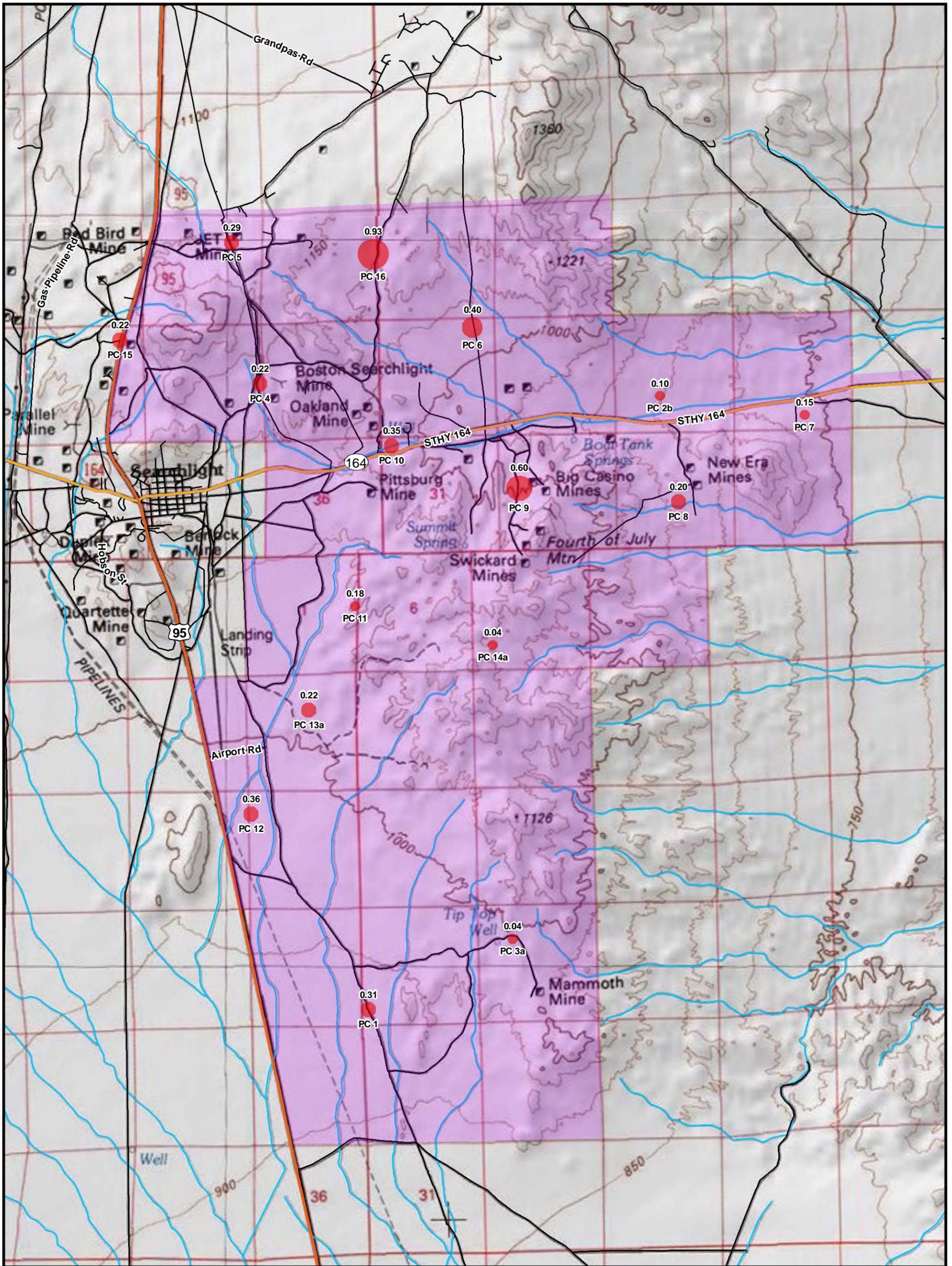


Figure 5

Duke - Searchlight
 Overall raptor mean use
 by point count location
 Clark County, NV



1:50,000
 NAD 1983 UTM 11
 Last Modified: 01/06/2010



Raptors per 20 Minutes

- 0.01 - 0.20
 - 0.21 - 0.40
 - 0.41 - 0.60
 - 0.61 - 0.80
 - 0.81 - 1.00
- # Mean Use Value
 PC# Point Count Number

- Project Area
- River/Stream
- Lake/Pond
- Federal Highway
- State Highway
- Other Road



Table 1. Searchlight Wind Resource Area point count survey dates.

Survey Number	Date(s)
Fall 2007	
1	8/12-8/13
2	8/23
3	8/27
4	9/4
5	9/10
6	9/19
7	9/26
8	10/1-10/2
9	10/11
10	10/16
11	10/23
12	10/28
13	11/7
14	11/14
Spring 2008	
1	3/23
2	3/30
3	4/6
4	4/13-4/14
5	4/20-4/21
6	4/27-4/28
7	5/4-5/5
8	5/11-5/12
9	5/18-5/19
10	5/23-5/25
11	6/1-6/2
12	6/8-6/9
13	6/15-6/16

Table 1. Searchlight Wind Resource Area point count survey dates.

Survey Number	Date(s)
Fall/winter 2008-2009	
1	9/12-9/13
2	9/20-9/21
3	9/27-9/28
4	10/4-10/5
5	10/11-10/12
6	10/18-10/19
7	10/25-10/26
8	11/2-11/3
9	11/8-11/9
10	11/15-11/16
11	11/22-11/23
12	11/29-11/30
13	12/6-12/7
14	12/26-12/29
15	1/19
Spring 2009	
1	3/15
2	3/22
3	3/29
4	4/7-4/8
5	4/12
6	4/19
7	4/26
8	5/3
9	5/10
10	5/17
11	5/24
12	5/31
13	6/7

Table 2. Avian species observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
black-throated sparrow	51	38	0.36	291	193	1.87	125	73	0.58	437	316	2.10	904	620	1.26
Gambel's quail	139	17	0.99	53	37	0.34	55	17	0.25	112	61	0.54	359	132	0.50
mourning dove	8	7	0.06	91	64	0.58	0	0	0.00	211	132	1.01	310	203	0.43
unidentified songbird	36	25	0.26	46	33	0.29	122	86	0.56	79	71	0.38	283	215	0.39
house finch	3	1	0.02	40	23	0.26	44	33	0.20	152	97	0.73	239	154	0.33
ash-throated flycatcher	4	4	0.03	87	83	0.56	0	0	0.00	91	88	0.44	182	175	0.25
common raven	37	28	0.26	42	29	0.27	58	48	0.27	42	26	0.20	179	131	0.25
horned lark	15	8	0.11	31	14	0.20	66	28	0.31	61	23	0.29	173	73	0.24
cactus wren	16	15	0.11	33	30	0.21	38	36	0.18	81	75	0.39	168	156	0.23
rock wren	27	26	0.19	40	36	0.26	65	62	0.30	16	14	0.08	148	138	0.21
verdin	15	15	0.11	20	19	0.13	56	52	0.26	41	35	0.20	132	121	0.18
loggerhead shrike	22	22	0.16	32	27	0.21	18	18	0.08	54	46	0.26	126	113	0.18
phainopepla	5	2	0.04	4	4	0.03	70	53	0.32	16	14	0.08	95	73	0.13
northern mockingbird	0	0	0.00	22	18	0.14	1	1	0.00	64	63	0.31	87	82	0.12
black-tailed gnatcatcher	13	11	0.09	20	18	0.13	41	34	0.19	10	10	0.05	84	73	0.12
turkey vulture	40	34	0.29	26	24	0.17	4	4	0.02	13	13	0.06	83	75	0.12
red-tailed hawk	10	9	0.07	22	20	0.14	19	18	0.09	29	22	0.14	80	69	0.11
Brewer's sparrow	4	4	0.03	50	12	0.32	0	0	0.00	24	14	0.12	78	30	0.11
ladder-backed woodpecker	7	7	0.05	22	22	0.14	18	18	0.08	29	28	0.14	76	75	0.11
northern flicker	13	13	0.09	15	15	0.10	23	23	0.11	15	15	0.07	66	66	0.09
Say's phoebe	1	1	0.01	17	16	0.11	6	6	0.03	17	17	0.08	41	40	0.06
American kestrel	0	0	0.00	20	10	0.13	4	4	0.02	15	14	0.07	39	28	0.05

* Mean use=# birds/20 min.

Table 2. Avian species observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
unidentified sparrow	0	0	0.00	8	7	0.05	2	2	0.01	22	19	0.11	32	28	0.04
yellow-rumped warbler	3	3	0.02	0	0	0.00	27	11	0.13	0	0	0.00	30	14	0.04
white-crowned sparrow	1	1	0.01	4	2	0.03	1	1	0.00	22	11	0.11	28	15	0.04
rock pigeon	22	5	0.16	5	2	0.03	0	0	0.00	0	0	0.00	27	7	0.04
northern rough-winged swallow	0	0	0.00	20	3	0.13	0	0	0.00	1	1	0.00	21	4	0.03
California quail	0	0	0.00	2	1	0.01	0	0	0.00	18	6	0.09	20	7	0.03
Scott's oriole	0	0	0.00	15	15	0.10	0	0	0.00	4	3	0.02	19	18	0.03
American crow	18	1	0.13	0	0	0.00	0	0	0.00	0	0	0.00	18	1	0.03
Wilson's warbler	0	0	0.00	8	5	0.05	0	0	0.00	3	3	0.01	11	8	0.02
tree swallow	0	0	0.00	7	3	0.04	0	0	0.00	4	1	0.02	11	4	0.02
crissal thrasher	0	0	0.00	4	4	0.03	3	3	0.01	4	4	0.02	11	11	0.02
western kingbird	0	0	0.00	1	1	0.01	0	0	0.00	7	6	0.03	8	7	0.01
unidentified bird	0	0	0.00	0	0	0.00	2	2	0.01	6	6	0.03	8	8	0.01
ruby-crowned kinglet	1	1	0.01	1	1	0.01	1	1	0.00	4	3	0.02	7	6	0.01
Bullock's oriole	0	0	0.00	1	1	0.01	0	0	0.00	6	5	0.03	7	6	0.01
bank swallow	0	0	0.00	0	0	0.00	0	0	0.00	7	2	0.03	7	2	0.01
northern harrier	2	2	0.01	1	1	0.01	1	1	0.00	2	2	0.01	6	6	0.01
European starling	6	1	0.04	0	0	0.00	0	0	0.00	0	0	0.00	6	1	0.01
Cooper's hawk	2	2	0.01	3	3	0.02	1	1	0.00	0	0	0.00	6	6	0.01
unidentified flycatcher	0	0	0.00	1	1	0.01	0	0	0.00	4	3	0.02	5	4	0.01
blue-gray gnatcatcher	0	0	0.00	0	0	0.00	2	1	0.01	3	3	0.01	5	4	0.01
Bewick's wren	0	0	0.00	0	0	0.00	2	2	0.01	3	3	0.01	5	5	0.01

* Mean use=# birds/20 min.

Table 2. Avian species observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
yellow warbler	2	2	0.01	2	2	0.01	0	0	0.00	0	0	0.00	4	4	0.01
violet-green swallow	0	0	0.00	0	0	0.00	0	0	0.00	4	2	0.02	4	2	0.01
unidentified swallow	0	0	0.00	2	1	0.01	0	0	0.00	2	2	0.01	4	3	0.01
unidentified hawk	0	0	0.00	1	1	0.01	1	1	0.00	2	2	0.01	4	4	0.01
unidentified woodpecker	0	0	0.00	1	1	0.01	1	1	0.00	1	1	0.00	3	3	0.00
unidentified warbler	0	0	0.00	0	0	0.00	0	0	0.00	3	2	0.01	3	2	0.00
sage thrasher	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.01	3	3	0.00
Le Conte's thrasher	0	0	0.00	3	1	0.02	0	0	0.00	0	0	0.00	3	1	0.00
lark sparrow	0	0	0.00	2	1	0.01	0	0	0.00	1	1	0.00	3	2	0.00
greater roadrunner	3	3	0.02	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.00
gray flycatcher	1	1	0.01	0	0	0.00	0	0	0.00	2	2	0.01	3	3	0.00
chipping sparrow	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.01	3	3	0.00
brown-headed cowbird	1	1	0.01	1	1	0.01	1	1	0.00	0	0	0.00	3	3	0.00
unidentified wren	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.01	2	2	0.00
unidentified hummingbird	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.00	2	2	0.00
lesser nighthawk	0	0	0.00	2	1	0.01	0	0	0.00	0	0	0.00	2	1	0.00
golden eagle	2	2	0.01	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.00
burrowing owl	0	0	0.00	2	2	0.01	0	0	0.00	0	0	0.00	2	2	0.00
black-headed grosbeak	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.01	2	2	0.00
Bendire's thrasher	0	0	0.00	2	1	0.01	0	0	0.00	0	0	0.00	2	1	0.00
barn swallow	0	0	0.00	0	0	0.00	2	1	0.01	0	0	0.00	2	1	0.00
western tanager	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00

* Mean use=# birds/20 min.

