2007- 2008 Avian Survey

Tule Wind Resource Area
San Diego County, California

Prepared for

Iberdrola Renewables, Inc.

IBERDROLA RENEWABLES

January 2009

TETRA TECH EC, INC.

EXECUTIVE SUMMARY

Tetra Tech, EC, Inc. was contracted by Iberdrola Renewables, Inc. to undertake avian use surveys for the proposed Tule Wind Resource Area (WRA) in San Diego County, California. 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 and power lines and displacement due to the presence of the associated structures. Biologists conducted surveys at the Tule WRA approximately every two weeks from September 13, 2007 to September 12, 2008. Thirty-minute fixed point count surveys (800-meter radius) were conducted at 16 points distributed throughout the Tule WRA.

In this report, we discuss the overall results of the avian surveys (fall 2007 – summer 2008). For specific discussion of the seasonal results of the avian surveys, please see the corresponding seasonal report. However, data from all seasons are presented here for completeness.

A total of 80 identified species and 12 unidentified species groups, consisting of 3,851 birds were observed within the Tule WRA. Overall mean bird use within the Tule WRA was 9.35 birds per 30 minutes (/30 min), ranging from zero to 143 birds/30 min point count. Comparing annual bird use rates at Tule in 2007-2008 with wind energy facilities throughout the country, not including previous studies at the Tule WRA, the Tule WRA ranked fourth out of 6 for raptor use, and sixth out of 6 for non-raptor use.

Songbirds had the highest mean use out of all species groups observed (3.87 birds/30 min). The most common songbird, the house finch (0.44 birds/30 min) is a widespread species and has a relatively stable population (Hill 1993, Sauer et al. 2007). Thus, local mortality is not expected to have population-level consequences for the house finch.

Turkey vultures and red-tailed hawks were the most commonly observed raptors in the Tule WRA. Mortalities of both species have occurred at existing wind farms (Kerns and Kerlinger 2004, Anderson et al. 2005, Kerlinger et al. 2005); however, the low mean use and the fact that both species have relatively stable populations (Sauer et al. 2007) make it unlikely that mortalities will have a population-level effect.

Listed and Sensitive Species

The golden eagle, protected under the Bald and Golden Eagle Protection Act (BGEPA), was detected twice during surveys and once incidentally. Golden eagles are susceptible to mortality from wind turbines and have experienced mortality rates higher than expected from pre-construction avian use surveys with the old technology turbines at the Altamont Pass area of California. The BGEPA prohibits the killing or disturbance of any golden eagle or golden eagle nest. While only three golden eagles were detected in the WRA, its presence implies that suitable habitat exists in the WRA.

No federally listed species were detected during surveys; however, the willow flycatcher, a species listed as threatened under the California Endangered Species Act was observed twice incidentally. The southwestern willow flycatcher, a federally endangered sub-species of willow flycatcher is known to occur in the area of the Tule WRA. Willow flycatchers breed in riparian vegetation and it is unlikely that this habitat will be disturbed during project development.

An additional 5 species observed are described as California Department of Fish and Game "Species of Special Concern" (SSC) when nesting. "…This designation is intended to result in special consideration for these animals by the department, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under federal and state endangered species laws and cumbersome recovery efforts that might ultimately be required." California SSC that occurred during point count and incidental surveys were loggerhead shrike (1 point count; 5 incidental), northern harrier (3 point count; 8 incidental), Vaux's swift (135 point count; 28 incidental), yellow warbler (1 point count), and olive-sided flycatcher (1 incidental).

Loggerhead shrike, northern harrier, and Vaux's swift were all seen in the fall or winter, and yellow warbler and olive-sided flycatcher were seen in the summer. However, they were seen only once each and thus are unlikely to be breeding in the area. Although 135 Vaux's swifts were observed within the WRA, overall mean use was only 0.33 birds/30 min. There is a potential for mortality as more than half of the birds flew within the rotor swept area. The Vaux's swift does not breed in southern California and although they are fairly common throughout California during spring and fall migrations, their occurrence is unpredictable. Thus, while some local mortality could occur, population level consequences are not expected for Vaux's swifts that might collide with turbines at the Tule WRA.

The following table summarizes potential impacts to avian species at the Tule WRA based on overall avian use, the presence of state or federally listed species, and habitat attractants (Table ES-1).

Table ES-1. Project Impact Summary

	Result	Details
Raptors		
Mean use	Moderate	
Mean use without turkey vultures	Low	
Mean use within the rotor swept area (RSA)	Moderate	
Number of species with high encounter rates (>1.0 birds/30 min)	None	
Eagles observed in WRA	Yes	See Section 4.4
Eagles observed nesting in WRA	No	
Federally listed[1] species observed within WRA	No	
Federally listed species observed nesting	No	
Federally listed species within RSA	No	
State-listed species[2] within WRA	Yes	See Section 4.4
State-listed species observed nesting within WRA	No	
State-listed species within RSA	No	
Non-raptors		
Mean use	Low	
Mean use within RSA	Low	
Number of species with high encounter rates (>1.0 birds/30 min)	None	
Federally listed species observed within the WRA	No*	See Section 4.4
Federally listed species within RSA	No	
State-listed species within WRA	Yes	See Section 4.4
State-listed species observed nesting within the WRA	No	
Habitat		
Native habitat likely to be affected by development	Yes	Mixed chaparral
Lakes (waterfowl attractant)	No	
Wetlands (attractant for cranes, waterfowl, and other water-based species)	No	
Cliffs (raptor nesting and traveling)	Yes	
River (permanent water source, migration corridor)	No	
Known refuges or habitat features that may funnel migrants	No	

[1] Federally listed species include threatened, endangered, or candidate species designations (USFWS 2008)

[2] State-listed species include threatened, endangered, candidate, and species of concern designations. State species listed are those in addition to federally listed species (CDFG 2008).

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ABBREVIATIONS AND ACRONYMS

BLM	U.S. Bureau of Land Management
CDFG	California Department of Fish and Game
MW	megawatt
obs/30 min	observations per 30 minutes
/30 min	per 30 minutes
PIF	Partners in Flight
RSA	rotor swept area
SSC	Species of Special Concern
TtEC	Tetra Tech EC, Inc.
WRA	Wind Resource Area

1.0 INTRODUCTION

Iberdrola Renewables, Inc. (Iberdrola) is planning to develop a wind energy conversion facility in San Diego County, California. The Tule Wind Resource Area (WRA) is primarily located on public land administered by the U.S. Bureau of Land Management (BLM), about 50 miles east of the city of San Diego and 2 miles north of the town of Boulevard (Figure 1). Iberdrola is committed to environmental due diligence and contracted Tetra Tech EC, Inc. (TtEC) to conduct avian surveys at the Tule WRA. Surveys were conducted approximately every two weeks from September 13, 2007 to September 12, 2008 to quantify local avian use in the area and to identify potential avian impacts associated with building and/or operating the proposed facility. In addition to the avian surveys discussed in this report, TtEC conducted avian surveys at the Tule WRA from March 2005 – March 2006 (TtEC 2007).

The Tule WRA covers approximately 12,000 acres and is located west of the Anza Borrego Desert State Park. The Tule WRA is located in the Sonoran Basin and Range ecoregion, and is characterized by chaparral habitats. The area contains the In-Ko-Pah Mountains, which have few dramatic peaks but are characterized by broad rolling upland areas strewn with numerous large granite rock formations. The mountains are oriented generally northwest to southeast, and rise gradually above the McCain Valley in the west and drop off into the Carrizo Canyon in the east. Some trees are present, and are generally associated with houses and campgrounds. The area is managed to provide for a variety of uses, including recreation, wildlife conservation, cattle grazing, and protection of archaeological resources (BLM 2007).

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, raptors and migrant passerines (i.e., songbirds) were found more often in post-construction mortality monitoring compared to other groups of birds (Erickson et al. 2001, 2005, Drewitt and Langston 2006, Johnson et al. 2007, Strickland and Morrison 2008).

The possible impacts to avian species from the construction and operation of the Tule wind farm are direct morality and injury from collisions with wind turbines and guy wires, temporary or permanent habitat loss, and displacement of birds from habitats near turbines (Drewitt and Langston 2006). Historically, raptor mortality has received the most attention. Raptor mortality at newer generation wind projects has been low relative to previous generation wind farms (Erickson et al. 2002). A number of mortality monitoring studies at newer generation wind projects have found fewer than five individual raptor mortalities (e.g., Johnson et al. 2002, Erickson et al. 2003, Kerns and Kerlinger 2004, Jain et al. 2007), but one study at the Stateline Wind Project in Oregon and Washington found as many as 17 dead raptors within a 2.5-year monitoring period (Erickson et al. 2004); however, the Stateline project has 454 turbines. Although raptor mortality is reduced, mortality may not be eliminated by advances in turbine technology and local micro-siting, and site evaluation efforts are still necessary.

At newer generation wind energy facilities outside of California, approximately 80 percent of documented mortalities have been passerines (i.e., songbirds); of which 50 percent were night migrants (Erickson et al. 2002). 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 at wind

Hemet
Bautista Creek
Lake Skinner Recreation Area
Riverside County
Indio--Cathedral City--Palm Springs
Coachella Canal
Thermal
Mecca
One Hundred Palms
Salton Sea
emecula--Murrieta
Chihuahua Creek
Coyote Lake
Palm Wash
Arroyo Salada
San Luis Rey River
Daley Ranch
Escondido Creek
Santa Ysabel Creek
San Felipe Creek
Anza-Borrego Desert State Park
Ramona
San Diego River
San Diego County
Imperial County
Cuyamaca Rancho State Park
Vallecito Creek
Carrizo Creek
Sweetwater River
Pine Valley Creek
Cottonwood Creek
La Posta Creek
Palm Canyon Wash
San Diego
Lake Morena Co Park
Otay River
Mexico
Project Area

Figure 1. Tule
Wind Resource Area Location Map
San Diego County, California
July 18, 2008

IBERDROLA RENEWABLES

1:400,000
NAD 83 UTM 11

Miles
0 2.5 5 10

Project Area
County Boundary
Water Body
Stream
Intermittent Stream

Transportation
Interstate
Highway
Major Road

UT
NV
CA
AZ
Fresno
Las Vegas
Phoenix
Santa Ana
Anaheim
Riverside
Long Beach
San Diego
Mexico

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farms in Oregon, Washington, and Minnesota (Erickson 2007). Resident species may have lower mortality than migrants because many songbirds do not fly within the rotor swept area (RSA). However, some resident species have behaviors that increase the risk of collisions with turbines because they fly within the RSA.

In addition to mortality associated with wind farms, concerns have been raised that some 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 grasslands containing turbines than in Conservation Reserve Program 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 meters 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).

California has 634 documented bird species and is situated within the Pacific Flyway, one of the main bird migratory routes (USFWS 2008a). The Pacific Flyway runs through the western portion of the United States and subsequently, the Tule WRA. Most birds that move along the Pacific Flyway travel from the western Arctic, including Alaska and the Aleutian Islands and the Rocky Mountain and Pacific coast regions of Canada, through the United States and Mexico, and south to where the Pacific Flyway merges with other flyways in Central and South America (BNC 2004).

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 Diurnal Fixed-point and Incidental Avian Use Surveys

Fixed-point Surveys

Experienced field biologists conducted 30-minute point count surveys at 16 locations within the Tule WRA to evaluate avian use, behavior, and species composition (Figure 2). Biologists conducted surveys approximately every two weeks from September 13, 2007 to September 12, 2008 (Table 1). TtEC 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.

Experienced field ornithologists collected data on all birds observed within an 800-meter radius circle centered on the point count location. The biologists also recorded incidental observations, such as birds detected outside the 800-meter radius or while moving between point count locations. Surveys at each point lasted for 30 minutes, during which time biologists continuously scanned for birds and recorded any visual or auditory observations. Biologists

PC 16
PC 15
PC 14
PC 9
PC 8
PC 13
PC 12
PC 7
PC 5
PC 4
PC 11
PC 10
PC 3
PC 6
PC 2
PC 1

Figure 2. Tule
Point Count Location Map

San Diego County, California
July 18, 2008

IBERDROLA RENEWABLES

1:60,000
NAD 83 UTM 11

Miles
0 0.5 1 2

Avian Survey Points
Lake/Reservoir
Perennial Stream
Intermittent Stream

Transportation
Interstate
Highway
Major Road
Other Road

San Bernardino NF
Riverside Cty
215
15
5
San Diego Cty
8
San Diego Metro Area
Cleveland NF

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P:\GIS_PROJECTS\Iberdrola_Renewables\Tule\maps\Avian_Survey\2008_Survey_Reports\Tule_Figure2_Point_Count_Locations_Map_081808.mxd - Last Accessed: 11/5/2008 - Map Scale is correct when printed at: Portrait ANSI B (11 x 17 inches)

scheduled point counts to cover all daylight hours and to ensure that each point was visited during different times of day to ensure species coverage. Biologists collected the following data: species, number of individuals, time, height above ground, behavior, and flight direction. The biologists also estimated flight heights and distances using existing meteorological towers, local transmission lines, and topographic maps for reference. Flight direction data are included in Appendix A.

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, 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 the bird community using the WRA.

TtEC chose 30-minute survey periods because they provide adequate time to detect both raptors and non-raptors. However, time periods of 30 minutes 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 scrub jay is detected perched on a fence then disappears from view and, 6 minutes later, a scrub jay 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 30-minute survey, not number of distinct individual birds.

Detectability varies among species and potentially not all individuals within the 800-meter 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 presented in the results.

Incidental Observations

Incidental observations included observations that occurred 1) during travel between points, 2) before or after the official 30-minute survey period, and 3) outside the 800-meter 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.

Data Quality Assurance/Quality Control

TtEC 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

TtEC considered two primary groups of interest: raptors and non-raptors. TtEC 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, TtEC has included them with raptors for the purpose of our analyses. Non-raptors were defined as all other species groups.

Avian Use

TtEC derived avian use (mean use) of the Tule WRA by calculating the average number of birds observed per 30-minute survey at each point. To evaluate the diversity and composition of avian species using the Tule WRA, TtEC first summarized the number of individuals (birds per 30 minutes [/30 min]) and species. TtEC also calculated a measure of variability (90 percent confidence intervals) for all mean use values. In addition, the number of observations (obs/30 min) 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., flock of birds moving through the rotor swept area). 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 use does not equate to abundance. Mean use is calculated per species and per species group. Multiple species are sighted during one point count period, which results in the overall mean for a species group being higher than the highest mean for a species within that group. TtEC classifies use as high, moderate, or low based on the ranking compared to published data from other existing wind energy facilities.

Flight Behavior

TtEC evaluated flight behavior by calculating the proportion of flying birds observed below, within, or above the turbine RSA. Turbines proposed for this site are either 1.5 or 3 megawatts (MW). Therefore, TtEC compared two RSAs; between 60 and 150 meters above ground (3 MW turbines) and between 41.5 and 118.5 meters above ground (1.5 MW turbines). TtEC considered a bird to have flown within the RSA if any of its recorded heights overlapped the RSA.

Encounter Rate

To estimate the rate at which a species flew through the anticipated RSA, TtEC applied the following equation to every species observed in the WRA:

$$Encounter\ Rate = A*P_f*P_t$$

where A is the mean number of birds/30 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 within the turbine RSA for a given species. The encounter rate provides information on the rate at which a species moves through the RSA. This information is an important component in evaluating risk; however, this number alone does not indicate risk to a species.

Encounter rate is an index of birds flying within the RSA and may not equate to actual post-construction mortality. 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 a species ability to detect turbine blades, flight maneuverability to avoid blades, and habitat selection also influence mortality; therefore, actual mortality may be higher or lower than indicated by the encounter rate (Orloff and Flannery 1992). Encounter rate is based on (and only applicable to) daytime observations of bird mean use and flight height. Values are sensitive to large flocks of birds flying within the RSA.

In this report, we discuss the overall results of the avian surveys (fall 2007 – summer 2008). For specific discussion of the seasonal results of the avian surveys, please see the corresponding seasonal report. However, data from all seasons are presented for completeness.

Mortality Estimates

TtEC has not included mortality estimates as part of this report. The statistical relationship between pre-construction avian use and post-construction mortality remains poorly defined, thereby limiting our ability to predict mortality based on use. Previous studies (e.g., Johnson 2007) have documented a significant positive relationship between use and mortality for raptors; however, these studies have been based on data sets from throughout the United States, contain several statistical inconsistencies, and likely have limited applicability on a regional scale. This limited applicability is due, in large part, to the highly regional nature of avian mean use across North America (Arnett et al. 2007). Unfortunately, data on avian mortality at wind farms are lacking at regional scales in many parts of North America. Rather than attempt to draw conclusions from limited data sets, TtEC takes a conservative approach and limits our discussion to patterns of avian use and mortality risk factors.

2.3 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 conducted the raptor nest survey across the project area before trees began to leaf out to increase visibility of raptor nests. Where possible, biologists also surveyed the area within approximately 1 mile around the project area. Once a nest was located, the biologist returned during the raptor breeding season to collect data on species, location, and activity status. 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. Biologists visited nests a minimum of two times, once to determine the location of the nest and once to determine if the nest was active. This second check also allowed biologists to detect late-nesting species such as Swainson's hawks. Raptor nest surveys provide an estimate of the number and species of raptors that use stick nests in the area. Ground nesting raptor species, such as northern harriers, were not surveyed.

3.0 RESULTS

3.1 Tule WRA

Biologists surveyed about 7,945 acres of the Tule WRA during point count surveys, covering approximately 66 percent of its total area. The 16 point count locations were surveyed between

23 and 27 times each, resulting in 412 total 30-minute surveys. Due to safety concerns, points 12-16 were surveyed from the edge of the 800-meter radius for approximately four months of the 1-year survey period. After this period, normal survey activity was resumed at points 12 and 13; and points 14, 15, and 16 were shifted to enable full-radius surveys. This method may have underestimated songbird abundance for this period at these points. However, these points were sampled at the original location during a number of surveys and the habitat at these points is not unique within the Tule WRA. Thus, the change in sampling methods is unlikely to affect conclusions regarding overall patterns of the avian community and rank order of the most common species.

3.2 Species Composition

Biologists recorded a total of 3,851 birds of 80 identified species and 12 unidentified species groups during the 412 fixed-point count surveys (Table 2). The most commonly observed birds were the western scrub-jay (18.9 percent of all birds observed), common raven (10.3 percent), white-throated swift (5.6 percent), and red-tailed hawk (5.2 percent). Each remaining species comprised 4.8 percent or less of the total number of birds observed (Table 4).

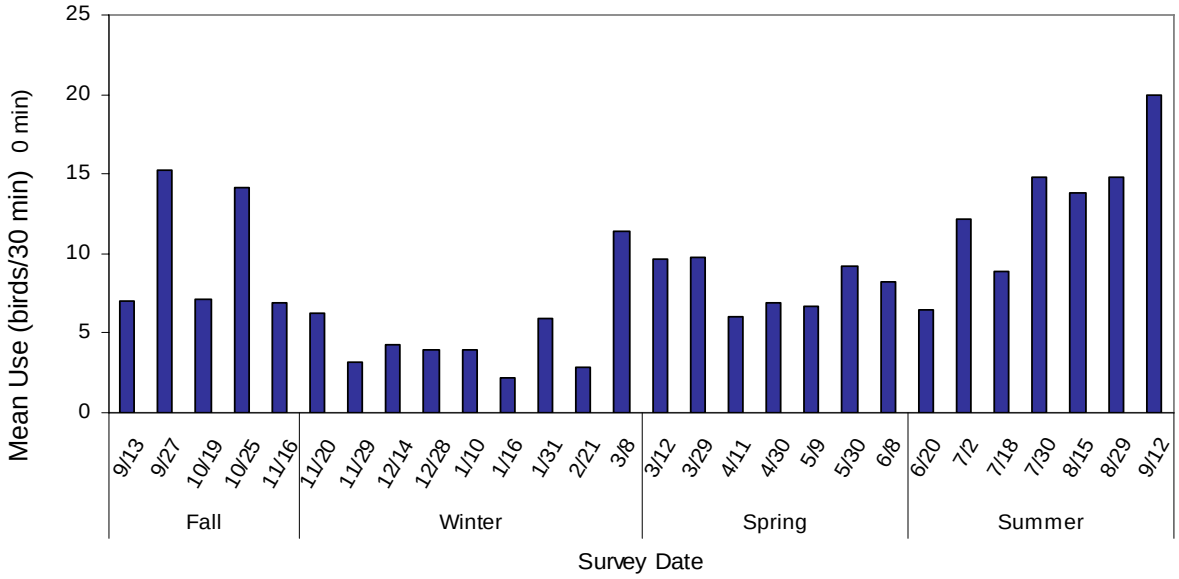
3.3 Avian Use

Overall mean bird use within the Tule WRA was 9.35 birds/30 min, ranging from zero to 143 birds/30 min point count. Overall mean use by non-raptors was 8.82 birds/30 min. The non-raptors with the highest mean use were the western scrub-jay (1.77 birds/30 min), common raven (0.96 birds/30 min), white-throated swift (0.52 birds/30 min), and house finch (0.44 birds/30 min) (Tables 2 and 3).

Among non-raptor species groups, mean use was highest for songbirds (3.87 birds/30 min). The most commonly observed species, house finch, accounted for 11.5 percent of individuals in this species group. Among crows and allies, the second highest species group (2.80 birds/30 min), commonly observed species included western scrub-jay (1.77 birds/30 min) and common raven (0.96 birds/30 min; Table 3). Among the remaining species groups, swifts/hummingbirds, woodpeckers, pigeons/doves, gamebirds, waterfowl, gulls/terns, and waterbirds had mean use values of 1.02 birds/30 min, 0.27 birds/30 min, 0.18 birds/30 min, 0.17 birds/30 min, 0.06 birds/30 min, 0.01 birds/30 min, and a single bird seen over all surveys, respectively.

Non-raptor mean use was relatively consistent throughout the spring, summer, and fall, although highest in the summer, and lower in the winter (Figure 3). Mean use for non-raptors was highest at point 16 (20.13 birds/30 min) and observations at this point included high numbers of western scrub-jay, acorn woodpecker, and flocks of bushtits (Figure 4).

Figure 3: Mean non-raptor use by survey date (2007-2008)



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 raptors was 0.98 birds/30 min. The raptors with the highest use were the red-tailed hawk (0.49 birds/30 min) and the turkey vulture (0.40 birds/30 min). Mean use for each other raptor species was 0.03 birds/30 min or fewer and included the Cooper's hawk, American kestrel, unidentified raptor, northern harrier, unidentified falcon, sharp-shinned hawk, golden eagle, prairie falcon, and osprey.

Mean use by raptors was relatively consistent throughout the survey period, although highest in the summer and lowest in the winter (Figure 5). Mean use by raptors was highest at point count location 3 (Figure 6). A total of 67 raptors were observed at point 3, of which 37 were red-tailed hawks, 28 were turkey vultures, one was a Cooper's hawk, and one was a sharp-shinned hawk.