Table 2. Avian species observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
unidentified accipiter hawk	0	0	0.00	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.00
sharp-shinned hawk	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
orange-crowned warbler	0	0	0.00	0	0	0.00	1	1	0.00	0	0	0.00	1	1	0.00
house wren	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00
dark-eyed junco	0	0	0.00	0	0	0.00	1	1	0.00	0	0	0.00	1	1	0.00
common grackle	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
curve-billed thrasher	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
black-chinned hummingbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
American pipit	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00
Grand Total	534	316	3.81	1124	810	7.21	882	645	4.08	1759	1302	8.46	4299	3073	5.97

* Mean use=# birds/20 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Songbirds															
black-throated sparrow	51	38	0.36	291	193	1.87	125	73	0.58	437	316	2.10	904	620	1.26
unidentified songbird	36	25	0.26	46	33	0.29	122	86	0.56	79	71	0.38	283	215	0.39
house finch	3	1	0.02	40	23	0.26	44	33	0.20	152	97	0.73	239	154	0.33
ash-throated flycatcher	4	4	0.03	87	83	0.56	0	0	0.00	91	88	0.44	182	175	0.25
common raven	37	28	0.26	42	29	0.27	58	48	0.27	42	26	0.20	179	131	0.25
horned lark	15	8	0.11	31	14	0.20	66	28	0.31	61	23	0.29	173	73	0.24
cactus wren	16	15	0.11	33	30	0.21	38	36	0.18	81	75	0.39	168	156	0.23
rock wren	27	26	0.19	40	36	0.26	65	62	0.30	16	14	0.08	148	138	0.21
verdin	15	15	0.11	20	19	0.13	56	52	0.26	41	35	0.20	132	121	0.18
loggerhead shrike	22	22	0.16	32	27	0.21	18	18	0.08	54	46	0.26	126	113	0.18
phainopepla	5	2	0.04	4	4	0.03	70	53	0.32	16	14	0.08	95	73	0.13
northern mockingbird	0	0	0.00	22	18	0.14	1	1	0.00	64	63	0.31	87	82	0.12
black-tailed gnatcatcher	13	11	0.09	20	18	0.13	41	34	0.19	10	10	0.05	84	73	0.12
Brewer's sparrow	4	4	0.03	50	12	0.32	0	0	0.00	24	14	0.12	78	30	0.11
Say's phoebe	1	1	0.01	17	16	0.11	6	6	0.03	17	17	0.08	41	40	0.06
unidentified sparrow	0	0	0.00	8	7	0.05	2	2	0.01	22	19	0.11	32	28	0.04
yellow-rumped warbler	3	3	0.02	0	0	0.00	27	11	0.13	0	0	0.00	30	14	0.04
white-crowned sparrow	1	1	0.01	4	2	0.03	1	1	0.00	22	11	0.11	28	15	0.04
northern rough-winged swallow	0	0	0.00	20	3	0.13	0	0	0.00	1	1	0.00	21	4	0.03
Scott's oriole	0	0	0.00	15	15	0.10	0	0	0.00	4	3	0.02	19	18	0.03
American crow	18	1	0.13	0	0	0.00	0	0	0.00	0	0	0.00	18	1	0.03

* Mean use=# birds/20 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Wilson's warbler	0	0	0.00	8	5	0.05	0	0	0.00	3	3	0.01	11	8	0.02
tree swallow	0	0	0.00	7	3	0.04	0	0	0.00	4	1	0.02	11	4	0.02
crissal thrasher	0	0	0.00	4	4	0.03	3	3	0.01	4	4	0.02	11	11	0.02
western kingbird	0	0	0.00	1	1	0.01	0	0	0.00	7	6	0.03	8	7	0.01
ruby-crowned kinglet	1	1	0.01	1	1	0.01	1	1	0.00	4	3	0.02	7	6	0.01
Bullock's oriole	0	0	0.00	1	1	0.01	0	0	0.00	6	5	0.03	7	6	0.01
bank swallow	0	0	0.00	0	0	0.00	0	0	0.00	7	2	0.03	7	2	0.01
European starling	6	1	0.04	0	0	0.00	0	0	0.00	0	0	0.00	6	1	0.01
unidentified flycatcher	0	0	0.00	1	1	0.01	0	0	0.00	4	3	0.02	5	4	0.01
blue-gray gnatcatcher	0	0	0.00	0	0	0.00	2	1	0.01	3	3	0.01	5	4	0.01
Bewick's wren	0	0	0.00	0	0	0.00	2	2	0.01	3	3	0.01	5	5	0.01
yellow warbler	2	2	0.01	2	2	0.01	0	0	0.00	0	0	0.00	4	4	0.01
violet-green swallow	0	0	0.00	0	0	0.00	0	0	0.00	4	2	0.02	4	2	0.01
unidentified swallow	0	0	0.00	2	1	0.01	0	0	0.00	2	2	0.01	4	3	0.01
unidentified warbler	0	0	0.00	0	0	0.00	0	0	0.00	3	2	0.01	3	2	0.00
sage thrasher	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.01	3	3	0.00
Le Conte's thrasher	0	0	0.00	3	1	0.02	0	0	0.00	0	0	0.00	3	1	0.00
lark sparrow	0	0	0.00	2	1	0.01	0	0	0.00	1	1	0.00	3	2	0.00
gray flycatcher	1	1	0.01	0	0	0.00	0	0	0.00	2	2	0.01	3	3	0.00
chipping sparrow	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.01	3	3	0.00
brown-headed cowbird	1	1	0.01	1	1	0.01	1	1	0.00	0	0	0.00	3	3	0.00
unidentified wren	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.01	2	2	0.00
black-headed grosbeak	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.01	2	2	0.00

* Mean use=# birds/20 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Bendire's thrasher	0	0	0.00	2	1	0.01	0	0	0.00	0	0	0.00	2	1	0.00
barn swallow	0	0	0.00	0	0	0.00	2	1	0.01	0	0	0.00	2	1	0.00
western tanager	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00
orange-crowned warbler	0	0	0.00	0	0	0.00	1	1	0.00	0	0	0.00	1	1	0.00
house wren	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00
dark-eyed junco	0	0	0.00	0	0	0.00	1	1	0.00	0	0	0.00	1	1	0.00
common grackle	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
curve-billed thrasher	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
American pipit	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00
Group Total	285	214	2.04	857	605	5.49	753	555	3.49	1303	997	6.26	3198	2371	4.44
Gamebirds															
Gambel's quail	139	17	0.99	53	37	0.34	55	17	0.25	112	61	0.54	359	132	0.50
California quail	0	0	0.00	2	1	0.01	0	0	0.00	18	6	0.09	20	7	0.03
Group Total	139	17	0.99	55	38	0.35	55	17	0.25	130	67	0.63	379	139	0.53
Pigeons/Doves															
mourning dove	8	7	0.06	91	64	0.58	0	0	0.00	211	132	1.01	310	203	0.43
rock pigeon	22	5	0.16	5	2	0.03	0	0	0.00	0	0	0.00	27	7	0.04
Group Total	30	12	0.21	96	66	0.62	0	0	0.00	211	132	1.01	337	210	0.47
Raptors															
turkey vulture	40	34	0.29	26	24	0.17	4	4	0.02	13	13	0.06	83	75	0.12
red-tailed hawk	10	9	0.07	22	20	0.14	19	18	0.09	29	22	0.14	80	69	0.11
American kestrel	0	0	0.00	20	10	0.13	4	4	0.02	15	14	0.07	39	28	0.05

* Mean use=# birds/20 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
northern harrier	2	2	0.01	1	1	0.01	1	1	0.00	2	2	0.01	6	6	0.01
Cooper's hawk	2	2	0.01	3	3	0.02	1	1	0.00	0	0	0.00	6	6	0.01
unidentified hawk	0	0	0.00	1	1	0.01	1	1	0.00	2	2	0.01	4	4	0.01
golden eagle	2	2	0.01	0	0	0.00	0	0	0.00	0	0	0.00	2	2	0.00
burrowing owl	0	0	0.00	2	2	0.01	0	0	0.00	0	0	0.00	2	2	0.00
unidentified accipiter hawk	0	0	0.00	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.00
sharp-shinned hawk	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
Group Total	56	49	0.40	76	62	0.49	30	29	0.14	62	54	0.30	224	194	0.31
Woodpeckers															
ladder-backed woodpecker	7	7	0.05	22	22	0.14	18	18	0.08	29	28	0.14	76	75	0.11
northern flicker	13	13	0.09	15	15	0.10	23	23	0.11	15	15	0.07	66	66	0.09
unidentified woodpecker	0	0	0.00	1	1	0.01	1	1	0.00	1	1	0.00	3	3	0.00
Group Total	20	20	0.14	38	38	0.24	42	42	0.19	45	44	0.22	145	144	0.20
Other															
unidentified bird	0	0	0.00	0	0	0.00	2	2	0.01	6	6	0.03	8	8	0.01
greater roadrunner	3	3	0.02	0	0	0.00	0	0	0.00	0	0	0.00	3	3	0.00
Group Total	3	3	0.02	0	0	0.00	2	2	0.01	6	6	0.03	11	11	0.02
Swifts/Hummingbirds															
unidentified hummingbird	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.00	2	2	0.00
black-chinned hummingbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.00	1	1	0.00
Group Total	1	1	0.01	0	0	0.00	0	0	0.00	2	2	0.01	3	3	0.00

* Mean use=# birds/20 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007			Spring 2008			Fall/Winter 2008-2009			Spring 2009			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Goatsuckers															
lesser nighthawk	0	0	0.00	2	1	0.01	0	0	0.00	0	0	0.00	2	1	0.00
Group Total	0	0	0.00	2	1	0.01	0	0	0.00	0	0	0.00	2	1	0.00
Grand Total	534	316	3.81	1124	810	7.21	882	645	4.08	1759	1302	8.46	4299	3073	5.97

* Mean use=# birds/20 min.

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007		Spring 2008		Fall/Winter 2008-2009		Spring 2009		Overall	
	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected
Songbirds										
black-throated sparrow	9.6	20.0	25.9	82.1	14.2	24.1	24.8	78.8	21.0	51.7
unidentified songbird	6.7	17.9	4.1	19.9	13.8	35.2	4.5	27.9	6.6	26.4
house finch	0.6	0.7	3.6	12.8	5.0	11.1	8.6	30.3	5.6	15.0
ash-throated flycatcher	0.7	2.9	7.7	42.9	0.0	0.0	5.2	32.2	4.2	19.2
common raven	6.9	17.1	3.7	14.7	6.6	16.7	2.4	11.5	4.2	14.9
horned lark	2.8	5.0	2.8	9.0	7.5	11.1	3.5	8.2	4.0	8.6
cactus wren	3.0	10.0	2.9	16.7	4.3	13.4	4.6	29.8	3.9	18.2
rock wren	5.1	17.1	3.6	19.2	7.4	22.7	0.9	5.8	3.4	16.0
verdin	2.8	10.7	1.8	10.9	6.3	18.1	2.3	15.4	3.1	14.3
loggerhead shrike	4.1	14.3	2.8	15.4	2.0	7.4	3.1	17.8	2.9	13.5
phainopepla	0.9	0.7	0.4	2.6	7.9	13.4	0.9	5.8	2.2	6.4
northern mockingbird	0.0	0.0	2.0	10.9	0.1	0.5	3.6	23.1	2.0	9.2
black-tailed gnatcatcher	2.4	7.1	1.8	10.3	4.6	12.0	0.6	4.8	2.0	8.6
Brewer's sparrow	0.7	2.9	4.4	5.8	0.0	0.0	1.4	6.7	1.8	3.8
Say's phoebe	0.2	0.7	1.5	10.3	0.7	2.8	1.0	6.7	1.0	5.1
unidentified sparrow	0.0	0.0	0.7	3.8	0.2	0.9	1.3	8.7	0.7	3.6
yellow-rumped warbler	0.6	1.4	0.0	0.0	3.1	4.6	0.0	0.0	0.7	1.7
white-crowned sparrow	0.2	0.7	0.4	0.6	0.1	0.5	1.3	4.8	0.7	1.8
northern rough-winged swallow	0.0	0.0	1.8	1.3	0.0	0.0	0.1	0.5	0.5	0.4
Scott's oriole	0.0	0.0	1.3	9.0	0.0	0.0	0.2	1.0	0.4	2.2
American crow	3.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1