20.13
PC 16
10.88
PC 15
6.44
PC 14
7.78
PC 9
11.15
PC 8
4.58
PC 13
6.63
PC 12
4.22
PC 7
6.04
PC 5
5.33
PC 4
10.28
PC 11
8.54
PC 10
7.07
PC 3
7.35
PC 6
13.19
PC 2
5.76
PC 1

Figure 4. Tule
Mean Non-Raptor Use by Point Count Location (2007 - 2008)

San Diego County, California
November 25, 2008

IBERDROLA RENEWABLES

1:60,000
NAD 83 UTM 11

Miles
0 0.5 1 2

Non-Raptors per 30 Minutes
- 4.22 - 5
- 5.01 - 10
- 10.01 - 15
- 15.01 - 20.13

Mean Use Value
PC# Point Count Number

- Lake/Reservoir
- Perennial Stream
- Intermittent Stream

Transportation
- Interstate
- Major Road
- Other Road

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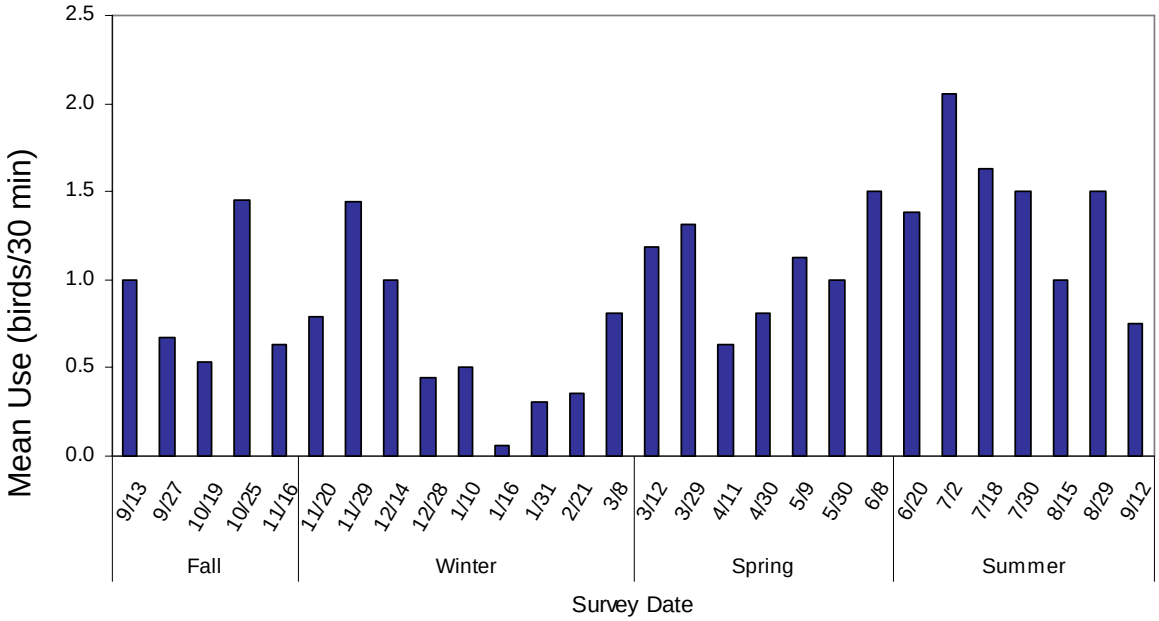
Figure 5: Mean raptor use by survey date (2007-2008)



3.4 Frequency of Occurrence

Crows and allies were present in the majority of surveys and were widely distributed throughout the Tule WRA (Tables 5a-d); the western scrub-jay (65.5 percent of all surveys) and common raven (40.3 percent of all surveys) occurred the most often (Table 4). The remaining species in this group, the Steller's jay and American crow, were detected in less than 4 percent of surveys.

Raptors were the second most commonly observed species group during surveys. Among raptors, red-tailed hawk (35.0 percent of all surveys) and turkey vulture (22.3 percent) were detected most frequently (Table 4). Turkey vultures and red-tailed hawks were widespread throughout the Tule WRA and were observed at most point count locations (Tables 5a-d). The other raptor species were detected at or less than 3.2 percent of surveys.

Songbirds were the third most common species group observed during summer surveys. The California towhee was observed most frequently (25.5 percent of all surveys), followed by the wrentit (24.0 percent), spotted towhee (22.1 percent), house finch (19.4) and California thrasher (17.2 percent of all surveys). Other songbirds were observed at lower frequencies at or less than 16.0 percent of all surveys.

Flight Height and Encounter Rate

During avian use surveys, biologists collected behavioral data for 97.1 percent of all birds observed during point count surveys. Biologists observed 56.2 percent of birds flying and collected flight height data for 98.3 percent and flight direction for 95.9 percent of observations.

0.74
PC 16
1.04
PC 15
0.78
PC 14
0.89
PC 9
0.85
PC 8
0.58
PC 13
0.79
PC 12
0.67
PC 7
1.44
PC 5
1.41
PC 4
0.64
PC 11
0.62
PC 10
2.00
PC 3
0.65
PC 6
1.38
PC 2
1.08
PC 1

Figure 6. Tule Mean Raptor Use by Point Count Location (2007 - 2008)

San Diego County, California
November 25, 2008

IBERDROLA RENEWABLES

1:60,000
NAD 83 UTM 11

Miles
0 0.5 1 2

Raptors per 30 Minutes
- 0 - 0.58
- 0.59 - 1
- 1.01 - 1.5
- 1.51 - 2

Mean Use Value
PC# Point Count Number

Lake/Reservoir
Perennial Stream
Intermittent Stream

Transportation
Interstate
Major Road
Other Road

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P:\GIS_PROJECTS\Iberdrola_Renewables\Tule\maps\Avian_Survey\2008_Survey_Reports\Tule_Figure6_Mean_RaptorUse_by_Point_Count_Location_112508.mxd - Last Accessed: 11/25/2008 - Map Scale is correct when printed at: Portrait ANSI B (11 x 17 inches)

Nest 13
Nest 14
Nest 2
Nest 1
Nest 7
Nest 12
Nest 6
Nest 5
Nest 11
Nest 8
Nest 10
Nest 9
Nest 3
Nest 4

Figure 7. Tule Raptor Nest Locations (spring 2008)

San Diego County, California
July 18, 2008

IBERDROLA RENEWABLES

1:55,000
NAD 83 UTM 11

Miles
0 0.5 1 2

Raptor Nests

- Red-tailed hawk
- Cooper's hawk
- Inactive

Lake/Reservoir

- Perennial Stream
- Intermittent Stream

Transportation

- Limited Access
- Highway
- Major Road
- Other Road

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3 MW Turbines (60-150 meter RSA)

For non-raptor species observed flying, 72.3 percent flew below the anticipated RSA, 26.1 percent flew within the anticipated RSA; and 1.5 percent flew above the anticipated RSA. For raptor species observed flying, 56.1 percent flew within the RSA, 40.6 percent flew below the RSA, and 3.3 percent flew above (Table 6a). Data on flight direction are located in Appendix A.

The white-throated swift had the highest encounter rate (0.34 birds flying within the RSA/30 min), followed by common raven (0.29 birds flying within the RSA/30 min), turkey vulture (0.25 birds flying within the RSA/30 min), and Vaux's swift and red-tailed hawk (both with 0.21 birds flying within the RSA/30 min; Table 7i). Species with encounter rates between 0.10 and 0.01 birds flying within the RSA/30 min were violet-green swallow (0.10), cliff swallow (0.06), western scrub-jay (0.03), unidentified swallow (0.02), Cooper's hawk (0.02), unidentified songbird (0.01), unidentified gull (0.01), house finch (0.01), and barn swallow (0.01;Table 7i).

1.5 MW Turbines (41.5-118.5 meter RSA)

For non-raptor species observed flying, 67.7 percent occurred below the anticipated RSA, 28.6 percent flew within the anticipated RSA; and 3.7 percent flew above the anticipated RSA. For raptor species observed flying, 66.9 percent flew within the RSA, 26.9 percent flew below the RSA, and 6.1 percent flew above (Table 6b). Data on flight direction are located in Appendix A.

The common raven had the highest encounter rate (0.39 birds flying within the RSA/30 min), followed by white-throated swift (0.30 birds flying within the RSA/30 min), turkey vulture (0.29 birds flying within the RSA/30 min), red-tailed hawk (0.25 birds flying within the RSA/30 min), and Vaux's swift (0.23 birds flying within the RSA/30 min; Table 7j). Species with encounter rates between 0.10 and 0.01 birds flying within the RSA/30 min were cliff swallow (0.07), western scrub-jay (0.03), unidentified swallow (0.02), house finch (0.02), Cooper's hawk (0.02), unidentified songbird (0.01), unidentified gull (0.01), northern rough-winged swallow (0.01), mourning dove (0.01), barn swallow (0.01), and American kestrel (0.01; Table 7j).

3.5 Incidental Observations

During summer surveys, biologists documented 83 species and 6 unidentified species groups incidentally (outside of timed point counts) for a total of 4,520 birds (Table 8). The bushtit was the most commonly recorded species incidentally within the Tule WRA (920 birds). Biologists documented 22 incidental species that were not detected during point count surveys (Table 8). Biologists observed several raptor species both as incidentals and during the point count surveys including the red-tailed hawk, turkey vulture, Cooper's hawk, American kestrel, sharp-shinned hawk, northern harrier, prairie falcon, osprey, and golden eagle.

3.6 Raptor Nest Surveys

During the early spring, biologists identified 14 nests while trees were still without leaves (Figure 7; Appendix B). Biologists revisited all nests at the end of the spring survey during the

raptor nesting period. Two of the 14 nests were active. One of those was a Cooper's hawk nest in an oak tree, and the other was a red-tailed hawk nest in a cottonwood.

4.0 DISCUSSION

4.1 Raptor Use and Encounter Rate

Overall raptor use at the Tule WRA from fall 2007 through summer 2008 was 0.98 birds/30 min and varied between seasons. Mean use was highest in the summer and spring and lowest in the fall and winter. Annual raptor use rates were moderate when compared to existing wind energy facilities throughout the country (Table 9). Compared to other facilities with seasonal raptor use rates, and not including data collected at the Tule WRA in 2005-2006, the Tule WRA ranked thirteenth out of 34 in the spring, ninth out of 32 in the summer, eighteenth out of 29 in the fall, and ninth out of 28 in winter (Table 9). High raptor use has been associated with high raptor mortality (greater than 0.40 raptors/MW/year) at wind farms (Erickson 2007); however, the strength of the conclusion is based on two data points for high raptor use (greater than 2.0 birds/30 minutes). Conversely, raptor mortality appears to be low (less than 0.20 raptors/MW/year) when raptor use is low (less than 1.0 birds/30 min; Erickson 2007). Continued monitoring and additional analysis of encounter rate and post-construction mortality data will help elucidate the relationship between these two variables.

The spatial distribution of raptors in the Tule WRA was characterized by 5 points with a mean use greater than 1.0 birds/30 min during the surveys. These points were located generally in the southern portion of the Tule WRA (points 1-5), and one in the northern portion (point 15; Figure 2). Use of the Tule WRA showed distinct seasonal patterns with use being highest in summer and lowest in winter. Raptor use was driven by the seasonal movements of the turkey vulture, which migrates from the area during the fall and winter.

Turkey vultures and red-tailed hawks were the most commonly observed raptor species in the Tule WRA and had the highest encounter rates for all raptors and for both turbine types (3 MW turbines: 0.25 and 0.21 birds flying within the RSA/30 min, respectively; 1.5 MW turbines: 0.29 and 0.25 birds flying within the RSA/30 min, respectively). Mean use for red-tailed hawks was consistent throughout the year (0.46 – 0.52 birds/30 min), whereas mean use for turkey vultures was seasonal with a low in winter (0.13 birds/30 min) and high in summer (0.87 birds/30 min). Turkey vultures have been recorded as fatalities at some wind energy facilities (Kerns and Kerlinger 2004, Kerlinger et al. 2005); however, at the Altamont WRA, mortality rates were lower than expected based on pre-construction avian use (Orloff and Flannery 1992). Turkey vulture populations are considered stable (Sauer et al. 2007), thereby minimizing the potential population-level impacts of fatalities. Mortality of red-tailed hawks due to collisions with wind turbines has been documented at multiple sites (Johnson et al. 2002, Erickson et al. 2004, Erickson 2007), and at the Altamont WRA, were higher than expected from pre-construction avian use surveys (Orloff and Flannery 1992); therefore, red-tailed hawk mortality events may occur at the Tule WRA. However, the overall low mean use of red-tailed hawks within the WRA coupled with a large population (Sauer et al. 2007) make it unlikely that mortality of red-tailed hawks would have population-level impacts.

The Cooper's hawk, American kestrel, northern harrier, sharp-shinned hawk, golden eagle, prairie falcon, osprey, and an unidentified falcon and raptor were also observed at the Tule WRA (Table 3). All of these species had relatively low encounter rates (0.02 or fewer birds

flying within the RSA/30 min) due to the fact that they were not very abundant and did not commonly fly within the RSA (Tables 7i and 7j). Hence, the likelihood of mortality is low, but if mortality occurred it could reduce local populations. No raptors observed during the surveys are federally or state listed as threatened or endangered.

When comparing the two proposed turbine types, encounter rates were higher for the 1.5 MW turbines based on the fact that more birds flew within the RSA. When analyzing flight heights with the 3 MW turbine (60-150 meter above ground), 56.1 percent of raptors flew within the RSA, compared to 66.9 percent within the 1.5 MW turbine RSA (41.5-118.5 meter above ground). Encounter rates during the surveys suggest that the 3 MW turbines may cause fewer raptor mortalities than the 1.5 MW turbines.

An active red-tailed hawk nest and a Cooper's hawk nest indicate that the Tule WRA is suitable raptor breeding habitat. Turbines should be sited away from nests to avoid impacts to nesting raptors and juvenile birds.