* Percent composition is the fraction of the total number of individuals

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007		Spring 2008		Fall/Winter 2008-2009		Spring 2009		Overall	
	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected
Wilson's warbler	0.0	0.0	0.7	2.6	0.0	0.0	0.2	1.0	0.3	0.8
tree swallow	0.0	0.0	0.6	1.9	0.0	0.0	0.2	0.5	0.3	0.6
crissal thrasher	0.0	0.0	0.4	2.6	0.3	1.4	0.2	1.9	0.3	1.5
western kingbird	0.0	0.0	0.1	0.6	0.0	0.0	0.4	2.9	0.2	1.0
ruby-crowned kinglet	0.2	0.7	0.1	0.6	0.1	0.5	0.2	1.4	0.2	0.8
Bullock's oriole	0.0	0.0	0.1	0.6	0.0	0.0	0.3	1.9	0.2	0.7
bank swallow	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	0.2	0.3
European starling	1.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
unidentified flycatcher	0.0	0.0	0.1	0.6	0.0	0.0	0.2	1.4	0.1	0.6
blue-gray gnatcatcher	0.0	0.0	0.0	0.0	0.2	0.5	0.2	1.4	0.1	0.6
Bewick's wren	0.0	0.0	0.0	0.0	0.2	0.9	0.2	1.4	0.1	0.7
yellow warbler	0.4	1.4	0.2	1.3	0.0	0.0	0.0	0.0	0.1	0.6
violet-green swallow	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.3
unidentified swallow	0.0	0.0	0.2	0.6	0.0	0.0	0.1	1.0	0.1	0.4
unidentified warbler	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.1	0.3
sage thrasher	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.4	0.1	0.4
Le Conte's thrasher	0.0	0.0	0.3	0.6	0.0	0.0	0.0	0.0	0.1	0.1
lark sparrow	0.0	0.0	0.2	0.6	0.0	0.0	0.1	0.5	0.1	0.3
gray flycatcher	0.2	0.7	0.0	0.0	0.0	0.0	0.1	1.0	0.1	0.4
chipping sparrow	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.4	0.1	0.4
brown-headed cowbird	0.2	0.7	0.1	0.6	0.1	0.5	0.0	0.0	0.1	0.4
unidentified wren	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	0.0	0.3

* Percent composition is the fraction of the total number of individuals

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007		Spring 2008		Fall/Winter 2008-2009		Spring 2009		Overall	
	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected
black-headed grosbeak	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1
Bendire's thrasher	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.1
barn swallow	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0	0.1
western tanager	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
orange-crowned warbler	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.1
house wren	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
dark-eyed junco	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.1
common grackle	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1
curve-billed thrasher	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1
American pipit	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Group Total	53.4		76.2		85.4		74.1		74.4	
Pigeons/Doves										
mourning dove	1.5	3.6	8.1	29.5	0.0	0.0	12.0	37.0	7.2	17.8
rock pigeon	4.1	2.9	0.4	1.3	0.0	0.0	0.0	0.0	0.6	0.8
Group Total	5.6		8.5		0.0		12.0		7.8	
Gamebirds										
Gambel's quail	26.0	12.1	4.7	19.9	6.2	6.5	6.4	22.6	8.4	15.1
California quail	0.0	0.0	0.2	0.6	0.0	0.0	1.0	2.4	0.5	0.8
Group Total	26.0		4.9		6.2		7.4		8.8	
Raptors										
turkey vulture	7.5	21.4	2.3	14.1	0.5	1.9	0.7	6.3	1.9	9.6

* Percent composition is the fraction of the total number of individuals

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007		Spring 2008		Fall/Winter 2008-2009		Spring 2009		Overall	
	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected
red-tailed hawk	1.9	5.7	2.0	10.9	2.2	8.3	1.6	9.1	1.9	8.6
American kestrel	0.0	0.0	1.8	5.8	0.5	1.4	0.9	5.3	0.9	3.2
northern harrier	0.4	1.4	0.1	0.6	0.1	0.5	0.1	1.0	0.1	0.8
Cooper's hawk	0.4	1.4	0.3	1.9	0.1	0.5	0.0	0.0	0.1	0.8
unidentified hawk	0.0	0.0	0.1	0.6	0.1	0.5	0.1	1.0	0.1	0.6
golden eagle	0.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
burrowing owl	0.0	0.0	0.2	1.3	0.0	0.0	0.0	0.0	0.0	0.3
unidentified accipiter hawk	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.1
sharp-shinned hawk	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1
Group Total	10.5		6.8		3.4		3.5		5.2	
Woodpeckers										
ladder-backed woodpecker	1.3	5.0	2.0	10.9	2.0	7.4	1.6	12.0	1.8	9.0
northern flicker	2.4	8.6	1.3	9.6	2.6	7.9	0.9	5.3	1.5	7.6
unidentified woodpecker	0.0	0.0	0.1	0.6	0.1	0.5	0.1	0.5	0.1	0.4
Group Total	3.7		3.4		4.8		2.6		3.4	
Other										
unidentified bird	0.0	0.0	0.0	0.0	0.2	0.9	0.3	2.9	0.2	1.1
greater roadrunner	0.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
Group Total	0.6		0.0		0.2		0.3		0.3	
Swifts/Hummingbirds										
unidentified hummingbird	0.2	0.7	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.3

* Percent composition is the fraction of the total number of individuals

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Searchlight Wind Resource Area, 2007-2009.

Species Group Species	Fall 2007		Spring 2008		Fall/Winter 2008-2009		Spring 2009		Overall	
	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected	Percent Comp.	Frequency % of surveys detected
black-chinned hummingbird	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1
Group Total	0.2		0.0		0.0		0.1		0.1	
Goatsuckers										
lesser nighthawk	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.1
Group Total	0.0		0.2		0.0		0.0		0.0	

* Percent composition is the fraction of the total number of individuals

Table 3. Avian species observed by point during fall 2007 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Observations	Points									
			1	4	5	6	7	8	9	10	11	12
northern harrier	2	2	0	0	0	0	0	1	1	0	0	0
golden eagle	2	2	1	0	0	0	1	0	0	0	0	0
Cooper's hawk	2	2	0	0	0	2	0	0	0	0	0	0
western tanager	1	1	0	0	0	0	1	0	0	0	0	0
white-crowned sparrow	1	1	0	0	0	0	0	0	0	1	0	0
unidentified hummingbird	1	1	0	1	0	0	0	0	0	0	0	0
Say's phoebe	1	1	0	0	1	0	0	0	0	0	0	0
ruby-crowned kinglet	1	1	0	0	1	0	0	0	0	0	0	0
house wren	1	1	0	0	0	0	0	1	0	0	0	0
gray flycatcher	1	1	0	0	1	0	0	0	0	0	0	0
brown-headed cowbird	1	1	0	0	0	0	0	0	0	1	0	0
American pipit	1	1	0	0	0	0	0	1	0	0	0	0
Grand Total	534	316	47	80	70	42	36	32	41	123	33	30

Table 5b. Avian species observed by point during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Obs.	Points											
			1	4	5	6	7	8	9	10	11	12	15	16
black-throated sparrow	291	193	26	25	28	14	31	27	17	21	34	29	18	21
mourning dove	91	64	0	4	17	9	2	3	9	13	22	2	4	6
ash-throated flycatcher	87	83	3	13	12	4	10	3	8	10	8	0	8	8
Gambel's quail	53	37	1	3	9	1	0	4	6	4	0	0	1	24
Brewer's sparrow	50	12	10	0	1	1	2	0	0	27	0	0	1	8
unidentified songbird	46	33	4	7	4	3	6	2	3	4	9	4	0	0
common raven	42	29	6	3	2	2	2	0	0	7	4	5	6	5
rock wren	40	36	2	3	0	2	1	7	17	2	6	0	0	0
house finch	40	23	0	2	20	0	1	1	1	3	1	2	9	0
cactus wren	33	30	1	6	2	9	2	0	3	2	2	0	1	5
loggerhead shrike	32	27	0	2	1	14	3	4	3	2	0	0	1	2
horned lark	31	14	1	2	12	0	0	0	0	4	1	7	1	3
turkey vulture	26	24	1	1	2	3	2	2	6	3	1	2	1	2
red-tailed hawk	22	20	0	1	2	5	1	1	1	2	1	2	3	3
northern mockingbird	22	18	2	1	3	6	0	0	1	6	0	0	2	1
ladder-backed woodpecker	22	22	0	5	1	6	0	0	0	5	0	0	1	4
verdin	20	19	0	0	4	0	2	0	1	2	1	3	4	3
northern rough-winged swallow	20	3	0	2	0	0	0	0	0	0	18	0	0	0
black-tailed gnatcatcher	20	18	1	0	3	0	2	1	2	2	1	0	1	7
American kestrel	20	10	0	0	0	0	0	0	0	1	0	1	0	18
Say's phoebe	17	16	0	5	4	0	1	2	0	0	1	0	3	1
Scott's oriole	15	15	1	2	1	8	0	0	2	1	0	0	0	0
northern flicker	15	15	1	2	2	1	0	0	2	0	0	0	0	7
Wilson's warbler	8	5	0	0	4	0	0	0	0	0	0	1	0	3
unidentified sparrow	8	7	0	2	3	0	0	0	1	0	0	0	2	0
tree swallow	7	3	4	2	0	0	1	0	0	0	0	0	0	0
rock pigeon	5	2	0	0	0	0	0	0	0	0	0	0	5	0
white-crowned sparrow	4	2	0	0	0	0	0	0	0	4	0	0	0	0
phainopepla	4	4	0	0	0	0	1	0	1	0	0	0	1	1

Table 5b. Avian species observed by point during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Obs.	Points											
			1	4	5	6	7	8	9	10	11	12	15	16
crissal thrasher	4	4	0	0	0	1	0	1	0	0	0	0	0	2
Le Conte's thrasher	3	1	3	0	0	0	0	0	0	0	0	0	0	0
Cooper's hawk	3	3	0	0	2	0	0	0	0	0	0	0	0	1
yellow warbler	2	2	0	0	1	0	0	0	0	1	0	0	0	0
unidentified swallow	2	1	0	0	0	2	0	0	0	0	0	0	0	0
lesser nighthawk	2	1	0	0	0	0	0	0	0	0	2	0	0	0
lark sparrow	2	1	0	0	2	0	0	0	0	0	0	0	0	0
California quail	2	1	0	0	0	0	0	0	0	0	0	0	2	0
burrowing owl	2	2	1	0	0	0	0	1	0	0	0	0	0	0
Bendire's thrasher	2	1	0	0	0	0	0	0	0	0	0	0	0	2
western kingbird	1	1	0	0	1	0	0	0	0	0	0	0	0	0
unidentified woodpecker	1	1	0	0	0	0	0	0	0	0	0	0	0	1
unidentified hawk	1	1	0	0	1	0	0	0	0	0	0	0	0	0
unidentified flycatcher	1	1	0	0	0	0	0	0	0	0	0	0	0	1
unidentified accipiter hawk	1	1	0	1	0	0	0	0	0	0	0	0	0	0
ruby-crowned kinglet	1	1	0	0	0	0	0	1	0	0	0	0	0	0
northern harrier	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Bullock's oriole	1	1	0	0	1	0	0	0	0	0	0	0	0	0
brown-headed cowbird	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1124	810	69	94	145	91	70	61	84	126	112	58	75	139

Table 5c. Avian species observed by point during fall/winter 2008-2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Observations	Points															
			1	2b	3a	4	5	6	7	8	9	10	11	12	13a	14a	15	16
black-throated sparrow	125	73	28	0	1	5	4	1	12	4	22	6	10	3	17	3	3	6
unidentified songbird	122	86	6	2	3	5	31	5	6	2	8	14	9	16	5	2	3	5
phainopepla	70	53	0	35	9	2	0	4	3	0	1	15	0	0	0	0	0	1
horned lark	66	28	9	2	0	2	3	0	0	0	1	0	15	19	2	8	5	0
rock wren	65	62	2	2	1	0	2	0	8	8	13	5	7	0	8	6	2	1
common raven	58	48	2	0	0	14	9	2	3	3	0	7	3	1	0	0	8	6
verdin	56	52	4	1	0	3	14	2	3	3	3	7	4	6	2	0	2	2
Gambel's quail	55	17	6	0	17	0	4	0	0	5	1	0	4	1	17	0	0	0
house finch	44	33	2	2	1	5	13	0	3	5	0	4	1	0	4	0	2	2
black-tailed gnatcatcher	41	34	4	2	0	2	7	0	4	0	0	10	2	6	0	1	0	3
cactus wren	38	36	0	0	6	4	5	1	0	0	8	1	2	0	1	1	3	6
yellow-rumped warbler	27	11	2	0	1	0	0	1	1	0	1	0	17	1	0	0	3	0
northern flicker	23	23	1	0	0	1	6	3	0	0	2	1	0	0	2	0	3	4
red-tailed hawk	19	18	2	1	0	0	0	0	2	0	3	3	1	4	1	0	2	0
loggerhead shrike	18	18	2	2	0	0	2	0	0	1	1	2	1	1	0	0	1	5
ladder-backed woodpecker	18	18	0	0	1	4	3	0	0	0	1	2	1	0	0	0	0	6
Say's phoebe	6	6	0	0	0	1	0	0	0	0	1	0	2	0	0	0	1	1
turkey vulture	4	4	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1	0
American kestrel	4	4	0	0	0	0	2	0	0	1	0	0	0	1	0	0	0	0
crissal thrasher	3	3	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
unidentified sparrow	2	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
unidentified bird	2	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
blue-gray gnatcatcher	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Bewick's wren	2	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
barn swallow	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
white-crowned sparrow	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
unidentified woodpecker	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
unidentified hawk	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
ruby-crowned kinglet	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
orange-crowned warbler	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
northern mockingbird	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
northern harrier	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
dark-eyed junco	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Cooper's hawk	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
brown-headed cowbird	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Grand Total	882	645	71	49	40	48	106	21	46	32	69	81	80	67	59	21	42	50

Table 5d. Avian species observed by point during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Observations	Points															
			1	2b	3a	4	5	6	7	8	9	10	11	12	13a	14a	15	16
black-throated sparrow	437	316	42	43	19	19	17	19	31	22	22	20	39	40	36	45	12	11
mourning dove	211	132	2	10	61	4	26	6	3	8	15	5	19	9	13	23	2	5
house finch	152	97	1	9	2	8	27	5	17	10	17	21	5	1	0	6	12	11
Gambel's quail	112	61	3	19	39	1	0	6	1	0	11	11	1	2	1	1	7	9
ash-throated flycatcher	91	88	3	10	6	7	3	7	8	2	3	8	4	2	5	5	9	9
cactus wren	81	75	0	2	14	5	6	13	2	2	2	0	11	0	7	3	5	9
unidentified songbird	79	71	7	1	5	10	3	6	4	5	8	6	2	6	3	8	1	4
northern mockingbird	64	63	7	9	4	4	8	4	4	2	2	7	4	0	4	0	0	5
horned lark	61	23	13	0	0	16	4	5	0	0	2	0	1	17	0	0	3	0
loggerhead shrike	54	46	4	5	2	4	0	7	3	1	10	6	2	1	5	2	0	2
common raven	42	26	4	0	0	1	4	0	1	2	4	1	0	2	11	0	9	3
verdin	41	35	4	4	3	2	3	2	0	0	0	3	0	9	0	1	3	7
red-tailed hawk	29	22	0	0	0	0	5	5	0	0	13	3	1	0	1	0	0	1
ladder-backed woodpecker	29	28	0	2	2	5	3	4	0	0	0	1	1	0	0	0	0	11
Brewer's sparrow	24	14	6	0	0	0	0	0	4	0	0	7	2	2	0	3	0	0
white-crowned sparrow	22	11	3	1	0	0	2	0	1	0	0	11	0	0	0	2	0	2
unidentified sparrow	22	19	0	0	2	1	0	3	1	2	1	1	0	3	5	0	3	0
California quail	18	6	0	5	11	1	0	1	0	0	0	0	0	0	0	0	0	0
Say's phoebe	17	17	0	3	0	2	1	0	0	5	0	3	0	0	2	0	1	0
rock wren	16	14	0	1	6	0	0	0	0	0	2	0	0	0	2	4	1	0
phainopepla	16	14	0	7	1	0	0	4	1	0	2	0	1	0	0	0	0	0
northern flicker	15	15	0	0	0	1	9	2	0	0	0	0	0	0	0	0	1	2
American kestrel	15	14	1	0	0	1	0	1	0	0	0	0	0	0	2	0	0	10
turkey vulture	13	13	0	1	1	1	0	1	1	2	0	1	1	0	1	1	1	1
black-tailed gnatcatcher	10	10	1	0	2	0	0	1	0	0	1	1	1	0	1	1	0	1
western kingbird	7	6	0	0	0	1	2	2	0	0	0	1	0	1	0	0	0	0
bank swallow	7	2	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
unidentified bird	6	6	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	1
Bullock's oriole	6	5	0	0	0	1	1	0	1	0	0	0	3	0	0	0	0	0
violet-green swallow	4	2	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0
unidentified flycatcher	4	3	0	0	0	0	1	0	0	0	0	0	2	0	0	0	1	0
tree swallow	4	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Scott's oriole	4	3	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0
ruby-crowned kinglet	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1
crissal thrasher	4	4	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0
Wilson's warbler	3	3	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0

Table 5d. Avian species observed by point during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds	Number of Observations	Points															
			1	2b	3a	4	5	6	7	8	9	10	11	12	13a	14a	15	16
unidentified warbler	3	2	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0
sage thrasher	3	3	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
chipping sparrow	3	3	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
blue-gray gnatcatcher	3	3	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Bewick's wren	3	3	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
unidentified wren	2	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
unidentified swallow	2	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
unidentified hawk	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
northern harrier	2	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
gray flycatcher	2	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
black-headed grosbeak	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
unidentified woodpecker	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
unidentified hummingbird	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
sharp-shinned hawk	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
northern rough-winged swallow	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
lark sparrow	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
common grackle	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
curve-billed thrasher	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
black-chinned hummingbird	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Grand Total	1759	1302	112	134	180	99	129	110	87	69	117	123	105	100	102	111	72	109

Table 6. Summary of avian flight heights (includes flying birds only) in relation to the turbine rotor swept area (RSA) during point count surveys at Searchlight Wind Resource Area, 2007-2009.

	Fall 2007 Individuals		Spring 2008 Individuals		Fall/Winter 2008-2009 Individuals		Spring 2009 Individuals		Overall Individuals	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Non-raptors										
Above RSA height (>130.5m)	0	0.0%	0	0.0%	1	0.3%	1	0.2%	2	0.1%
At RSA height (29.5m–130.5m)	19	9.9%	60	14.6%	99	27.3%	112	20.1%	290	19.1%
Below RSA height (<29.5m)	173	90.1%	350	85.4%	263	72.5%	444	79.7%	1230	80.8%
Raptors										
Above RSA height (>130.5m)	6	11.1%	11	15.1%	3	13.6%	2	4.5%	22	11.4%
At RSA height (29.5m–130.5m)	45	83.3%	57	78.1%	17	77.3%	34	77.3%	153	79.3%
Below RSA height (<29.5m)	3	5.6%	5	6.8%	2	9.1%	8	18.2%	18	9.3%

¹These values assume a Siemens 2.5 MW turbine with a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 7a. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during fall 2007 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
turkey vulture	0.26	0.29 (0.20 - 0.38)	100.0	7.5	90.0	2.5
common raven	0.06	0.26 (0.15 - 0.37)	70.3	0.0	34.6	65.4
black-throated sparrow	0.03	0.36 (0.23 - 0.49)	39.2	0.0	20.0	80.0
red-tailed hawk	0.03	0.07 (0.03 - 0.11)	80.0	37.5	50.0	12.5
phainopepla	0.02	0.04 (0.00 - 0.10)	100.0	0.0	60.0	40.0
rock pigeon	0.01	0.16 (0.00 - 0.33)	100.0	0.0	9.1	90.9
northern harrier	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
golden eagle	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
mourning dove	<0.01	0.06 (0.02 - 0.10)	100.0	0.0	12.5	87.5
Cooper's hawk	<0.01	0.01 (0.00 - 0.03)	100.0	0.0	50.0	50.0
yellow warbler	0.00	0.01 (0.00 - 0.03)	100.0	0.0	0.0	100.0
yellow-rumped warbler	0.00	0.02 (0.00 - 0.05)	100.0	0.0	0.0	100.0
western tanager	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
white-crowned sparrow	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
verdin	0.00	0.11 (0.07 - 0.15)	6.7	0.0	0.0	100.0
unidentified songbird	0.00	0.26 (0.14 - 0.38)	22.2	0.0	0.0	100.0
unidentified hummingbird	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
Say's phoebe	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
rock wren	0.00	0.19 (0.13 - 0.25)	7.4	0.0	0.0	100.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
northern flicker	0.00	0.09 (0.05 - 0.13)	7.7	0.0	0.0	100.0
loggerhead shrike	0.00	0.16 (0.10 - 0.22)	9.1	0.0	0.0	100.0
ladder-backed woodpecker	0.00	0.05 (0.02 - 0.08)	14.3	0.0	0.0	100.0
house wren	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
horned lark	0.00	0.11 (0.02 - 0.20)	86.7	0.0	0.0	100.0
house finch	0.00	0.02 (0.00 - 0.06)	100.0	0.0	0.0	100.0

Table 7a. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during fall 2007 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
greater roadrunner	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
gray flycatcher	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
Gambel's quail	0.00	0.99 (0.36 - 1.62)	28.8	0.0	0.0	100.0
European starling	0.00	0.04 (0.00 - 0.11)	100.0	0.0	0.0	100.0
cactus wren	0.00	0.11 (0.06 - 0.16)	0.0	0.0	0.0	0.0
black-tailed gnatcatcher	0.00	0.09 (0.04 - 0.14)	23.1	0.0	0.0	100.0
Brewer's sparrow	0.00	0.03 (0.01 - 0.05)	0.0	0.0	0.0	0.0
brown-headed cowbird	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
ash-throated flycatcher	0.00	0.03 (0.01 - 0.05)	25.0	0.0	0.0	100.0
American pipit	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
American crow	0.00	0.13 (0.00 - 0.34)	100.0	0.0	0.0	100.0

¹These values assume a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 7b. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
common raven	0.19	0.27 (0.16 - 0.38)	92.9	0.0	76.9	23.1
American kestrel	0.12	0.13 (0.01 - 0.25)	100.0	0.0	95.0	5.0
turkey vulture	0.12	0.17 (0.11 - 0.23)	100.0	23.1	69.2	7.7
northern rough-winged swallow	0.12	0.13 (0.00 - 0.32)	100.0	0.0	90.0	10.0
red-tailed hawk	0.10	0.14 (0.08 - 0.20)	90.9	20.0	80.0	0.0
unidentified songbird	0.04	0.29 (0.19 - 0.39)	69.6	0.0	21.9	78.1
Cooper's hawk	0.01	0.02 (0.00 - 0.04)	100.0	33.3	66.7	0.0
loggerhead shrike	0.01	0.21 (0.13 - 0.29)	28.1	0.0	22.2	77.8
unidentified hawk	0.01	0.01 (0.00 - 0.02)	100.0	0.0	100.0	0.0
northern harrier	0.01	0.01 (0.00 - 0.02)	100.0	0.0	100.0	0.0
verdin	<0.01	0.13 (0.08 - 0.18)	25.0	0.0	20.0	80.0
mourning dove	<0.01	0.58 (0.41 - 0.75)	69.2	0.0	1.6	98.4
ladder-backed woodpecker	<0.01	0.14 (0.08 - 0.20)	31.8	0.0	14.3	85.7
yellow warbler	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
Wilson's warbler	0.00	0.05 (0.00 - 0.10)	100.0	0.0	0.0	100.0
western kingbird	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
white-crowned sparrow	0.00	0.03 (0.00 - 0.07)	50.0	0.0	0.0	100.0
unidentified woodpecker	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
unidentified swallow	0.00	0.01 (0.00 - 0.03)	100.0	0.0	0.0	100.0
unidentified sparrow	0.00	0.05 (0.01 - 0.09)	62.5	0.0	0.0	100.0
unidentified flycatcher	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
unidentified accipiter hawk	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
tree swallow	0.00	0.04 (0.00 - 0.09)	100.0	0.0	0.0	100.0
Scott's oriole	0.00	0.10 (0.06 - 0.14)	60.0	0.0	0.0	100.0
Say's phoebe	0.00	0.11 (0.07 - 0.15)	52.9	0.0	0.0	100.0
rock wren	0.00	0.26 (0.18 - 0.34)	10.0	0.0	0.0	100.0

Table 7b. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
rock pigeon	0.00	0.03 (0.00 - 0.07)	100.0	0.0	0.0	100.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
phainopepla	0.00	0.03 (0.01 - 0.05)	25.0	0.0	0.0	100.0
northern mockingbird	0.00	0.14 (0.08 - 0.20)	22.7	0.0	0.0	100.0
northern flicker	0.00	0.10 (0.06 - 0.14)	20.0	0.0	0.0	100.0
lesser nighthawk	0.00	0.01 (0.00 - 0.03)	100.0	0.0	0.0	100.0
Le Conte's thrasher	0.00	0.02 (0.00 - 0.05)	100.0	0.0	0.0	100.0
lark sparrow	0.00	0.01 (0.00 - 0.03)	100.0	0.0	0.0	100.0
horned lark	0.00	0.20 (0.09 - 0.31)	48.4	0.0	0.0	100.0
house finch	0.00	0.26 (0.14 - 0.38)	45.0	0.0	0.0	100.0
Gambel's quail	0.00	0.34 (0.16 - 0.52)	0.0	0.0	0.0	0.0
crissal thrasher	0.00	0.03 (0.01 - 0.05)	50.0	0.0	0.0	100.0
California quail	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
cactus wren	0.00	0.21 (0.14 - 0.28)	0.0	0.0	0.0	0.0
burrowing owl	0.00	0.01 (0.00 - 0.02)	50.0	0.0	0.0	100.0
Bullock's oriole	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
black-throated sparrow	0.00	1.87 (1.68 - 2.06)	29.9	0.0	0.0	100.0
black-tailed gnatcatcher	0.00	0.13 (0.07 - 0.19)	35.0	0.0	0.0	100.0
Brewer's sparrow	0.00	0.32 (0.04 - 0.60)	30.0	0.0	0.0	100.0
brown-headed cowbird	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
Bendire's thrasher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
ash-throated flycatcher	0.00	0.56 (0.46 - 0.66)	23.0	0.0	0.0	100.0