4.2 Non-Raptor Use and Encounter Rate

Overall use by non-raptors at the Tule WRA was 8.37 birds/30 min (Table 3). Overall non-raptor use at the Tule WRA varied between seasons, and was highest in the summer and lowest in the winter. Annual non-raptor use rates were low when compared to existing wind energy facilities throughout the country (Table 9). Compared to other facilities with seasonal non-raptor use rates, and not including data collected at the Tule WRA in 2005-2006, the Tule WRA ranked eighteenth out of 20 in the spring, tenth out of 19 in the summer, tenth out of 15 in the fall, and fourteenth of 15 in winter (Table 9). 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 and crows and allies had the second highest mean use.

The spatial distribution of non-raptors in the Tule WRA was characterized by 5 points with a mean use greater than 10.0 birds/30 min during the surveys. These points were located throughout the Tule WRA (points 2, 8, 11, 15, and 16; Figure 2). Mean use for non-raptors was highest at point 16 because the point is located next to a riparian area. Riparian areas are particularly valuable habitats for wildlife. Riparian areas generally have more vigorous plant growth and greater plant variety than the surrounding uplands and in turn support much higher insect populations. Consequently, riparian areas are much more valuable as feeding areas for songbirds, especially during the nesting season. The dense vegetation of riparian zones also provides many wildlife species with cover that may not exist in the adjacent uplands. In addition, the structural diversity creates many niches, which offers homes to a great variety of wildlife species.

Use of the Tule WRA showed seasonal patterns with use being highest in the summer and fall, and lower in the spring and winter. Non-raptor use was driven by Vaux's swift migrating through the WRA in the fall (mean use of 1.99 birds/30 min versus 0.00 birds/30 min for all other seasons), and a number of songbirds being present in the summer during the breeding season (e.g., western scrub-jay, house finch).

The white-throated swift had the highest encounter rate for the 3 MW turbine type, and second highest for the 1.5 MW turbine type. White-throated swifts have been found as mortalities at existing wind energy facilities, although in low numbers (Erickson et al. 2000, Anderson et al.

2005, Kerlinger et al. 2005). The stability of white-throated swift populations is relatively unknown, due to difficulty of detection and the patchy distribution of this species. However, a long-term decrease has been noted at Palos Verdes, CA between 1972 and 1996 for unknown reasons, but the range is thought to be expanding elsewhere in British Columbia, California, and Texas (Ryan and Collins 2000). Population numbers in California are estimated to be about 50,000 birds (PIF 2008); hence, due to the relatively low numbers of birds seen in the Tule WRA (214 individuals over four survey seasons) any mortality caused by this wind energy facility would be unlikely to cause population level impacts.

Common ravens had the highest encounter rate for the 1.5 MW turbine type, and second highest for the 3 MW turbine type; and Vaux's swifts had the third highest encounter rates for non-raptor species for both turbine types. Mean use for common ravens was relatively consistent throughout the year (0.61-1.37 birds/30 min), whereas mean use for Vaux's swifts was seasonal with a high mean use in the fall (1.99 birds/30 min) and no presence the rest of the year. Common ravens have been found as mortalities at existing wind energy facilities in low numbers (Thelander et al. 2003, Anderson et al. 2005). A post-construction mortality study at the Stateline project in Oregon and Washington found that common ravens were commonly seen in the area of wind turbines but were not found as mortalities (Erickson et al. 2004). Common raven populations appear to be relatively widespread and stable (Boarman and Heinrich 1999). Vaux's swifts have not been documented as mortalities at any existing wind energy facilities, although other species of swift have been found dead (Anderson et al. 2005, Kerlinger et al. 2005, Erickson et al. 2000). The Vaux's swift has declined by 2.1 percent per year in California from 1980–2006 (Sauer et al. 2007), and appears to be declining throughout its range. Vaux's swifts do not breed within the vicinity of the Tule WRA, and the birds seen were observed in large flocks and were most likely migrating (Bull and Collins 2007). Mortalities may occur at this wind energy facility and could cause local level impacts but would not likely cause population level impacts to either common ravens or Vaux's swifts.

Aside from the species discussed above, the three most common species, the western scrub jay (1.77 birds/30 min), white-throated swift (0.52 birds/30 min), and house finch (0.44 birds/30 min) all had relatively low encounter rates (0.03 birds or fewer flying within the RSA/30 min) because they did not regularly fly through the RSA. Most of the other local resident non-raptors were observed flying below the RSA and thus had low encounter rates as well.

When comparing the two proposed turbine types, encounter rates were higher for the 1.5 MW turbines based on the fact that more birds flew within the RSA. When analyzing flight heights with the 3 MW turbine (60-150 meter above ground), 26.1 percent of non-raptors flew within the RSA, compared to 28.6 percent within the 1.5 MW turbine RSA (41.5-118.5 meter above ground). Encounter rates during the summer surveys suggest that the 3 MW turbines may cause fewer non-raptor mortalities than the 1.5 MW turbines.

4.3 Comparison of 2007-2008 Data to 2005-2006 Data

Summer point count surveys were conducted approximately every two weeks between March 25, 2005 and March 10, 2006 at 14 point count locations, compared to the data analyzed in this report between September 13, 2007 and September 12, 2008 at 16 point count locations. Mean avian use was in the moderate range during both 2005-2006 and 2007-2008 surveys (11.67 and 9.35 birds/30 min, respectively). Although the number of species was similar, more birds were detected in 2007-2008 than 2005-2006 (3,851 versus 3,500 birds, respectively). The most

commonly detected birds in 2005 (western scrub jay, common raven, and bushtit) were also detected regularly in 2007-2008. Avian use among species groups was similar although songbird use was 6.54 and 3.87 birds/30 min, respectively, during summer 2005-2006 and 2007-2008. Species with the highest encounter rates during both years included common raven, white-throated swift, turkey vulture, and red-tailed hawk.

Raptor mean use during 2005-2006 was lower than 2007-2008 (0.58 birds/30 min, 0.98 birds/30 min, respectively). Similar to 2007-2008, the red-tailed hawk and turkey vulture had the highest mean use (0.29 and 0.21 birds/30 min, respectively) of raptors detected during the 2005-2006 surveys. The encounter rates for turkey vulture and red-tailed hawk were between 0.47 and 0.02 birds flying in the RSA/30 min for both 3 MW and 1.5 MW turbines in 2005-2006; and lower than 2008 (between 0.64 and 0.04 birds flying within the RSA/30 minutes for both 3 MW and 1.5 MW turbines). Overall, these rates can be considered moderately low in both years.

4.4 Listed and Sensitive Species

No species listed as candidate, threatened, or endangered under the Endangered Species Act of 1973 were observed during avian surveys. However, the willow flycatcher, a species listed as threatened under the California Endangered Species Act was observed twice incidentally. The southwestern willow flycatcher, a federally endangered sub-species of willow flycatcher is known to occur in the area of the Tule WRA. Willow flycatchers breed in riparian vegetation and it is unlikely that this habitat will be disturbed during project development. Additionally, the California Department of Fish and Game (CDFG 2008) explains "Species of Special Concern (SSC) status applies to animals not listed under the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the department, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under federal and state endangered species laws and cumbersome recovery efforts that might ultimately be required." California SSC that occurred during point count and incidental surveys were loggerhead shrike (1 point count; 5 incidental), northern harrier (3 point count; 8 incidental), Vaux's swift (135 point count; 28 incidental), yellow warbler (1 point count), and olive-sided flycatcher (1 incidental). Cooper's hawk, sharp-shinned hawk, merlin and osprey were identified as species of concern in previous project reports. However, these species were removed from California's species of concern list when the list was updated in February 2008.

Loggerhead shrike, northern harrier, and Vaux's swift were all seen in the fall or winter, and yellow warbler and olive-sided flycatcher were seen in the summer. However, they were seen only once each and thus are unlikely to be breeding in the area. Although 135 Vaux's swifts were observed within the WRA, overall mean use was only 0.33 birds/30 min. There is a potential for mortality considering that more than half of the Vaux's swifts observed flew within the RSA, but the species does not breed in southern California. Although they are fairly common throughout California during spring and fall migrations, their occurrence is unpredictable. Thus, population level consequences are not expected for Vaux's swifts at the Tule WRA

The golden eagle, protected under the Bald and Golden Eagle Protection Act (BGEPA), was detected twice during surveys and once incidentally. Golden eagles are susceptible to mortality from wind turbines and have experienced mortality rates higher than expected from pre-construction avian use surveys in the Altamont Pass area of California. The BGEPA prohibits the killing or disturbance of any golden eagle or golden eagle nest. While only three golden eagles were detected in the WRA, its presence implies that suitable habitat exists in the WRA.

4.5 Tule Project Area Conclusions

Non-raptor use at the Tule WRA ranked sixth of six studies, indicating relatively low mean use (Table 9). Although mortality events will likely occur at the Tule WRA, the most commonly observed species – the western scrub-jay and common raven – are widespread species and have relatively stable populations (Sauer et al. 2007). Therefore, individual mortalities are unlikely to have population-level consequences or receive a high level of scrutiny from state or federal wildlife agencies. Nocturnal migrants may pass through the Tule WRA and would not be detected by the survey methods used in this study if the birds did not stop over within the WRA. However, mortality of nocturnal migrants at the Tule WRA is not expected to have population-level implications because less than 0.01 percent of nocturnal migrants that fly through wind farms are killed (Erickson 2007).

Raptor use at the Tule WRA was moderate when compared to other wind generation facilities, ranking fourth out of six studies (Table 9). Moderate raptor use at the Tule WRA suggests that raptor mortality is anticipated to be moderate; however, mortality rates are variable between species and pre-construction mean use surveys may not equate to post-construction mortality. Turkey vultures and red-tailed hawks were the most common raptors observed at the Tule WRA. Mortalities of both species have occurred at existing wind farms (Kerns and Kerlinger 2004, Anderson et al. 2005, Kerlinger et al. 2005); however, the stable populations make it unlikely that local mortalities would have a population-level effect. These impacts likely could be minimized if turbines are sited away from areas of high raptor use, active raptor nests, saddles along ridgelines, and ridge edges.

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Susan Hurley/ Rich Young	12/16/08
Report Author	Date
Karl Kosciuch	12/31/08
Peer Review #1	Date
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Peer Review #2	Date

TABLES

Table 1. Tule Wind Resource Area 2007-2008 point count survey dates.

	Survey Number	Date
Fall 2007		
	1	9/13/07
	1	9/21/07
	2	9/26/07
	2	9/27/07
	2	9/28/07
	2	10/4/07
	3	10/5/07
	3	10/10/07
	3	10/11/07
	3	10/17/07
	3	10/18/07
	3	10/19/07
	4	10/25/07
	4	10/26/07
	4	10/31/07
	4	11/1/07
	5	11/14/07
	5	11/15/07
	5	11/16/07
Winter 2007		
	1	11/19/07
	1	11/20/07
	2	11/28/07
	2	11/29/07
	2	12/6/07
	3	12/12/07
	3	12/13/07
	3	12/14/07
	4	12/27/07
	4	12/28/07
	4	12/29/07
	5	1/9/08
	5	1/10/08
	5	1/11/08
	6	1/16/08
	6	1/17/08

Table 1. Tule Wind Resource Area 2007-2008 point count survey dates.

	Survey Number	Date
	6	1/23/08
	6	1/24/08
	7	1/30/08
	7	1/31/08
	7	2/6/08
	7	2/7/08
	8	2/13/08
	8	2/21/08
	9	2/27/08
	9	2/28/08
	9	3/7/08
	9	3/8/08
Spring 2008		
	1	3/12/08
	1	3/13/08
	1	3/22/08
	1	3/23/08
	1	3/24/08
	2	3/28/08
	2	3/29/08
	2	3/31/08
	2	4/1/08
	3	4/10/08
	3	4/11/08
	3	4/17/08
	3	4/18/08
	4	4/26/08
	4	4/29/08
	4	4/30/08
	4	5/1/08
	4	5/2/08
	5	5/8/08
	5	5/9/08
	5	5/15/08
	5	5/16/08
	6	5/22/08
	6	5/29/08

Table 1. Tule Wind Resource Area 2007-2008 point count survey dates.