¹These values assume a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 7c. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during fall/winter 2008-2009 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
common raven	0.17	0.27 (0.19 - 0.35)	75.9	2.3	84.1	13.6
unidentified songbird	0.14	0.56 (0.40 - 0.72)	41.0	0.0	60.0	40.0
horned lark	0.08	0.31 (0.18 - 0.44)	59.1	0.0	46.2	53.8
red-tailed hawk	0.04	0.09 (0.06 - 0.12)	63.2	25.0	75.0	0.0
house finch	0.02	0.20 (0.11 - 0.29)	61.4	0.0	18.5	81.5
turkey vulture	0.02	0.02 (0.00 - 0.04)	100.0	0.0	100.0	0.0
loggerhead shrike	0.01	0.08 (0.05 - 0.11)	55.6	0.0	30.0	70.0
barn swallow	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
American kestrel	0.01	0.02 (0.00 - 0.04)	75.0	0.0	66.7	33.3
northern flicker	<0.01	0.11 (0.07 - 0.15)	17.4	0.0	50.0	50.0
unidentified bird	<0.01	0.01 (0.00 - 0.02)	50.0	0.0	100.0	0.0
rock wren	<0.01	0.30 (0.23 - 0.37)	18.5	0.0	8.3	91.7
yellow-rumped warbler	0.00	0.13 (0.01 - 0.25)	74.1	0.0	0.0	100.0
white-crowned sparrow	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
verdin	0.00	0.26 (0.19 - 0.33)	30.4	0.0	0.0	100.0
unidentified woodpecker	0.00	0.00 (0.00 - 0.01)	0.0	0.0	0.0	0.0
unidentified sparrow	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
unidentified hawk	0.00	0.00 (0.00 - 0.01)	100.0	0.0	100.0	0.0
Say's phoebe	0.00	0.03 (0.01 - 0.05)	33.3	0.0	0.0	100.0
ruby-crowned kinglet	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
phainopepla	0.00	0.32 (0.19 - 0.45)	35.7	0.0	0.0	100.0
orange-crowned warbler	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
northern mockingbird	0.00	0.00 (0.00 - 0.01)	0.0	0.0	0.0	0.0
northern harrier	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
ladder-backed woodpecker	0.00	0.08 (0.05 - 0.11)	22.2	0.0	0.0	100.0
Gambel's quail	0.00	0.25 (0.10 - 0.40)	0.0	0.0	0.0	0.0

Table 7c. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during fall/winter 2008-2009 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
dark-eyed junco	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
crissal thrasher	0.00	0.01 (0.00 - 0.02)	66.7	0.0	0.0	100.0
Cooper's hawk	0.00	0.00 (0.00 - 0.01)	100.0	0.0	100.0	0.0
cactus wren	0.00	0.18 (0.13 - 0.23)	15.8	0.0	0.0	100.0
black-throated sparrow	0.00	0.58 (0.40 - 0.76)	57.6	0.0	0.0	100.0
black-tailed gnatcatcher	0.00	0.19 (0.13 - 0.25)	39.0	0.0	0.0	100.0
brown-headed cowbird	0.00	0.00 (0.00 - 0.01)	0.0	0.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.01 (0.00 - 0.03)	100.0	0.0	0.0	100.0
Bewick's wren	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0

¹These values assume a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 7d. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
house finch	0.20	0.73 (0.53 - 0.93)	42.1	0.0	64.1	35.9
common raven	0.14	0.20 (0.13 - 0.27)	76.2	0.0	90.6	9.4
horned lark	0.07	0.29 (0.12 - 0.46)	60.7	0.0	40.5	59.5
red-tailed hawk	0.07	0.14 (0.09 - 0.19)	51.7	6.7	93.3	0.0
turkey vulture	0.05	0.06 (0.03 - 0.09)	100.0	7.7	84.6	7.7
unidentified songbird	0.04	0.38 (0.30 - 0.46)	38.0	0.0	26.7	73.3
American kestrel	0.03	0.07 (0.03 - 0.11)	73.3	0.0	54.5	45.5
violet-green swallow	0.02	0.02 (0.00 - 0.04)	100.0	0.0	100.0	0.0
tree swallow	0.02	0.02 (0.00 - 0.05)	100.0	0.0	100.0	0.0
northern harrier	0.01	0.01 (0.00 - 0.02)	100.0	0.0	100.0	0.0
white-crowned sparrow	<0.01	0.11 (0.02 - 0.20)	27.3	0.0	33.3	66.7
unidentified warbler	<0.01	0.01 (0.00 - 0.03)	100.0	0.0	66.7	33.3
unidentified swallow	<0.01	0.01 (0.00 - 0.02)	100.0	50.0	50.0	0.0
unidentified hawk	<0.01	0.01 (0.00 - 0.02)	100.0	0.0	50.0	50.0
unidentified bird	<0.01	0.03 (0.01 - 0.05)	66.7	0.0	25.0	75.0
black-headed grosbeak	<0.01	0.01 (0.00 - 0.03)	50.0	0.0	100.0	0.0
Bullock's oriole	<0.01	0.03 (0.00 - 0.06)	83.3	0.0	20.0	80.0
mourning dove	<0.01	1.01 (0.76 - 1.26)	66.8	0.0	0.7	99.3
bank swallow	<0.01	0.03 (0.00 - 0.08)	100.0	0.0	14.3	85.7
Wilson's warbler	0.00	0.01 (0.00 - 0.03)	33.3	0.0	0.0	100.0
western kingbird	0.00	0.03 (0.01 - 0.05)	71.4	0.0	0.0	100.0
verdin	0.00	0.20 (0.14 - 0.26)	14.6	0.0	0.0	100.0
unidentified wren	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
unidentified woodpecker	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
unidentified sparrow	0.00	0.11 (0.07 - 0.15)	40.9	0.0	0.0	100.0
unidentified hummingbird	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0

Table 7d. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
unidentified flycatcher	0.00	0.02 (0.00 - 0.04)	50.0	0.0	0.0	100.0
sharp-shinned hawk	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
Scott's oriole	0.00	0.02 (0.00 - 0.04)	50.0	0.0	0.0	100.0
sage thrasher	0.00	0.01 (0.00 - 0.02)	66.7	0.0	0.0	100.0
Say's phoebe	0.00	0.08 (0.04 - 0.12)	17.6	0.0	0.0	100.0
rock wren	0.00	0.08 (0.04 - 0.12)	6.3	0.0	0.0	100.0
ruby-crowned kinglet	0.00	0.02 (0.00 - 0.04)	50.0	0.0	0.0	100.0
phainopepla	0.00	0.08 (0.04 - 0.12)	31.3	0.0	0.0	100.0
northern rough-winged swallow	0.00	0.00 (0.00 - 0.01)	100.0	0.0	100.0	0.0
northern mockingbird	0.00	0.31 (0.24 - 0.38)	21.9	0.0	0.0	100.0
northern flicker	0.00	0.07 (0.03 - 0.11)	20.0	0.0	0.0	100.0
loggerhead shrike	0.00	0.26 (0.19 - 0.33)	27.8	0.0	0.0	100.0
ladder-backed woodpecker	0.00	0.14 (0.09 - 0.19)	17.2	0.0	0.0	100.0
lark sparrow	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
gray flycatcher	0.00	0.01 (0.00 - 0.02)	100.0	0.0	0.0	100.0
Gambel's quail	0.00	0.54 (0.35 - 0.73)	0.9	0.0	0.0	100.0
crissal thrasher	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
common grackle	0.00	0.00 (0.00 - 0.01)	100.0	0.0	0.0	100.0
chipping sparrow	0.00	0.01 (0.00 - 0.02)	66.7	0.0	0.0	100.0
curve-billed thrasher	0.00	0.00 (0.00 - 0.01)	0.0	0.0	0.0	0.0
California quail	0.00	0.09 (0.02 - 0.16)	0.0	0.0	0.0	0.0
cactus wren	0.00	0.39 (0.31 - 0.47)	3.7	0.0	0.0	100.0
black-throated sparrow	0.00	2.10 (1.88 - 2.32)	24.9	0.0	0.0	100.0
black-tailed gnatcatcher	0.00	0.05 (0.03 - 0.07)	10.0	0.0	0.0	100.0
Brewer's sparrow	0.00	0.12 (0.06 - 0.18)	25.0	0.0	0.0	100.0
blue-gray gnatcatcher	0.00	0.01 (0.00 - 0.02)	33.3	0.0	0.0	100.0

Table 7d. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
Bewick's wren	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
black-chinned hummingbird	0.00	0.00 (0.00 - 0.01)	0.0	0.0	0.0	0.0
ash-throated flycatcher	0.00	0.44 (0.36 - 0.52)	13.2	0.0	0.0	100.0

¹These values assume a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 7c. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ at the Searchlight Wind Resource Area, from 08/12/2007-06/07/2009.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
common raven	0.15	0.25 (0.03 - 0.47)	80.4	0.7	74.5	24.8
turkey vulture	0.1	0.12 (0.00 - 0.33)	100.0	12.0	83.1	4.8
house finch	0.08	0.33 (0.11 - 0.55)	56.5	0.0	41.1	58.9
unidentified songbird	0.06	0.39 (0.17 - 0.61)	42.8	0.0	37.5	62.5
red-tailed hawk	0.06	0.11 (0.00 - 0.33)	68.8	20.0	78.2	1.8
horned lark	0.05	0.24 (0.02 - 0.46)	67.6	0.0	31.7	68.3
American kestrel	0.04	0.05 (0.00 - 0.27)	87.2	0.0	79.4	20.6
northern rough-winged swallow	0.03	0.03 (0.00 - 0.25)	100.0	0.0	90.5	9.5
northern harrier	<0.01	0.01 (0.00 - 0.23)	100.0	0.0	83.3	16.7
loggerhead shrike	<0.01	0.18 (0.00 - 0.39)	28.6	0.0	13.9	86.1
black-throated sparrow	<0.01	1.26 (1.04 - 1.48)	33.1	0.0	1.4	98.6
violet-green swallow	<0.01	0.01 (0.00 - 0.23)	100.0	0.0	100.0	0.0
tree swallow	<0.01	0.02 (0.00 - 0.23)	100.0	0.0	36.4	63.6
Cooper's hawk	<0.01	0.01 (0.00 - 0.22)	100.0	16.7	66.7	16.7
mourning dove	<0.01	0.43 (0.21 - 0.65)	69.0	0.0	1.4	98.6
unidentified hawk	<0.01	0.01 (0.00 - 0.23)	100.0	0.0	75.0	25.0
white-crowned sparrow	<0.01	0.04 (0.00 - 0.26)	53.6	0.0	20.0	80.0
phainopepla	<0.01	0.13 (0.00 - 0.35)	37.9	0.0	8.3	91.7
golden eagle	<0.01	0.00 (0.00 - 0.27)	100.0	0.0	100.0	0.0
barn swallow	<0.01	0.00 (0.00 - 0.22)	100.0	0.0	100.0	0.0
unidentified warbler	<0.01	0.00 (0.00 - 0.22)	100.0	0.0	66.7	33.3
unidentified bird	<0.01	0.01 (0.00 - 0.23)	62.5	0.0	40.0	60.0
rock pigeon	<0.01	0.04 (0.00 - 0.29)	100.0	0.0	7.4	92.6
northern flicker	<0.01	0.09 (0.00 - 0.31)	16.7	0.0	18.2	81.8
verdin	<0.01	0.18 (0.00 - 0.40)	23.5	0.0	3.4	96.6
unidentified swallow	<0.01	0.01 (0.00 - 0.23)	100.0	25.0	25.0	50.0