	Survey Number	Date
	6	5/30/08
	7	6/5/08
	7	6/6/08
	7	6/7/08
	7	6/8/08
	7	6/12/08
	7	6/13/08
	7	6/18/08
Summer 2008		
	1	6/19/08
	1	6/20/08
	1	6/24/08
	1	6/25/08
	2	7/2/08
	2	7/3/08
	2	7/9/08
	2	7/10/08
	3	7/17/08
	3	7/18/08
	3	7/22/08
	3	7/23/08
	4	7/30/08
	4	7/31/08
	4	8/6/08
	4	8/7/08
	5	8/14/08
	5	8/15/08
	5	8/18/08
	5	8/19/08
	6	8/29/08
	6	9/5/08
	7	9/11/08
	7	9/12/08

Table 2. Avian species observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
western scrub-jay	137	118	2.01	190	147	1.39	146	122	1.36	256	149	2.56	**729**	**536**	**1.77**
common raven	93	47	1.37	100	62	0.73	142	92	1.33	61	29	0.61	**396**	**230**	**0.96**
white-throated swift	74	15	1.09	11	7	0.08	34	10	0.32	95	18	0.95	**214**	**50**	**0.52**
red-tailed hawk	34	29	0.50	71	65	0.52	49	40	0.46	48	41	0.48	**202**	**175**	**0.49**
house finch	16	9	0.24	11	7	0.08	41	23	0.38	115	58	1.15	**183**	**97**	**0.44**
turkey vulture	9	8	0.13	10	8	0.07	60	51	0.56	87	56	0.87	**166**	**123**	**0.40**
California towhee	23	19	0.34	34	29	0.25	39	36	0.36	55	44	0.55	**151**	**128**	**0.37**
wrentit	29	28	0.43	23	22	0.17	44	43	0.41	54	43	0.54	**150**	**136**	**0.36**
Vaux's swift	135	7	1.99	0	0	0.00	0	0	0.00	0	0	0.00	**135**	**7**	**0.33**
spotted towhee	6	6	0.09	20	17	0.15	61	59	0.57	34	31	0.34	**121**	**113**	**0.29**
California thrasher	6	6	0.09	43	41	0.31	36	35	0.34	14	11	0.14	**99**	**93**	**0.24**
bushtit	15	2	0.22	23	3	0.17	13	3	0.12	32	3	0.32	**83**	**11**	**0.20**
Bewick's wren	11	11	0.16	10	9	0.07	40	40	0.37	19	16	0.19	**80**	**76**	**0.19**
lesser goldfinch	13	7	0.19	6	3	0.04	5	3	0.05	53	17	0.53	**77**	**30**	**0.19**
mourning dove	0	0	0.00	3	3	0.02	25	22	0.23	44	33	0.44	**72**	**58**	**0.17**
western bluebird	19	3	0.28	34	9	0.25	4	2	0.04	14	6	0.14	**71**	**20**	**0.17**
California quail	20	3	0.29	13	6	0.09	23	17	0.21	13	8	0.13	**69**	**34**	**0.17**
phainopepla	2	2	0.03	3	3	0.02	10	5	0.09	44	35	0.44	**59**	**45**	**0.14**
black-throated sparrow	0	0	0.00	5	3	0.04	20	18	0.19	29	22	0.29	**54**	**43**	**0.13**
northern flicker	6	5	0.09	12	11	0.09	10	9	0.09	17	17	0.17	**45**	**42**	**0.11**
unidentified hummingbird	4	4	0.06	0	0	0.00	4	3	0.04	35	29	0.35	**43**	**36**	**0.10**
acorn woodpecker	2	1	0.03	6	2	0.04	10	6	0.09	23	13	0.23	**41**	**22**	**0.10**

* Mean use=# birds/30 min.

Table 2. Avian species observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
violet-green swallow	0	0	0.00	40	1	0.29	0	0	0.00	0	0	0.00	**40**	**1**	**0.10**
oak titmouse	1	1	0.01	12	8	0.09	14	8	0.13	13	9	0.13	**40**	**26**	**0.10**
ash-throated flycatcher	0	0	0.00	0	0	0.00	16	14	0.15	19	17	0.19	**35**	**31**	**0.08**
dark-eyed junco	12	5	0.18	15	6	0.11	6	3	0.06	0	0	0.00	**33**	**14**	**0.08**
cliff swallow	3	1	0.04	0	0	0.00	22	3	0.21	8	4	0.08	**33**	**8**	**0.08**
sage sparrow	0	0	0.00	0	0	0.00	1	1	0.01	25	12	0.25	**26**	**13**	**0.06**
unidentified songbird	12	9	0.18	4	3	0.03	8	7	0.07	1	1	0.01	**25**	**20**	**0.06**
mallard	0	0	0.00	24	1	0.18	0	0	0.00	0	0	0.00	**24**	**1**	**0.06**
black-chinned sparrow	0	0	0.00	0	0	0.00	11	10	0.10	13	10	0.13	**24**	**20**	**0.06**
rock wren	2	2	0.03	0	0	0.00	0	0	0.00	20	18	0.20	**22**	**20**	**0.05**
black-headed grosbeak	0	0	0.00	0	0	0.00	9	8	0.08	11	10	0.11	**20**	**18**	**0.05**
Anna’s hummingbird	1	1	0.01	0	0	0.00	1	1	0.01	16	14	0.16	**18**	**16**	**0.04**
Steller's jay	0	0	0.00	2	2	0.01	7	3	0.07	7	4	0.07	**16**	**9**	**0.04**
Nuttall's woodpecker	1	1	0.01	1	1	0.01	1	1	0.01	12	11	0.12	**15**	**14**	**0.04**
fox sparrow	8	4	0.12	6	5	0.04	0	0	0.00	0	0	0.00	**14**	**9**	**0.03**
white-crowned sparrow	5	2	0.07	5	3	0.04	3	1	0.03	0	0	0.00	**13**	**6**	**0.03**
Cooper's hawk	6	6	0.09	0	0	0.00	2	2	0.02	5	5	0.05	**13**	**13**	**0.03**
American crow	5	3	0.07	0	0	0.00	0	0	0.00	7	4	0.07	**12**	**7**	**0.03**
unidentified swallow	0	0	0.00	0	0	0.00	0	0	0.00	10	3	0.10	**10**	**3**	**0.02**
northern mockingbird	0	0	0.00	0	0	0.00	3	3	0.03	7	5	0.07	**10**	**8**	**0.02**
yellow-rumped warbler	0	0	0.00	0	0	0.00	9	7	0.08	0	0	0.00	**9**	**7**	**0.02**
mountain bluebird	0	0	0.00	9	2	0.07	0	0	0.00	0	0	0.00	**9**	**2**	**0.02**

* Mean use=# birds/30 min.

Table 2. Avian species observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
black-chinned hummingbird	0	0	0.00	0	0	0.00	7	7	0.07	2	2	0.02	**9**	**9**	**0.02**
Lawrence's goldfinch	0	0	0.00	0	0	0.00	0	0	0.00	8	4	0.08	**8**	**4**	**0.02**
northern rough-winged swallow	5	1	0.07	0	0	0.00	0	0	0.00	2	1	0.02	**7**	**2**	**0.02**
ladder-backed woodpecker	0	0	0.00	4	4	0.03	0	0	0.00	3	3	0.03	**7**	**7**	**0.02**
American kestrel	1	1	0.01	2	2	0.01	2	2	0.02	2	2	0.02	**7**	**7**	**0.02**
western tanager	0	0	0.00	0	0	0.00	0	0	0.00	6	3	0.06	**6**	**3**	**0.01**
unidentified sparrow	1	1	0.01	0	0	0.00	0	0	0.00	5	4	0.05	**6**	**5**	**0.01**
barn swallow	5	2	0.07	0	0	0.00	0	0	0.00	1	1	0.01	**6**	**3**	**0.01**
western kingbird	0	0	0.00	0	0	0.00	0	0	0.00	5	5	0.05	**5**	**5**	**0.01**
unidentified raptor	2	1	0.03	3	3	0.02	0	0	0.00	0	0	0.00	**5**	**4**	**0.01**
ruby-crowned kinglet	2	2	0.03	1	1	0.01	2	2	0.02	0	0	0.00	**5**	**5**	**0.01**
orange-crowned warbler	0	0	0.00	0	0	0.00	5	5	0.05	0	0	0.00	**5**	**5**	**0.01**
mountain chickadee	0	0	0.00	4	1	0.03	1	1	0.01	0	0	0.00	**5**	**2**	**0.01**
house wren	0	0	0.00	0	0	0.00	1	1	0.01	4	4	0.04	**5**	**5**	**0.01**
horned lark	0	0	0.00	0	0	0.00	5	2	0.05	0	0	0.00	**5**	**2**	**0.01**
Wilson's warbler	0	0	0.00	0	0	0.00	2	2	0.02	2	2	0.02	**4**	**4**	**0.01**
western wood-pewee	0	0	0.00	0	0	0.00	2	1	0.02	2	2	0.02	**4**	**3**	**0.01**
Scott's oriole	0	0	0.00	0	0	0.00	2	2	0.02	2	2	0.02	**4**	**4**	**0.01**
blue-gray gnatcatcher	0	0	0.00	0	0	0.00	2	1	0.02	2	2	0.02	**4**	**3**	**0.01**
unidentified gull	0	0	0.00	3	1	0.02	0	0	0.00	0	0	0.00	**3**	**1**	**0.01**
pacific-slope flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	2	2	0.02	**3**	**3**	**0.01**
northern harrier	1	1	0.01	2	2	0.01	0	0	0.00	0	0	0.00	**3**	**3**	**0.01**

* Mean use=# birds/30 min.

Table 2. Avian species observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
unidentified falcon	0	0	0.00	0	0	0.00	0	0	0.00	2	1	0.02	**2**	**1**	**0.00**
unidentified empidonax flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	1	1	0.01	**2**	**2**	**0.00**
Townsend's Warbler	0	0	0.00	0	0	0.00	2	2	0.02	0	0	0.00	**2**	**2**	**0.00**
sharp-shinned hawk	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.01	**2**	**2**	**0.00**
savannah sparrow	0	0	0.00	0	0	0.00	0	0	0.00	2	1	0.02	**2**	**1**	**0.00**
golden eagle	1	1	0.01	0	0	0.00	1	1	0.01	0	0	0.00	**2**	**2**	**0.00**
canyon wren	0	0	0.00	0	0	0.00	1	1	0.01	1	1	0.01	**2**	**2**	**0.00**
band-tailed pigeon	0	0	0.00	1	1	0.01	0	0	0.00	1	1	0.01	**2**	**2**	**0.00**
yellow warbler	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
unidentified piranga tanager	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
unidentified woodpecker	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
unidentified warbler	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
unidentified quail	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
Say's phoebe	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
rufous-crowned sparrow	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
prairie falcon	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
osprey	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
Nashville warbler	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
loggerhead shrike	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
Hammond’s flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
downy woodpecker	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
double-crested cormorant	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**

* Mean use=# birds/30 min.

Table 2. Avian species observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Cassin's kingbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
black-tailed gnatcatcher	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
blue grosbeak	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
brown-headed cowbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
Grand Total	**733**	**380**	**10.78**	**766**	**504**	**5.59**	**972**	**749**	**9.08**	**1380**	**859**	**13.80**	**3851**	**2492**	**9.35**

* Mean use=# birds/30 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Songbirds															
house finch	16	9	0.24	11	7	0.08	41	23	0.38	115	58	1.15	**183**	**97**	**0.44**
California towhee	23	19	0.34	34	29	0.25	39	36	0.36	55	44	0.55	**151**	**128**	**0.37**
wrentit	29	28	0.43	23	22	0.17	44	43	0.41	54	43	0.54	**150**	**136**	**0.36**
spotted towhee	6	6	0.09	20	17	0.15	61	59	0.57	34	31	0.34	**121**	**113**	**0.29**
California thrasher	6	6	0.09	43	41	0.31	36	35	0.34	14	11	0.14	**99**	**93**	**0.24**
bushtit	15	2	0.22	23	3	0.17	13	3	0.12	32	3	0.32	**83**	**11**	**0.20**
Bewick's wren	11	11	0.16	10	9	0.07	40	40	0.37	19	16	0.19	**80**	**76**	**0.19**
lesser goldfinch	13	7	0.19	6	3	0.04	5	3	0.05	53	17	0.53	**77**	**30**	**0.19**
western bluebird	19	3	0.28	34	9	0.25	4	2	0.04	14	6	0.14	**71**	**20**	**0.17**
phainopepla	2	2	0.03	3	3	0.02	10	5	0.09	44	35	0.44	**59**	**45**	**0.14**
black-throated sparrow	0	0	0.00	5	3	0.04	20	18	0.19	29	22	0.29	**54**	**43**	**0.13**
violet-green swallow	0	0	0.00	40	1	0.29	0	0	0.00	0	0	0.00	**40**	**1**	**0.10**
oak titmouse	1	1	0.01	12	8	0.09	14	8	0.13	13	9	0.13	**40**	**26**	**0.10**
ash-throated flycatcher	0	0	0.00	0	0	0.00	16	14	0.15	19	17	0.19	**35**	**31**	**0.08**
dark-eyed junco	12	5	0.18	15	6	0.11	6	3	0.06	0	0	0.00	**33**	**14**	**0.08**
cliff swallow	3	1	0.04	0	0	0.00	22	3	0.21	8	4	0.08	**33**	**8**	**0.08**
sage sparrow	0	0	0.00	0	0	0.00	1	1	0.01	25	12	0.25	**26**	**13**	**0.06**
unidentified songbird	12	9	0.18	4	3	0.03	8	7	0.07	1	1	0.01	**25**	**20**	**0.06**
black-chinned sparrow	0	0	0.00	0	0	0.00	11	10	0.10	13	10	0.13	**24**	**20**	**0.06**
rock wren	2	2	0.03	0	0	0.00	0	0	0.00	20	18	0.20	**22**	**20**	**0.05**
black-headed grosbeak	0	0	0.00	0	0	0.00	9	8	0.08	11	10	0.11	**20**	**18**	**0.05**
fox sparrow	8	4	0.12	6	5	0.04	0	0	0.00	0	0	0.00	**14**	**9**	**0.03**

* Mean use=# birds/30 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
white-crowned sparrow	5	2	0.07	5	3	0.04	3	1	0.03	0	0	0.00	**13**	**6**	**0.03**
unidentified swallow	0	0	0.00	0	0	0.00	0	0	0.00	10	3	0.10	**10**	**3**	**0.02**
northern mockingbird	0	0	0.00	0	0	0.00	3	3	0.03	7	5	0.07	**10**	**8**	**0.02**
yellow-rumped warbler	0	0	0.00	0	0	0.00	9	7	0.08	0	0	0.00	**9**	**7**	**0.02**
mountain bluebird	0	0	0.00	9	2	0.07	0	0	0.00	0	0	0.00	**9**	**2**	**0.02**
Lawrence's goldfinch	0	0	0.00	0	0	0.00	0	0	0.00	8	4	0.08	**8**	**4**	**0.02**
northern rough-winged swallow	5	1	0.07	0	0	0.00	0	0	0.00	2	1	0.02	**7**	**2**	**0.02**
western tanager	0	0	0.00	0	0	0.00	0	0	0.00	6	3	0.06	**6**	**3**	**0.01**
unidentified sparrow	1	1	0.01	0	0	0.00	0	0	0.00	5	4	0.05	**6**	**5**	**0.01**
barn swallow	5	2	0.07	0	0	0.00	0	0	0.00	1	1	0.01	**6**	**3**	**0.01**
western kingbird	0	0	0.00	0	0	0.00	0	0	0.00	5	5	0.05	**5**	**5**	**0.01**
ruby-crowned kinglet	2	2	0.03	1	1	0.01	2	2	0.02	0	0	0.00	**5**	**5**	**0.01**
orange-crowned warbler	0	0	0.00	0	0	0.00	5	5	0.05	0	0	0.00	**5**	**5**	**0.01**
mountain chickadee	0	0	0.00	4	1	0.03	1	1	0.01	0	0	0.00	**5**	**2**	**0.01**
house wren	0	0	0.00	0	0	0.00	1	1	0.01	4	4	0.04	**5**	**5**	**0.01**
horned lark	0	0	0.00	0	0	0.00	5	2	0.05	0	0	0.00	**5**	**2**	**0.01**
Wilson's warbler	0	0	0.00	0	0	0.00	2	2	0.02	2	2	0.02	**4**	**4**	**0.01**
western wood-pewee	0	0	0.00	0	0	0.00	2	1	0.02	2	2	0.02	**4**	**3**	**0.01**
Scott's oriole	0	0	0.00	0	0	0.00	2	2	0.02	2	2	0.02	**4**	**4**	**0.01**
blue-gray gnatcatcher	0	0	0.00	0	0	0.00	2	1	0.02	2	2	0.02	**4**	**3**	**0.01**
pacific-slope flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	2	2	0.02	**3**	**3**	**0.01**
unidentified empidonax flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	1	1	0.01	**2**	**2**	**0.00**
Townsend's Warbler	0	0	0.00	0	0	0.00	2	2	0.02	0	0	0.00	**2**	**2**	**0.00**

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Table 3. Avian mean use, by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
savannah sparrow	0	0	0.00	0	0	0.00	0	0	0.00	2	1	0.02	**2**	**1**	**0.00**
canyon wren	0	0	0.00	0	0	0.00	1	1	0.01	1	1	0.01	**2**	**2**	**0.00**
yellow warbler	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
unidentified piranga tanager	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
unidentified warbler	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
Say's phoebe	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
rufous-crowned sparrow	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
Nashville warbler	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
loggerhead shrike	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
Hammond’s flycatcher	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
Cassin's kingbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
black-tailed gnatcatcher	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
blue grosbeak	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
brown-headed cowbird	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
Group Total	**199**	**126**	**2.93**	**308**	**176**	**2.25**	**444**	**356**	**4.15**	**642**	**417**	**6.42**	**1593**	**1075**	**3.87**
Crows and Allies															
western scrub-jay	137	118	2.01	190	147	1.39	146	122	1.36	256	149	2.56	**729**	**536**	**1.77**
common raven	93	47	1.37	100	62	0.73	142	92	1.33	61	29	0.61	**396**	**230**	**0.96**
Steller's jay	0	0	0.00	2	2	0.01	7	3	0.07	7	4	0.07	**16**	**9**	**0.04**
American crow	5	3	0.07	0	0	0.00	0	0	0.00	7	4	0.07	**12**	**7**	**0.03**
Group Total	**235**	**168**	**3.46**	**292**	**211**	**2.13**	**295**	**217**	**2.76**	**331**	**186**	**3.31**	**1153**	**782**	**2.80**
Swifts/Hummingbirds															
white-throated swift	74	15	1.09	11	7	0.08	34	10	0.32	95	18	0.95	**214**	**50**	**0.52**

* Mean use=# birds/30 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
Vaux's swift	135	7	1.99	0	0	0.00	0	0	0.00	0	0	0.00	**135**	**7**	**0.33**
unidentified hummingbird	4	4	0.06	0	0	0.00	4	3	0.04	35	29	0.35	**43**	**36**	**0.10**
Anna's hummingbird	1	1	0.01	0	0	0.00	1	1	0.01	16	14	0.16	**18**	**16**	**0.04**
black-chinned hummingbird	0	0	0.00	0	0	0.00	7	7	0.07	2	2	0.02	**9**	**9**	**0.02**
Group Total	**214**	**27**	**3.15**	**11**	**7**	**0.08**	**46**	**21**	**0.43**	**148**	**63**	**1.48**	**419**	**118**	**1.02**
Raptors/Vultures/Owls															
red-tailed hawk	34	29	0.50	71	65	0.52	49	40	0.46	48	41	0.48	**202**	**175**	**0.49**
turkey vulture	9	8	0.13	10	8	0.07	60	51	0.56	87	56	0.87	**166**	**123**	**0.40**
Cooper's hawk	6	6	0.09	0	0	0.00	2	2	0.02	5	5	0.05	**13**	**13**	**0.03**
American kestrel	1	1	0.01	2	2	0.01	2	2	0.02	2	2	0.02	**7**	**7**	**0.02**
unidentified raptor	2	1	0.03	3	3	0.02	0	0	0.00	0	0	0.00	**5**	**4**	**0.01**
northern harrier	1	1	0.01	2	2	0.01	0	0	0.00	0	0	0.00	**3**	**3**	**0.01**
unidentified falcon	0	0	0.00	0	0	0.00	0	0	0.00	2	1	0.02	**2**	**1**	**0.00**
sharp-shinned hawk	1	1	0.01	0	0	0.00	0	0	0.00	1	1	0.01	**2**	**2**	**0.00**
golden eagle	1	1	0.01	0	0	0.00	1	1	0.01	0	0	0.00	**2**	**2**	**0.00**
prairie falcon	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
osprey	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
Group Total	**55**	**48**	**0.81**	**88**	**80**	**0.64**	**116**	**98**	**1.08**	**145**	**106**	**1.45**	**404**	**332**	**0.98**
Woodpeckers															
northern flicker	6	5	0.09	12	11	0.09	10	9	0.09	17	17	0.17	**45**	**42**	**0.11**
acorn woodpecker	2	1	0.03	6	2	0.04	10	6	0.09	23	13	0.23	**41**	**22**	**0.10**
Nuttall's woodpecker	1	1	0.01	1	1	0.01	1	1	0.01	12	11	0.12	**15**	**14**	**0.04**
ladder-backed woodpecker	0	0	0.00	4	4	0.03	0	0	0.00	3	3	0.03	**7**	**7**	**0.02**

* Mean use=# birds/30 min.

Table 3. Avian mean use, by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007			Winter 2007-2008			Spring 2008			Summer 2008			Overall		
	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*	# Birds	# Obs.	Mean Use*
unidentified woodpecker	0	0	0.00	0	0	0.00	0	0	0.00	1	1	0.01	**1**	**1**	**0.00**
downy woodpecker	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
Group Total	**9**	**7**	**0.13**	**23**	**18**	**0.17**	**22**	**17**	**0.21**	**56**	**45**	**0.56**	**110**	**87**	**0.27**
Pigeons/Doves															
mourning dove	0	0	0.00	3	3	0.02	25	22	0.23	44	33	0.44	**72**	**58**	**0.17**
band-tailed pigeon	0	0	0.00	1	1	0.01	0	0	0.00	1	1	0.01	**2**	**2**	**0.00**
Group Total	**0**	**0**	**0.00**	**4**	**4**	**0.03**	**25**	**22**	**0.23**	**45**	**34**	**0.45**	**74**	**60**	**0.18**
Gamebirds															
California quail	20	3	0.29	13	6	0.09	23	17	0.21	13	8	0.13	**69**	**34**	**0.17**
unidentified quail	1	1	0.01	0	0	0.00	0	0	0.00	0	0	0.00	**1**	**1**	**0.00**
Group Total	**21**	**4**	**0.31**	**13**	**6**	**0.09**	**23**	**17**	**0.21**	**13**	**8**	**0.13**	**70**	**35**	**0.17**
Waterfowl															
mallard	0	0	0.00	24	1	0.18	0	0	0.00	0	0	0.00	**24**	**1**	**0.06**
Group Total	**0**	**0**	**0.00**	**24**	**1**	**0.18**	**0**	**0**	**0.00**	**0**	**0**	**0.00**	**24**	**1**	**0.06**
Gulls/Terns															
unidentified gull	0	0	0.00	3	1	0.02	0	0	0.00	0	0	0.00	**3**	**1**	**0.01**
Group Total	**0**	**0**	**0.00**	**3**	**1**	**0.02**	**0**	**0**	**0.00**	**0**	**0**	**0.00**	**3**	**1**	**0.01**
Waterbirds															
double-crested cormorant	0	0	0.00	0	0	0.00	1	1	0.01	0	0	0.00	**1**	**1**	**0.00**
Group Total	**0**	**0**	**0.00**	**0**	**0**	**0.00**	**1**	**1**	**0.01**	**0**	**0**	**0.00**	**1**	**1**	**0.00**
Grand Total	**733**	**380**	**10.78**	**766**	**504**	**5.59**	**972**	**749**	**9.08**	**1380**	**859**	**13.80**	**3851**	**2492**	**9.35**

* Mean use=# birds/30 min.