Table 7c. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ at the Searchlight Wind Resource Area, from 08/12/2007-06/07/2009.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
black-headed grosbeak	<0.01	0.00 (0.00 - 0.22)	50.0	0.0	100.0	0.0
ladder-backed woodpecker	<0.01	0.11 (0.00 - 0.33)	22.4	0.0	5.9	94.1
Bullock's oriole	<0.01	0.01 (0.00 - 0.23)	85.7	0.0	16.7	83.3
bank swallow	<0.01	0.01 (0.00 - 0.23)	100.0	0.0	14.3	85.7
rock wren	<0.01	0.21 (0.00 - 0.43)	12.8	0.0	5.3	94.7
yellow warbler	0.00	0.01 (0.00 - 0.26)	100.0	0.0	0.0	100.0
yellow-rumped warbler	0.00	0.04 (0.00 - 0.26)	76.7	0.0	0.0	100.0
Wilson's warbler	0.00	0.02 (0.00 - 0.23)	81.8	0.0	0.0	100.0
western tanager	0.00	0.00 (0.00 - 0.27)	100.0	0.0	0.0	100.0
western kingbird	0.00	0.01 (0.00 - 0.23)	62.5	0.0	0.0	100.0
unidentified wren	0.00	0.00 (0.00 - 0.22)	0.0	0.0	0.0	0.0
unidentified woodpecker	0.00	0.00 (0.00 - 0.22)	33.3	0.0	0.0	100.0
unidentified sparrow	0.00	0.04 (0.00 - 0.26)	50.0	0.0	0.0	100.0
unidentified hummingbird	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
unidentified flycatcher	0.00	0.01 (0.00 - 0.23)	60.0	0.0	0.0	100.0
unidentified accipiter hawk	0.00	0.00 (0.00 - 0.25)	100.0	0.0	0.0	100.0
sharp-shinned hawk	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
Scott's oriole	0.00	0.03 (0.00 - 0.25)	57.9	0.0	0.0	100.0
sage thrasher	0.00	0.00 (0.00 - 0.22)	66.7	0.0	0.0	100.0
Say's phoebe	0.00	0.06 (0.00 - 0.28)	36.6	0.0	0.0	100.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.23)	57.1	0.0	0.0	100.0
orange-crowned warbler	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
northern mockingbird	0.00	0.12 (0.00 - 0.34)	23.0	0.0	0.0	100.0
lesser nighthawk	0.00	0.00 (0.00 - 0.26)	100.0	0.0	0.0	100.0
Le Conte's thrasher	0.00	0.00 (0.00 - 0.26)	100.0	0.0	0.0	100.0
lark sparrow	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0

Table 7e. Avian flight height characteristics in relation to the turbine rotor swept area (RSA)¹ at the Searchlight Wind Resource Area, from 08/12/2007-06/07/2009.

Species	Encounter Rate	Mean Use # birds/ 20 min. (90% confidence interval)	Percent Flying	Percent Above RSA Height	Percent At RSA Height	Percent Below RSA Height
house wren	0.00	0.00 (0.00 - 0.27)	0.0	0.0	0.0	0.0
greater roadrunner	0.00	0.00 (0.00 - 0.27)	0.0	0.0	0.0	0.0
gray flycatcher	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
Gambel's quail	0.00	0.50 (0.28 - 0.72)	11.4	0.0	0.0	100.0
European starling	0.00	0.01 (0.00 - 0.28)	100.0	0.0	0.0	100.0
dark-eyed junco	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
crissal thrasher	0.00	0.02 (0.00 - 0.23)	36.4	0.0	0.0	100.0
common grackle	0.00	0.00 (0.00 - 0.22)	100.0	0.0	0.0	100.0
chipping sparrow	0.00	0.00 (0.00 - 0.22)	66.7	0.0	0.0	100.0
curve-billed thrasher	0.00	0.00 (0.00 - 0.22)	0.0	0.0	0.0	0.0
California quail	0.00	0.03 (0.00 - 0.25)	0.0	0.0	0.0	0.0
cactus wren	0.00	0.23 (0.01 - 0.45)	5.4	0.0	0.0	100.0
burrowing owl	0.00	0.00 (0.00 - 0.26)	50.0	0.0	0.0	100.0
black-tailed gnatcatcher	0.00	0.12 (0.00 - 0.34)	32.1	0.0	0.0	100.0
Brewer's sparrow	0.00	0.11 (0.00 - 0.33)	26.9	0.0	0.0	100.0
brown-headed cowbird	0.00	0.00 (0.00 - 0.22)	33.3	0.0	0.0	100.0
blue-gray gnatcatcher	0.00	0.01 (0.00 - 0.23)	60.0	0.0	0.0	100.0
Bewick's wren	0.00	0.01 (0.00 - 0.23)	40.0	0.0	0.0	100.0
Bendire's thrasher	0.00	0.00 (0.00 - 0.26)	0.0	0.0	0.0	0.0
black-chinned hummingbird	0.00	0.00 (0.00 - 0.22)	0.0	0.0	0.0	0.0
ash-throated flycatcher	0.00	0.25 (0.03 - 0.47)	18.1	0.0	0.0	100.0
American pipit	0.00	0.00 (0.00 - 0.27)	0.0	0.0	0.0	0.0
American crow	0.00	0.03 (0.00 - 0.29)	100.0	0.0	0.0	100.0

¹These values assume a Siemens 2.5 MW turbine with a rotor diameter of 101 (m) and a hub height of 80 (m)

Table 8. Incidental observations of birds during point counts at the Searchlight Wind Resource Area, 2007-2009.

Species	Fall 2007 Number of individuals	Spring 2008 Number of individuals	Fall/Winter 2008-2009 Number of individuals	Spring 2009 Number of individuals	Overall Number of individuals
turkey vulture	2	70	27	6	105
red-tailed hawk	21	31	11	19	82
phainopepla	6	22	31	0	59
American kestrel	0	4	5	7	16
unidentified hawk	5	0	1	2	8
Cooper's hawk	1	1	2	1	5
western wood-pewee	1	0	0	1	2
western tanager	1	0	0	1	2
golden eagle	2	0	0	0	2
yellow warbler	0	0	0	1	1
unidentified raptor	1	0	0	0	1
unidentified accipiter hawk	0	1	0	0	1
Swainson's hawk	1	0	0	0	1
sharp-shinned hawk	0	0	0	1	1
sage thrasher	0	1	0	0	1
osprey	0	1	0	0	1
northern mockingbird	0	0	0	1	1
northern harrier	0	0	0	1	1
mourning dove	0	0	0	1	1
loggerhead shrike	0	0	0	1	1
Harris' hawk	1	0	0	0	1
great horned owl	1	0	0	0	1
Costa's hummingbird	0	0	0	1	1
black-headed grosbeak	0	0	0	1	1
black-chinned hummingbird	0	0	0	1	1
Grand Total	43	131	77	46	297

Table 9. Comparison of raptor and other bird use per 20-minute survey with other studies of wind projects using the similar survey methodology.
Project sites sorted by highest to lowest fall mean use by raptors.

Project Site	State	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Reference	Correction factor ^a
		Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann			
Altamont Pass	CA	3.8	3.2	4.6	3							10	Orloff and Flannery (1992)	x2
Tehachapi Pass	CA	0.87	0.39	2.36	0.94	1.09						20	Erickson et al. (2002)	
Cotterel Mountain	ID	1.69	1.89	1.49	0.18		9.53	5.76	7.38	14.08		20	BLM (2006)	
Foote Creek WEC	WY	0.49	0.75	0.96	0.21							40	Johnson et al. (2000)	
Hatchet Ridge	CA	0.7	1.02	0.91	0.12	0.69	5.21	6.9	6.29	4	5.62	30	Young et al. (2007c)	
Windy Flats	WA	0.77	0.88	0.82	0.86		21.51	13.66	16.03	24.56		20	Johnson et al. (2007b)	
Elkhorn	OR	0.81	1.56	0.79			29.43	12.15	20.36			20	WEST (2005a)	
Columbia Hills	WA	0.94	1.34	0.78	0.26	0.75						20	Erickson et al. (2002)	
Combined study of: Kittitas Valley; Desert Claim; Wild Horse	WA	0.89	0.85	0.76	0.51	0.75	11.72	8.18	7.99	15.64	10.88	20	Young et al. (2003)	
Kittitas Valley	WA	1.01	1.03	0.73			14.13	8.13	11.47			20	Erickson et al. (2003a)	
Zintel Canyon	WA	0.19	0.3	0.7	0.51	0.44						20	Erickson et al. (2002)	
Maiden	WA	0.29	0.35	0.62	0.15	0.37	4.55	4.68	11.85	8.52	7.53	30	Young et al. (2002a)	
White Creek	WA	0.46	0.87	0.56	0.38		9.91	9.1	15.24	11.01		20	Kronner et al. (2005a)	
Leaning Juniper	OR	0.39	1.07	0.53	0.24		11.36	5.68	19.09	47		20	Kronner et al. (2005b)	

Table 9. Comparison of raptor and other bird use per 20-minute survey with other studies of wind projects using the similar survey methodology.
Project sites sorted by highest to lowest fall mean use by raptors.

Project Site	State	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Reference	Correction factor ^a
		Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann			
Searchlight	NV	0.40 (Spring 2009)		0.49 (Fall 2007)			8.16 (Spring 2009)		3.94 (Fall 2007)				This Study	
Combine Hills	OR	0.79	0.55	0.43	0.64		5.92	2.62	1.33	2.66		30	Young et al. (2002b)	x 2
Klondike Phase I	OR	0.47	0.39	0.39	0.57	0.47						20	Erickson et al. (2002)	
Golden Hills	OR	0.9	0.56	0.38	0.44		8.53	6.4	9.12	22.3		20	Jeffrey et al. (2008)	
Wild Horse	WA	0.45	0.45	0.3	0.14		5.75	5.75	4	3.23		30	Erickson et al. (2003b)	
Dry Lake	AZ	0.08	0.14	0.21	0.14	0.15	8.05	10.96	16.01	17.89	13.44	30	Young et al. (2007d)	x.66
Biglow Canyon	OR	0.31	0.39	0.19	0.32		10.11	3.33	7.14	11.58		30	WEST (2005b)	x0.67
Stateline Wind	OR/WA	0.29	0.26	0.17	0.21	0.23						10	Erickson et al. (2004)	
Nine Canyon	WA	0.35	0.2	0.16	0.31	0.26						20	Erickson et al. (2002)	
Vantage	WA	0.29	0.4	0.14	0.15		10.57	8.83	3.7	4.9		20	Jeffrey et al. (2007)	
Windy Point	WA	0.79			0.77		17.17			14.52		20	Johnson et al. (2006a)	
Klickitat County PEIS	WA	0.96	1.12				15.34	14.3				20	Johnson et al. (2006c)	
Lower Linden Ranch	WA	1.37					11.63					20	Johnson et al. (2007d)	
Hocor Ridge	WA	1.42	1.33				10	17.92				20	Johnson et al. (2006b)	

Table 9. Comparison of raptor and other bird use per 20-minute survey with other studies of wind projects using the similar survey methodology.
Project sites sorted by highest to lowest fall mean use by raptors.

Project Site	State	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Reference	Correction factor ^a
		Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann			
Bighorn Site	WA	0.4	0.44				9.72	10.04				20	Johnson and Erickson (2004)	
Sand Ridge	WA	0.34	0.46				6.19	5.21				20	Johnson et al. (2007c)	
High Winds	CA					4.14					125.47	30	Kerlinger et al. (2005)	

^aMultiplication factor to standardize mean use to birds/20 min.