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group / Species	Fall 2007		Winter 2007-2008		Spring 2008		Summer 2008		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										
house finch	2.2	13.2	1.4	5.1	4.2	17.8	8.3	45.0	**4.8**	**19.4**
California towhee	3.1	22.1	4.4	17.5	4.0	29.9	4.0	34.0	**3.9**	**25.5**
wrentit	4.0	29.4	3.0	11.7	4.5	27.1	3.9	34.0	**3.9**	**24.0**
spotted towhee	0.8	7.4	2.6	10.2	6.3	41.1	2.5	28.0	**3.1**	**22.1**
California thrasher	0.8	7.4	5.6	21.2	3.7	26.2	1.0	9.0	**2.6**	**17.2**
bushtit	2.0	2.9	3.0	2.2	1.3	2.8	2.3	3.0	**2.2**	**2.7**
Bewick's wren	1.5	13.2	1.3	6.6	4.1	30.8	1.4	15.0	**2.1**	**16.0**
lesser goldfinch	1.8	10.3	0.8	1.5	0.5	2.8	3.8	14.0	**2.0**	**6.3**
western bluebird	2.6	4.4	4.4	5.8	0.4	1.9	1.0	4.0	**1.8**	**4.1**
phainopepla	0.3	2.9	0.4	2.2	1.0	4.7	3.2	27.0	**1.5**	**9.0**
black-throated sparrow	0.0	0.0	0.7	2.2	2.1	12.1	2.1	19.0	**1.4**	**8.5**
violet-green swallow	0.0	0.0	5.2	0.7	0.0	0.0	0.0	0.0	**1.0**	**0.2**
oak titmouse	0.1	1.5	1.6	5.8	1.4	5.6	0.9	9.0	**1.0**	**5.8**
ash-throated flycatcher	0.0	0.0	0.0	0.0	1.6	9.3	1.4	16.0	**0.9**	**6.3**
dark-eyed junco	1.6	7.4	2.0	4.4	0.6	2.8	0.0	0.0	**0.9**	**3.4**
cliff swallow	0.4	1.5	0.0	0.0	2.3	2.8	0.6	4.0	**0.9**	**1.9**
sage sparrow	0.0	0.0	0.0	0.0	0.1	0.9	1.8	11.0	**0.7**	**2.9**
unidentified songbird	1.6	10.3	0.5	1.5	0.8	6.5	0.1	1.0	**0.6**	**4.1**
black-chinned sparrow	0.0	0.0	0.0	0.0	1.1	7.5	0.9	6.0	**0.6**	**3.4**
rock wren	0.3	2.9	0.0	0.0	0.0	0.0	1.4	15.0	**0.6**	**4.1**
black-headed grosbeak	0.0	0.0	0.0	0.0	0.9	6.5	0.8	8.0	**0.5**	**3.6**
fox sparrow	1.1	4.4	0.8	3.6	0.0	0.0	0.0	0.0	**0.4**	**1.9**

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group / Species	Fall 2007		Winter 2007-2008		Spring 2008		Summer 2008		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
white-crowned sparrow	0.7	2.9	0.7	2.2	0.3	0.9	0.0	0.0	**0.3**	**1.5**
unidentified swallow	0.0	0.0	0.0	0.0	0.0	0.0	0.7	3.0	**0.3**	**0.7**
northern mockingbird	0.0	0.0	0.0	0.0	0.3	2.8	0.5	5.0	**0.3**	**1.9**
yellow-rumped warbler	0.0	0.0	0.0	0.0	0.9	4.7	0.0	0.0	**0.2**	**1.2**
mountain bluebird	0.0	0.0	1.2	1.5	0.0	0.0	0.0	0.0	**0.2**	**0.5**
Lawrence's goldfinch	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.0	**0.2**	**0.7**
northern rough-winged swallow	0.7	1.5	0.0	0.0	0.0	0.0	0.1	1.0	**0.2**	**0.5**
western tanager	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.0	**0.2**	**0.7**
unidentified sparrow	0.1	1.5	0.0	0.0	0.0	0.0	0.4	4.0	**0.2**	**1.2**
barn swallow	0.7	2.9	0.0	0.0	0.0	0.0	0.1	1.0	**0.2**	**0.7**
western kingbird	0.0	0.0	0.0	0.0	0.0	0.0	0.4	5.0	**0.1**	**1.2**
ruby-crowned kinglet	0.3	2.9	0.1	0.7	0.2	1.9	0.0	0.0	**0.1**	**1.2**
orange-crowned warbler	0.0	0.0	0.0	0.0	0.5	3.7	0.0	0.0	**0.1**	**1.0**
mountain chickadee	0.0	0.0	0.5	0.7	0.1	0.9	0.0	0.0	**0.1**	**0.5**
house wren	0.0	0.0	0.0	0.0	0.1	0.9	0.3	4.0	**0.1**	**1.2**
horned lark	0.0	0.0	0.0	0.0	0.5	1.9	0.0	0.0	**0.1**	**0.5**
Wilson's warbler	0.0	0.0	0.0	0.0	0.2	1.9	0.1	2.0	**0.1**	**1.0**
western wood-pewee	0.0	0.0	0.0	0.0	0.2	0.9	0.1	2.0	**0.1**	**0.7**
Scott's oriole	0.0	0.0	0.0	0.0	0.2	1.9	0.1	2.0	**0.1**	**1.0**
blue-gray gnatcatcher	0.0	0.0	0.0	0.0	0.2	0.9	0.1	2.0	**0.1**	**0.7**
pacific-slope flycatcher	0.0	0.0	0.0	0.0	0.1	0.9	0.1	2.0	**0.1**	**0.7**
unidentified empidonax flycatcher	0.0	0.0	0.0	0.0	0.1	0.9	0.1	1.0	**0.1**	**0.5**
Townsend's Warbler	0.0	0.0	0.0	0.0	0.2	1.9	0.0	0.0	**0.1**	**0.5**

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group / Species	Fall 2007		Winter 2007-2008		Spring 2008		Summer 2008		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
savannah sparrow	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.1**	**0.2**
canyon wren	0.0	0.0	0.0	0.0	0.1	0.9	0.1	1.0	**0.1**	**0.5**
yellow warbler	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
unidentified piranga tanager	0.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.2**
unidentified warbler	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
Say's phoebe	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
rufous-crowned sparrow	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
Nashville warbler	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**
loggerhead shrike	0.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.2**
Hammond’s flycatcher	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**
Cassin's kingbird	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
black-tailed gnatcatcher	0.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.2**
blue grosbeak	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
brown-headed cowbird	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
Group Total	**27.1**		**40.2**		**45.7**		**46.5**		**41.4**	
Crows and Allies										
western scrub-jay	18.7	66.2	24.8	54.0	15.0	63.6	18.6	83.0	**18.9**	**65.5**
common raven	12.7	48.5	13.1	38.0	14.6	55.1	4.4	22.0	**10.3**	**40.3**
Steller's jay	0.0	0.0	0.3	1.5	0.7	2.8	0.5	3.0	**0.4**	**1.9**
American crow	0.7	4.4	0.0	0.0	0.0	0.0	0.5	4.0	**0.3**	**1.7**
Group Total	**32.1**		**38.1**		**30.3**		**24.0**		**29.9**	
Swifts/Hummingbirds										

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group / Species	Fall 2007		Winter 2007-2008		Spring 2008		Summer 2008		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
white-throated swift	10.1	10.3	1.4	3.6	3.5	9.3	6.9	16.0	**5.6**	**9.2**
Vaux's swift	18.4	1.5	0.0	0.0	0.0	0.0	0.0	0.0	**3.5**	**0.2**
unidentified hummingbird	0.5	5.9	0.0	0.0	0.4	2.8	2.5	23.0	**1.1**	**7.3**
Anna's hummingbird	0.1	1.5	0.0	0.0	0.1	0.9	1.2	12.0	**0.5**	**3.4**
black-chinned hummingbird	0.0	0.0	0.0	0.0	0.7	5.6	0.1	2.0	**0.2**	**1.9**
Group Total	**29.2**		**1.4**		**4.7**		**10.7**		**10.9**	
Raptors/Vultures/Owls										
red-tailed hawk	4.6	38.2	9.3	37.2	5.0	32.7	3.5	32.0	**5.2**	**35.0**
turkey vulture	1.2	5.9	1.3	4.4	6.2	38.3	6.3	41.0	**4.3**	**22.3**
Cooper's hawk	0.8	8.8	0.0	0.0	0.2	1.9	0.4	5.0	**0.3**	**3.2**
American kestrel	0.1	1.5	0.3	1.5	0.2	1.9	0.1	2.0	**0.2**	**1.7**
unidentified raptor	0.3	1.5	0.4	2.2	0.0	0.0	0.0	0.0	**0.1**	**1.0**
northern harrier	0.1	1.5	0.3	1.5	0.0	0.0	0.0	0.0	**0.1**	**0.7**
unidentified falcon	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.1**	**0.2**
sharp-shinned hawk	0.1	1.5	0.0	0.0	0.0	0.0	0.1	1.0	**0.1**	**0.5**
golden eagle	0.1	1.5	0.0	0.0	0.1	0.9	0.0	0.0	**0.1**	**0.5**
prairie falcon	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**
osprey	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**
Group Total	**7.5**		**11.5**		**11.9**		**10.5**		**10.5**	
Woodpeckers										
northern flicker	0.8	7.4	1.6	7.3	1.0	7.5	1.2	14.0	**1.2**	**9.0**
acorn woodpecker	0.3	1.5	0.8	1.5	1.0	4.7	1.7	8.0	**1.1**	**3.9**

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007		Winter 2007-2008		Spring 2008		Summer 2008		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
Nuttall's woodpecker	0.1	1.5	0.1	0.7	0.1	0.9	0.9	11.0	**0.4**	**3.4**
ladder-backed woodpecker	0.0	0.0	0.5	2.9	0.0	0.0	0.2	3.0	**0.2**	**1.7**
unidentified woodpecker	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	**0.0**	**0.2**
downy woodpecker	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**
Group Total	**1.2**		**3.0**		**2.3**		**4.1**		**2.9**	
Pigeons/Doves										
mourning dove	0.0	0.0	0.4	1.5	2.6	15.0	3.2	28.0	**1.9**	**11.2**
band-tailed pigeon	0.0	0.0	0.1	0.7	0.0	0.0	0.1	1.0	**0.1**	**0.5**
Group Total	**0.0**		**0.5**		**2.6**		**3.3**		**1.9**	
Gamebirds										
California quail	2.7	4.4	1.7	3.6	2.4	15.9	0.9	8.0	**1.8**	**8.0**
unidentified quail	0.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.2**
Group Total	**2.9**		**1.7**		**2.4**		**0.9**		**1.8**	
Waterfowl										
mallard	0.0	0.0	3.1	0.7	0.0	0.0	0.0	0.0	**0.6**	**0.2**
Group Total	**0.0**		**3.1**		**0.0**		**0.0**		**0.6**	
Gulls/Terns										
unidentified gull	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.0	**0.1**	**0.2**
Group Total	**0.0**		**0.4**		**0.0**		**0.0**		**0.1**	
Waterbirds										
double-crested cormorant	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	**0.0**	**0.2**

Table 4. Avian percent composition* and frequency, sorted by species group, observed during point count surveys at the Tule Wind Resource Area, 2007-2008.