Table 10a. Spring 2008 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
7	Creosote-Bursage, Mojave Mixed Scrub (central patch of <i>Yucca schidigera</i>)	total # of individuals				2	3	2		
		maximum # individuals detected in one weekly survey				2	1	1		
		mean use (birds/20 min)				0.15	0.23	0.15		
8	Creosote-Bursage (with <i>Acacia greggii</i> in washes), Mojave Mixed Scrub, Desert Salt Scrub	total # of individuals		1			4			1
		maximum # individuals detected in one weekly survey		1			2			1
		mean use (birds/20 min)		0.08			0.31			0.08
9	Creosote-Bursage, Mojave Mixed Scrub, Blackbrush	total # of individuals					3	1	1	
		maximum # individuals detected in one weekly survey					2	1	1	
		mean use (birds/20 min)					0.23	0.08	0.08	
10	Creosote-Bursage, Mojave Mixed Scrub, Blackbrush (with <i>Acacia greggii</i> in wash)	total # of individuals				27	2	2		
		maximum # individuals detected in one weekly survey				19	1	1		
		mean use (birds/20 min)				2.08	0.15	0.15		

Table 10a. Spring 2008 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
11	Mojave Mixed Scrub, Creosote-Bursage, Blackbrush	total # of individuals						1		
		maximum # individuals detected in one weekly survey						1		
		mean use (birds/20 min)						0.08		
12	Creosote-Bursage, Mixed Mojave Scrub	total # of individuals						3		
		maximum # individuals detected in one weekly survey						1		
		mean use (birds/20 min)						0.23		
15	Mojave Mixed Scrub, Blackbrush, Creosote-Bursage, Salt Desert Scrub, Hopsage	total # of individuals				1	1	4	1	
		maximum # individuals detected in one weekly survey				1	1	1	1	
		mean use (birds/20 min)				0.08	0.08	0.31	0.08	
16	Mojave Mixed Scrub (characterized by <i>Yucca brevifolia</i>); Creosote-Bursage, Hopsage, Salt Desert Scrub	total # of individuals		1	2	8	2	3	1	
		maximum # individuals detected in one weekly survey		1	2	8	1	2	1	
		mean use (birds/20 min)		0.08	0.15	0.62	0.15	0.23	0.08	
total birds			3	3	2	50	32	21	3	2

Table 10b. Spring 2009 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
1	Uniform habitat: Creosote bursage, Mojave Mixed Scrub (characterized by <i>Yucca schidigera</i> , <i>Acacia greggii</i> , <i>Ambrosia dumosa</i>)	total # of individuals				6	4	4		
		maximum # individuals detected in one weekly survey				2	4			
		mean use (birds/20 min)				0.46	0.31	0.31		
2b	Creosote-Bursage, Desert Salt Scrub, Mojave Mixed Scrub (<i>Acacia</i> spp in wash)	total # of individuals		1			5	4	7	
		maximum # individuals detected in one weekly survey		1			2		4	
		mean use (birds/20 min)		0.08			0.38	0.31	0.54	
3a	Creosote-Bursage, Mixed Mojave Scrub (<i>Yucca schidigera</i>), Blackbrush	total # of individuals					2	3	1	
		maximum # individuals detected in one weekly survey					1		1	
		mean use (birds/20 min)					0.15	0.23	0.08	
4	Mojave Mixed Scrub (characterized by <i>Yucca brevifolia</i>), Creosote-Bursage, Blackbrush, Salt Desert Scrub, Hopsage	total # of individuals					4	2		
		maximum # individuals detected in one weekly survey					1			
		mean use (birds/20 min)					0.31	0.15		

Table 10b. Spring 2009 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
5	Mojave Mixed Scrub (Yucca brevifolia), Blackbrush, Creosote-Bursage, Salt Desert Scrub, Hopsage	total # of individuals		1				3		
		maximum # individuals detected in one weekly survey		1						
		mean use (birds/20 min)		0.08				0.23		
6	Mojave Mixed Scrub, Creosote-Bursage	total # of individuals					7	2	3	
		maximum # individuals detected in one weekly survey					2		1	
		mean use (birds/20 min)					0.54	0.15	0.23	
7	Creosote-Bursage, Mojave Mixed Scrub (central patch of <i>Yucca schidigera</i>)	total # of individuals				4	3		1	
		maximum # individuals detected in one weekly survey				2	2		1	
		mean use (birds/20 min)				0.31	0.23		0.08	
8	Creosote-Bursage (with <i>Acacia greggii</i> in washes), Mojave Mixed Scrub, Desert Salt Scrub	total # of individuals					1			
		maximum # individuals detected in one weekly survey					1			
		mean use (birds/20 min)					0.08			

Table 10b. Spring 2009 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
9	Creosote-Bursage, Mojave Mixed Scrub, Blackbrush	total # of individuals					10		2	
		maximum # individuals detected in one weekly survey					2		1	
		mean use (birds/20 min)					0.77		0.15	
10	Creosote-Bursage, Mojave Mixed Scrub, Blackbrush (with <i>Acacia greggii</i> in wash)	total # of individuals				7	7	3		
		maximum # individuals detected in one weekly survey				5	4			
		mean use (birds/20 min)				0.54	0.54	0.23		
11	Mojave Mixed Scrub, Creosote-Bursage, Blackbrush	total # of individuals		1		2	2		1	
		maximum # individuals detected in one weekly survey		1		1	1		1	
		mean use (birds/20 min)		0.08		0.15	0.15		0.08	
12	Creosote-Bursage, Mixed Mojave Scrub	total # of individuals				2	1	9		
		maximum # individuals detected in one weekly survey				1	1			
		mean use (birds/20 min)				0.15	0.08	0.69		

Table 10b. Spring 2009 mean use per point for NDOW and BLM listed sensitive species with breeding range falling within the Searchlight WRA.

Point	General Habitat Features (GAP data)		LeConte's thrasher	crissal thrasher	Bendire's thrasher	Brewer's sparrow	loggerhead shrike	verdin	phainopepla	burrowing owl
13a	Creosote-Bursage (dense in center of point), Mojave Mixed Scrub, Salt Desert Scrub, Blackbrush	total # of individuals					5			
		maximum # individuals detected in one weekly survey					2			
		mean use (birds/20 min)					0.38			
14a	Mojave Mixed Scrub, Creosote-Bursage, Blackbrush, Salt Desert Scrub	total # of individuals		1		3	2	1		
		maximum # individuals detected in one weekly survey		1		3	1			
		mean use (birds/20 min)		0.08		0.23	0.15	0.08		
15	Mojave Mixed Scrub (characterized by <i>Yucca brevifolia</i>), Blackbrush, Creosote-Bursage, Salt Desert Scrub, Hopsage	total # of individuals						3		
		maximum # individuals detected in one weekly survey								
		mean use (birds/20 min)						0.23		
16	Mojave Mixed Scrub (characterized by <i>Yucca brevifolia</i>); Creosote-Bursage, Hopsage, Salt Desert Scrub	total # of individuals					2	7		
		maximum # individuals detected in one weekly survey					1			
		mean use (birds/20 min)					0.15	0.54		
Total Birds			0	3	0	21	46	30	15	0

Appendix 1a. Flight directions of birds observed during fall 2007 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
turkey vulture	40	34	35.0	2.5	17.5	0.0	25.0	7.5	10.0	2.5	0.0
Gambel's quail	40	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
common raven	27	18	18.5	14.8	14.8	3.7	22.2	0.0	3.7	22.2	0.0
black-throated sparrow	27	18	11.1	0.0	3.7	3.7	18.5	7.4	40.7	14.8	0.0
rock pigeon	22	5	13.6	0.0	63.6	9.1	0.0	4.5	9.1	0.0	0.0
American crow	18	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
horned lark	13	6	0.0	46.2	15.4	0.0	7.7	0.0	7.7	23.1	0.0
unidentified songbird	8	3	0.0	0.0	87.5	0.0	0.0	0.0	12.5	0.0	0.0
red-tailed hawk	8	7	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0
mourning dove	8	7	12.5	0.0	12.5	0.0	12.5	0.0	62.5	0.0	0.0
European starling	6	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
phainopepla	5	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
yellow-rumped warbler	3	3	66.7	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0
house finch	3	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
black-tailed gnatcatcher	3	2	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	66.7
yellow warbler	2	2	0.0	0.0	50.0	0.0	0.0	50.0	0.0	0.0	0.0
verdin	2	2	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0
rock wren	2	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern harrier	2	2	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0
loggerhead shrike	2	2	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0
golden eagle	2	2	0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0
Cooper's hawk	2	2	50.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0
western tanager	1	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
white-crowned sparrow	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
unidentified hummingbird	1		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0

Appendix 1a. Flight directions of birds observed during fall 2007 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
Say's phoebe	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
ruby-crowned kinglet	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
northern flicker	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
ladder-backed woodpecker	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
gray flycatcher	1	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
brown-headed cowbird	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
ash-throated flycatcher	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Grand Total	255	133	31.4	4.7	19.2	2.0	11.0	3.5	13.7	5.9	8.6

¹ Includes only flying birds with flight directions

Appendix 1b. Flight directions of birds observed during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
black-throated sparrow	89	54	21.3	3.4	23.6	7.9	11.2	2.2	24.7	3.4	2.2
mourning dove	63	40	20.6	3.2	11.1	3.2	12.7	1.6	31.7	15.9	0.0
common raven	39	26	15.4	2.6	25.6	0.0	12.8	0.0	23.1	0.0	20.5
unidentified songbird	32	19	0.0	15.6	3.1	0.0	0.0	15.6	43.8	9.4	12.5
turkey vulture	26	24	11.5	11.5	11.5	3.8	19.2	11.5	23.1	3.8	3.8
red-tailed hawk	20	18	5.0	15.0	10.0	10.0	10.0	5.0	30.0	5.0	10.0
northern rough-winged swallow	20	3	10.0	0.0	0.0	0.0	0.0	60.0	0.0	30.0	0.0
house finch	20	11	20.0	5.0	20.0	0.0	0.0	0.0	50.0	5.0	0.0
ash-throated flycatcher	20	18	20.0	5.0	20.0	10.0	10.0	5.0	15.0	10.0	5.0
American kestrel	20	10	5.0	0.0	70.0	0.0	10.0	0.0	5.0	0.0	10.0
Brewer's sparrow	15	4	0.0	0.0	33.3	0.0	0.0	0.0	53.3	13.3	0.0
horned lark	14	3	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
loggerhead shrike	9	9	22.2	0.0	22.2	0.0	22.2	11.1	0.0	11.1	11.1
Wilson's warbler	8	5	0.0	0.0	0.0	0.0	25.0	0.0	75.0	0.0	0.0
Scott's oriole	8	8	0.0	12.5	50.0	0.0	0.0	12.5	12.5	12.5	0.0
Say's phoebe	8	7	25.0	0.0	12.5	0.0	25.0	0.0	37.5	0.0	0.0
tree swallow	7	3	85.7	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0
ladder-backed woodpecker	7	7	14.3	0.0	42.9	14.3	0.0	28.6	0.0	0.0	0.0
black-tailed gnatcatcher	7	6	14.3	14.3	28.6	0.0	0.0	14.3	28.6	0.0	0.0
unidentified sparrow	5	4	20.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	0.0
rock pigeon	5	2	0.0	60.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0
northern mockingbird	5	4	0.0	0.0	0.0	40.0	20.0	0.0	20.0	20.0	0.0
verdin	4	4	0.0	0.0	75.0	0.0	25.0	0.0	0.0	0.0	0.0
rock wren	4	4	0.0	0.0	50.0	25.0	25.0	0.0	0.0	0.0	0.0
northern flicker	3		0.0	0.0	33.3	0.0	0.0	0.0	33.3	33.3	0.0

Appendix 1b. Flight directions of birds observed during spring 2008 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
Le Conte's thrasher	3	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooper's hawk	3	3	66.7	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0
yellow warbler	2	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
white-crowned sparrow	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
unidentified swallow	2	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
lesser nighthawk	2	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
lark sparrow	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
crissal thrasher	2	2	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0
unidentified hawk	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified flycatcher	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
unidentified accipiter hawk	1	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
phainopepla	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
northern harrier	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
burrowing owl	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Bullock's oriole	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total	483	315	15.9	5.0	19.5	3.7	9.9	6.8	27.3	6.8	5.0

¹ Includes only flying birds with flight directions

Appendix 1c. Flight directions of birds observed during fall/winter 2008-2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
black-throated sparrow	72	26	29.2	5.6	25.0	1.4	13.9	0.0	22.2	0.0	2.8
unidentified songbird	50	17	44.0	0.0	14.0	0.0	26.0	0.0	2.0	14.0	0.0
common raven	44	34	18.2	13.6	13.6	4.5	11.4	4.5	13.6	9.1	11.4
horned lark	40	13	2.5	7.5	0.0	2.5	50.0	7.5	22.5	7.5	0.0
house finch	30	20	13.3	0.0	20.0	3.3	20.0	3.3	16.7	23.3	0.0
phainopepla	25	20	8.0	0.0	36.0	0.0	4.0	0.0	16.0	4.0	32.0
yellow-rumped warbler	20	5	15.0	0.0	5.0	0.0	0.0	75.0	5.0	0.0	0.0
verdin	17	16	23.5	5.9	11.8	5.9	11.8	5.9	17.6	0.0	17.6
black-tailed gnatcatcher	16	13	50.0	6.3	12.5	0.0	18.8	0.0	0.0	6.3	6.3
red-tailed hawk	12	12	41.7	0.0	8.3	0.0	16.7	0.0	8.3	0.0	25.0
rock wren	12	11	16.7	8.3	33.3	0.0	16.7	0.0	0.0	8.3	16.7
loggerhead shrike	10	10	0.0	10.0	40.0	0.0	10.0	0.0	20.0	0.0	20.0
cactus wren	6	4	0.0	0.0	0.0	0.0	50.0	0.0	33.3	0.0	16.7
turkey vulture	4	4	0.0	25.0	25.0	0.0	0.0	0.0	0.0	25.0	25.0
northern flicker	4	4	25.0	0.0	0.0	0.0	25.0	0.0	25.0	25.0	0.0
ladder-backed woodpecker	4	4	25.0	25.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0
American kestrel	3	3	33.3	0.0	0.0	0.0	33.3	0.0	33.3	0.0	0.0
unidentified sparrow	2	2	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0
Say's phoebe	2	2	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
crissal thrasher	2	2	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
blue-gray gnatcatcher	2	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Bewick's wren	2	2	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
barn swallow	2	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
white-crowned sparrow	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified hawk	1		0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0

Appendix 1c. Flight directions of birds observed during fall/winter 2008-2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
unidentified bird	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
ruby-crowned kinglet	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern harrier	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
dark-eyed junco	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooper's hawk	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Grand Total	388	233	21.6	5.4	17.5	1.5	19.3	5.7	13.7	7.0	8.2

¹ Includes only flying birds with flight directions

Appendix 1d. Flight directions of birds observed during spring 2009 point count surveys at the Searchlight Wind Resource Area.

Species	Number of Birds ¹	Number of Observations	Percentage of Flights								
			N	NE	E	SE	S	SW	W	NW	Variable
cactus wren	3	3	66.7	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0
unidentified swallow	2	2	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0
Scott's oriole	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
sage thrasher	2	2	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0
ruby-crowned kinglet	2	2	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0
northern harrier	2	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern flicker	2	2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
gray flycatcher	2	2	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
chipping sparrow	2	2	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Wilson's warbler	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified woodpecker	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified hummingbird	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
unidentified hawk	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified flycatcher	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
rock wren	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
northern rough-winged swallow	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gambel's quail	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
common grackle	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
black-tailed gnatcatcher	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Brewer's sparrow	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
black-headed grosbeak	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
blue-gray gnatcatcher	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total	550	376	28.7	6.9	14.4	4.7	19.5	2.9	18.2	3.6	1.1

¹ Includes only flying birds with flight directions

Appendix 2 Mean use by survey number for Searchlight 8/12/2007-6/7/2009

Season	Survey Number	Survey Date	Number of Raptors	Raptor species Mean Use # birds/ 20 min.	Number of non-raptors	Non-raptor species Mean Use # birds/ 20 min.	Overall Mean Use # birds/ 20 min.
	10	5/23/08	8	0.67	97	8.08	8.75
	11	6/1/08	2	0.17	92	7.67	7.83
	12	6/8/08	5	0.42	49	4.08	4.50
	13	6/15/08	2	0.17	79	6.58	6.75
Fall/winter 2008							
	1	9/12/08	3	0.25	62	5.17	5.42
	2	9/20/08	4	0.33	83	6.92	7.25
	3	9/28/08	3	0.25	55	4.58	4.83
	4	10/4/08	2	0.17	49	4.08	4.25
	5	10/11/08	0	0.00	32	2.67	2.67
	6	10/18/08	4	0.29	116	8.29	8.57
	7	10/25/08	2	0.13	59	3.93	4.07
	8	11/2/08	0	0.00	57	3.80	3.80
	9	11/8/08	0	0.00	46	2.88	2.88
	10	11/15/08	2	0.13	36	2.25	2.38
	11	11/22/08	5	0.31	108	6.75	7.06
	12	11/29/08	0	0.00	44	2.75	2.75
	13	12/7/08	1	0.06	56	3.50	3.56
	14	12/26/08	2	0.13	23	1.44	1.56
	15	1/19/09	2	0.13	26	1.63	1.75
Spring 2009							
	1	3/15/09	4	0.25	95	5.94	6.19
	2	3/22/09	3	0.19	49	3.06	3.25
	3	3/29/09	4	0.25	65	4.06	4.31
	4	4/8/09	3	0.19	123	7.69	7.88

Appendix 2 Mean use by survey number for Searchlight 8/12/2007-6/7/2009

Season	Survey Number	Survey Date	Number of Raptors	Raptor species Mean Use # birds/ 20 min.	Number of non-raptors	Non-raptor species Mean Use # birds/ 20 min.	Overall Mean Use # birds/ 20 min.
	5	4/12/09	6	0.38	135	8.44	8.81
	6	4/19/09	3	0.19	207	12.94	13.13
	7	4/26/09	5	0.31	127	7.94	8.25
	8	5/3/09	0	0.00	183	11.44	11.44
	9	5/10/09	9	0.56	150	9.38	9.94
	10	5/17/09	7	0.44	100	6.25	6.69
	11	5/24/09	3	0.19	137	8.56	8.75
	12	5/31/09	9	0.56	186	11.63	12.19
	13	6/7/09	6	0.38	140	8.75	9.13

Appendix 2 Mean use by survey number for Searchlight 8/12/2007-6/7/2009

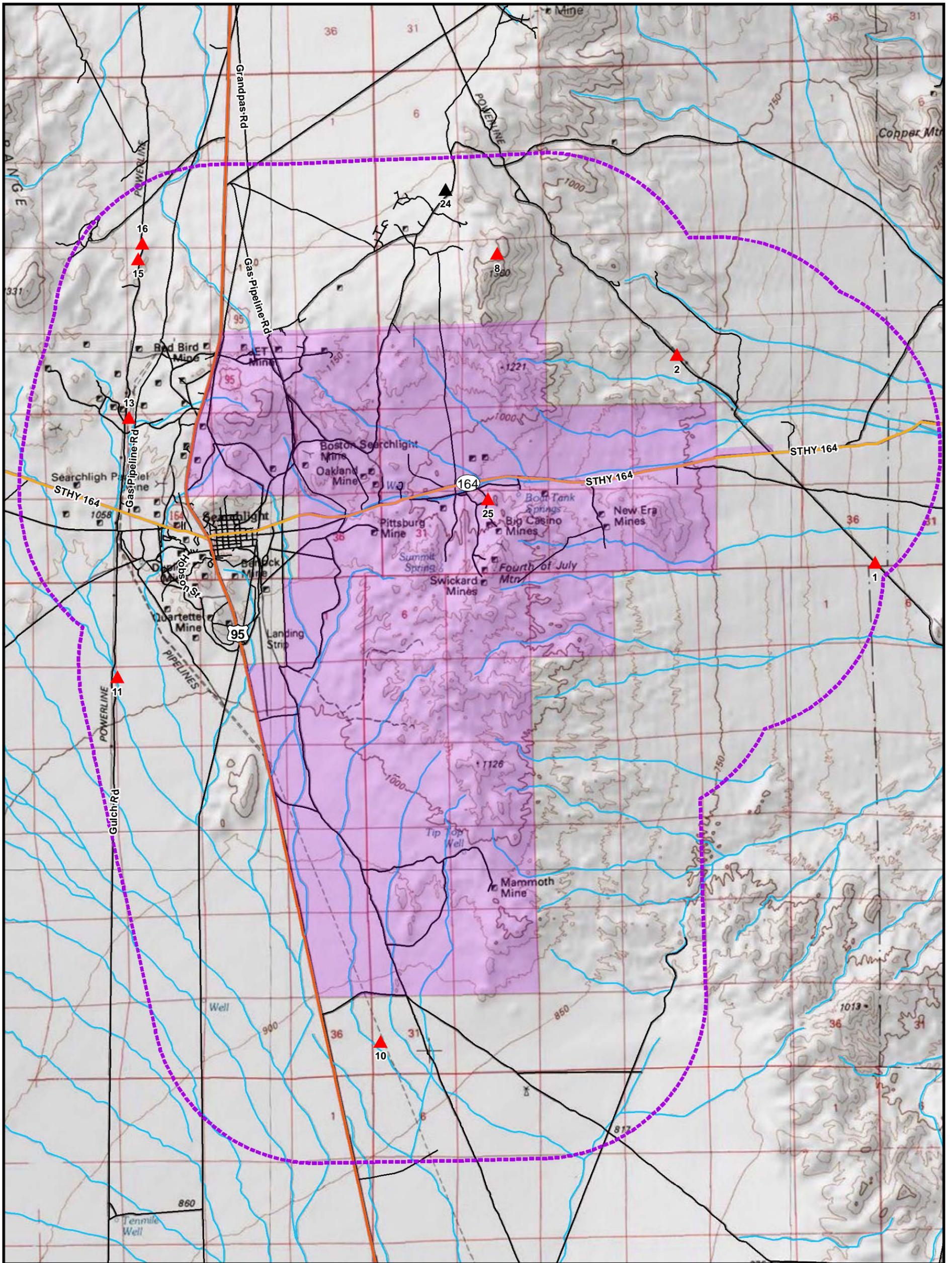
Season	Survey Number	Survey Date	Number of Raptors	Raptor species Mean Use # birds/ 20 min.	Number of non-raptors	Non-raptor species Mean Use # birds/ 20 min.	Overall Mean Use # birds/ 20 min.
Fall 2007							
	1	8/12/07	11	1.10	20	2.00	3.10
	2	8/23/07	11	1.10	30	3.00	4.10
	3	8/27/07	9	0.90	37	3.70	4.60
	4	9/4/07	4	0.40	46	4.60	5.00
	5	9/10/07	3	0.30	44	4.40	4.70
	6	9/19/07	4	0.40	33	3.30	3.70
	7	9/26/07	5	0.50	31	3.10	3.60
	8	10/2/07	1	0.10	62	6.20	6.30
	9	10/11/07	1	0.10	21	2.10	2.20
	10	10/16/07	2	0.20	28	2.80	3.00
	11	10/23/07	3	0.30	60	6.00	6.30
	12	10/28/07	2	0.20	29	2.90	3.10
	13	11/7/07	0	0.00	24	2.40	2.40
	14	11/14/07	0	0.00	13	1.30	1.30
Spring 2008							
	1	3/23/08	7	0.58	50	4.17	4.75
	2	3/30/08	6	0.50	58	4.83	5.33
	3	4/6/08	4	0.33	68	5.67	6.00
	4	4/13/08	3	0.25	151	12.58	12.83
	5	4/21/08	15	1.25	92	7.67	8.92
	6	4/28/08	11	0.92	57	4.75	5.67
	7	5/5/08	5	0.42	90	7.50	7.92
	8	5/11/08	4	0.33	97	8.08	8.42
	9	5/19/08	4	0.33	68	5.67	6.00

Appendix 3. Results of aerial raptor and raven nest survey for the Searchlight WRA, Clark County, Nevada (NAD83 Z11N). Survey conducted via helicopter on April 20, 2009; ground follow-up conducted on May 15, 2009 and May 24, 2009.

Nest Number	Species ¹	Nest Status	Survey Dates	# of Adult(s) on Nest	# of Eggs	# of Young	Nesting Substrate	UTM	
								Northing	Easting
1	RTHA	Active	4/20/2009	1			man made structure	3926124	701574
2	RTHA	Active	4/20/09 5/12/09 5/24/09	2	2	1	man made structure	3930145	697747
3	UNRA	Inactive	4/20/2009				man made structure	3932407	695565
4	UNRA	Inactive	4/20/2009				rock outcrop	3920802	694555
5	CORA	Active	4/20/2009				rock outcrop	3921402	694340
6	UNRA	Inactive	4/20/2009				man made structure	3934114	694286
7	CORA	Active	4/20/2009				rock outcrop	3922231	693896
8	RTHA	Active	4/20/2009 5/24/09	1	2		rock outcrop	3932104	694288
9	UNRA	Inactive	4/20/2009				rock outcrop	3922712	692532
10	RTHA/CORA	Active	4/20/2009 5/24/2009				man made structure	3916867	692037
11	RTHA	Active	4/20/2009	2			man made structure	3923914	686962
12	UNRA	Inactive	4/20/2009				man made structure	3926047	686998
13	RTHA	Active	4/20/2009				man made structure	3928927	687182
14	UNRA	Inactive	4/20/2009				man made structure	3930662	687299
15	RTHA	Active	4/20/2009				man made structure	3931994	687354
16	RTHA	Active	4/20/2009				man made structure	3932302	687437
17	UNRA	Inactive	4/20/2009				man made structure	3932436	687446

Nest Number	Species ¹	Nest Status	Survey Dates	# of Adult(s) on Nest	# of Eggs	# of Young	Nesting Substrate	UTM	
								Northing	Easting
18	UNRA	Inactive	4/20/2009				man made structure	3933157	687503
19	RTHA	Active	4/20/2009				man made structure	3934098	687510
20	GOEA	Inactive	4/20/2009				rock outcrop	3934639	684616
21	RTHA	Active	4/20/2009				man made structure	3918173	686817
22	BUOW	Inactive	5/15/2009				Dirt	3919312	691827
23	BUOW	Unknown	5/15/2009				unknown	3926399	696182
24	BANO	Active	5/4/2009				man made structure	3933340	693291
25	RTHA	Active	5/24/2009			1	man made structure	3927351	694103

¹ CORA = common raven; GOEA = golden eagle; RTHA = red-tailed hawk; UNRA = unknown raptor; BUOW = burrowing owl; BANO = Barn Owl



Appendix 4
Duke - Searchlight
 Raptor nest location map
 Clark County, NV

1:70,000
 NAD 1983 UTM 11
 Last Modified: 01/06/2010

Project Area	River/Stream
Project Area 2-mile Survey Buffer	Lake/Pond
Red-tailed Hawk Nest	Federal Highway
Barn Owl Nest	State Highway
	Other Road

0 1 2
Miles