Species Group Species	Fall 2007 Percent Comp.	Fall 2007 Frequency % of surveys detected	Winter 2007-2008 Percent Comp.	Winter 2007-2008 Frequency % of surveys detected	Spring 2008 Percent Comp.	Spring 2008 Frequency % of surveys detected	Summer 2008 Percent Comp.	Summer 2008 Frequency % of surveys detected	Overall Percent Comp.	Overall Frequency % of surveys detected
Group Total	**0.0**		**0.0**		**0.1**		**0.0**		**0.0**	
Grand Total	**100.0%**		**100.0%**		**100.0%**		**100.0%**		**100.0%**	

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

Table 5a. Avian species observed by point during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
western scrub-jay	137	118	4	7	6	7	4	3	8	19
Vaux's swift	135	7	0	135	0	0	0	0	0	0
common raven	93	47	9	11	5	4	2	0	10	2
white-throated swift	74	15	0	0	0	15	0	0	7	0
red-tailed hawk	34	29	3	2	5	4	2	2	0	0
wrentit	29	28	0	0	1	3	0	1	2	0
California towhee	23	19	0	2	4	0	0	1	0	1
California quail	20	3	0	0	0	0	0	19	0	0
western bluebird	19	3	0	0	0	0	0	0	0	14
house finch	16	9	0	0	0	2	0	0	4	2
bushtit	15	2	0	0	10	0	0	0	0	0
lesser goldfinch	13	7	0	0	0	3	3	0	0	2
unidentified songbird	12	9	0	0	2	0	0	0	3	3
dark-eyed junco	12	5	0	0	5	2	0	4	0	0
Bewick's wren	11	11	0	1	2	2	0	0	0	1
turkey vulture	9	8	1	0	1	5	2	0	0	0
fox sparrow	8	4	0	0	0	0	1	0	0	0
spotted towhee	6	6	0	0	0	0	0	0	0	3
northern flicker	6	5	0	0	0	0	0	0	2	1
Cooper's hawk	6	6	0	1	0	1	1	0	3	0
California thrasher	6	6	0	1	0	0	0	1	0	1
white-crowned sparrow	5	2	0	0	0	0	4	0	0	0
northern rough-winged swallow	5	1	0	0	0	0	0	0	0	0
barn swallow	5	2	0	0	0	3	0	0	0	0
American crow	5	3	0	0	0	0	0	0	0	5
unidentified hummingbird	4	4	0	0	1	1	1	0	0	1

Table 5a. Avian species observed by point during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
cliff swallow	3	1	0	0	0	0	0	0	3	0
unidentified raptor	2	1	0	0	0	0	0	0	0	2
rock wren	2	2	0	0	1	1	0	0	0	0
ruby-crowned kinglet	2	2	0	0	0	0	0	0	0	1
phainopepla	2	2	0	0	0	0	0	0	0	0
acorn woodpecker	2	1	0	0	0	0	0	0	0	0
unidentified piranga tanager	1	1	0	0	1	0	0	0	0	0
unidentified sparrow	1	1	0	0	0	0	0	0	0	0
unidentified quail	1	1	0	0	0	0	0	0	0	0
sharp-shinned hawk	1	1	0	0	1	0	0	0	0	0
oak titmouse	1	1	0	0	0	0	0	0	0	0
Nuttall's woodpecker	1	1	0	0	0	0	0	0	1	0
northern harrier	1	1	0	0	0	0	0	0	0	0
loggerhead shrike	1	1	0	0	1	0	0	0	0	0
golden eagle	1	1	0	0	0	0	0	0	0	0
black-tailed gnatcatcher	1	1	0	0	0	0	0	0	0	0
Anna’s hummingbird	1	1	0	1	0	0	0	0	0	0
American kestrel	1	1	0	0	0	0	0	0	0	0
Grand Total	**733**	**380**	**17**	**161**	**46**	**53**	**20**	**31**	**43**	**58**

Table 5a. Avian species observed by point during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
western scrub-jay	137	118	15	8	24	3	2	16	7	4
Vaux's swift	135	7	0	0	0	0	0	0	0	0
common raven	93	47	14	5	10	3	1	5	1	11
white-throated swift	74	15	25	6	3	0	0	2	16	0
red-tailed hawk	34	29	3	2	2	3	2	2	1	1
wrentit	29	28	0	2	5	5	1	8	0	1
California towhee	23	19	3	2	7	2	0	1	0	0
California quail	20	3	0	0	0	0	0	1	0	0
western bluebird	19	3	0	2	0	0	0	0	0	3
house finch	16	9	5	0	0	0	0	2	0	1
bushtit	15	2	0	0	0	5	0	0	0	0
lesser goldfinch	13	7	2	0	1	0	0	0	2	0
unidentified songbird	12	9	0	2	0	0	1	0	1	0
dark-eyed junco	12	5	0	0	0	0	0	0	0	1
Bewick's wren	11	11	3	0	0	0	0	2	0	0
turkey vulture	9	8	0	0	0	0	0	0	0	0
fox sparrow	8	4	0	0	6	0	0	0	0	1
spotted towhee	6	6	1	0	0	0	0	2	0	0
northern flicker	6	5	0	0	2	1	0	0	0	0
Cooper's hawk	6	6	0	0	0	0	0	0	0	0
California thrasher	6	6	0	0	1	0	2	0	0	0
white-crowned sparrow	5	2	0	0	1	0	0	0	0	0
northern rough-winged swallow	5	1	5	0	0	0	0	0	0	0
barn swallow	5	2	2	0	0	0	0	0	0	0
American crow	5	3	0	0	0	0	0	0	0	0

Table 5a. Avian species observed by point during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
unidentified hummingbird	4	4	0	0	0	0	0	0	0	0
cliff swallow	3	1	0	0	0	0	0	0	0	0
unidentified raptor	2	1	0	0	0	0	0	0	0	0
rock wren	2	2	0	0	0	0	0	0	0	0
ruby-crowned kinglet	2	2	1	0	0	0	0	0	0	0
phainopepla	2	2	0	0	0	0	0	0	0	2
acorn woodpecker	2	1	0	0	0	0	0	0	0	2
unidentified piranga tanager	1	1	0	0	0	0	0	0	0	0
unidentified sparrow	1	1	0	0	1	0	0	0	0	0
unidentified quail	1	1	0	1	0	0	0	0	0	0
sharp-shinned hawk	1	1	0	0	0	0	0	0	0	0
oak titmouse	1	1	0	0	0	0	0	0	0	1
Nuttall's woodpecker	1	1	0	0	0	0	0	0	0	0
northern harrier	1	1	0	0	0	0	0	0	1	0
loggerhead shrike	1	1	0	0	0	0	0	0	0	0
golden eagle	1	1	0	0	0	0	0	0	1	0
black-tailed gnatcatcher	1	1	0	0	1	0	0	0	0	0
Anna’s hummingbird	1	1	0	0	0	0	0	0	0	0
American kestrel	1	1	1	0	0	0	0	0	0	0
Grand Total	**733**	**380**	**80**	**30**	**64**	**22**	**9**	**41**	**30**	**28**

Table 5b. Avian species observed by point during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
western scrub-jay	190	147	4	7	11	3	16	8	4	30
common raven	100	62	10	6	6	4	6	6	4	14
red-tailed hawk	71	65	3	3	10	7	4	3	2	6
California thrasher	43	41	5	2	3	4	1	2	2	3
violet-green swallow	40	1	0	0	0	0	0	0	0	0
western bluebird	34	9	2	9	0	0	0	8	0	0
California towhee	34	29	0	4	4	4	0	0	0	3
mallard	24	1	0	0	0	0	24	0	0	0
wrentit	23	22	0	0	1	1	0	1	3	1
bushtit	23	3	0	0	0	1	0	0	0	15
spotted towhee	20	17	1	1	2	0	0	1	5	5
dark-eyed junco	15	6	2	0	0	0	0	2	0	0
California quail	13	6	0	0	4	0	0	1	0	0
oak titmouse	12	8	0	0	0	3	0	2	0	3
northern flicker	12	11	0	2	0	0	0	0	0	2
white-throated swift	11	7	0	2	1	3	0	0	4	0
house finch	11	7	0	0	0	0	0	0	0	1
turkey vulture	10	8	2	3	0	1	0	1	2	0
Bewick's wren	10	9	0	0	0	0	0	1	0	0
mountain bluebird	9	2	0	0	0	0	0	0	0	0
lesser goldfinch	6	3	0	0	0	0	0	0	0	0
fox sparrow	6	5	2	0	1	0	0	0	0	0
acorn woodpecker	6	2	0	0	0	0	0	0	0	0
white-crowned sparrow	5	3	0	0	0	0	0	0	0	1
black-throated sparrow	5	3	0	0	4	0	0	1	0	0
unidentified songbird	4	3	0	0	0	0	0	0	0	0

Table 5b. Avian species observed by point during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
mountain chickadee	4	1	0	0	0	0	0	0	0	0
ladder-backed woodpecker	4	4	0	0	1	0	0	0	0	1
unidentified raptor	3	3	0	0	0	0	0	0	0	1
unidentified gull	3	1	0	0	0	0	0	3	0	0
phainopepla	3	3	0	0	0	0	0	1	0	0
mourning dove	3	3	0	0	0	1	0	2	0	0
Steller's jay	2	2	0	0	0	0	0	0	0	0
northern harrier	2	2	0	0	0	2	0	0	0	0
American kestrel	2	2	0	0	0	0	0	0	0	0
ruby-crowned kinglet	1	1	0	0	0	0	0	0	0	0
Nuttall's woodpecker	1	1	0	1	0	0	0	0	0	0
band-tailed pigeon	1	1	0	0	0	0	0	0	0	0
Grand Total	**766**	**504**	**31**	**40**	**48**	**34**	**51**	**43**	**26**	**86**

Table 5b. Avian species observed by point during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
western scrub-jay	190	147	16	7	26	3	11	17	7	20
common raven	100	62	3	4	10	12	3	4	2	6
red-tailed hawk	71	65	1	4	5	10	5	2	4	2
California thrasher	43	41	4	0	5	3	4	5	0	0
violet-green swallow	40	1	0	40	0	0	0	0	0	0
western bluebird	34	9	10	0	0	0	0	5	0	0
California towhee	34	29	3	0	5	4	1	3	1	2
mallard	24	1	0	0	0	0	0	0	0	0
wrentit	23	22	0	0	8	1	5	0	1	1
bushtit	23	3	0	0	0	0	0	0	0	7
spotted towhee	20	17	0	3	0	0	0	1	0	1
dark-eyed junco	15	6	0	1	0	0	0	0	5	5
California quail	13	6	0	1	0	0	0	7	0	0
oak titmouse	12	8	0	2	0	0	0	0	0	2
northern flicker	12	11	0	1	1	2	0	0	2	2
white-throated swift	11	7	0	0	0	1	0	0	0	0
house finch	11	7	1	0	2	3	3	0	0	1
turkey vulture	10	8	1	0	0	0	0	0	0	0
Bewick's wren	10	9	2	1	1	0	1	1	0	3
mountain bluebird	9	2	6	0	0	0	3	0	0	0
lesser goldfinch	6	3	3	0	0	0	3	0	0	0
fox sparrow	6	5	0	0	2	0	0	0	0	1
acorn woodpecker	6	2	0	0	0	0	0	0	1	5
white-crowned sparrow	5	3	0	0	1	3	0	0	0	0
black-throated sparrow	5	3	0	0	0	0	0	0	0	0

Table 5b. Avian species observed by point during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
unidentified songbird	4	3	0	2	0	0	2	0	0	0
mountain chickadee	4	1	0	0	0	0	0	0	0	4
ladder-backed woodpecker	4	4	0	1	1	0	0	0	0	0
unidentified raptor	3	3	0	0	0	0	1	1	0	0
unidentified gull	3	1	0	0	0	0	0	0	0	0
phainopepla	3	3	0	0	0	0	0	1	0	1
mourning dove	3	3	0	0	0	0	0	0	0	0
Steller's jay	2	2	0	0	0	0	0	0	0	2
northern harrier	2	2	0	0	0	0	0	0	0	0
American kestrel	2	2	0	0	0	0	1	0	0	1
ruby-crowned kinglet	1	1	0	0	0	0	0	0	0	1
Nuttall's woodpecker	1	1	0	0	0	0	0	0	0	0
band-tailed pigeon	1	1	0	0	0	0	0	0	0	1
Grand Total	**766**	**504**	**50**	**67**	**67**	**42**	**43**	**47**	**23**	**68**

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
western scrub-jay	146	122	2	7	8	7	15	7	5	12
common raven	142	92	11	14	9	12	3	7	4	18
spotted towhee	61	59	3	2	1	4	4	1	4	5
turkey vulture	60	51	3	6	6	6	9	3	4	3
red-tailed hawk	49	40	1	8	4	5	2	3	1	2
wrentit	44	43	2	0	0	4	3	3	2	0
house finch	41	23	1	1	0	2	12	1	7	0
Bewick's wren	40	40	4	3	2	3	1	4	1	4
California towhee	39	36	4	5	4	4	1	6	2	1
California thrasher	36	35	4	3	2	2	3	1	2	2
white-throated swift	34	10	0	0	4	0	0	0	0	0
mourning dove	25	22	0	3	1	0	0	2	0	0
California quail	23	17	0	2	1	0	0	1	0	0
cliff swallow	22	3	0	0	0	0	1	0	0	0
black-throated sparrow	20	18	3	4	6	1	0	0	0	2
ash-throated flycatcher	16	14	0	0	0	1	0	2	0	1
oak titmouse	14	8	0	0	0	0	0	0	0	2
bushtit	13	3	0	0	5	0	5	0	0	0
black-chinned sparrow	11	10	0	0	0	0	0	0	0	0
phainopepla	10	5	4	1	3	0	0	0	0	0
northern flicker	10	9	0	0	0	0	0	2	0	0
acorn woodpecker	10	6	0	0	0	0	0	0	0	0
yellow-rumped warbler	9	7	0	0	0	0	0	0	0	0
black-headed grosbeak	9	8	2	1	0	0	0	0	0	0
unidentified songbird	8	7	1	0	0	1	1	0	0	3
Steller's jay	7	3	0	0	0	0	0	0	0	0

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
black-chinned hummingbird	7	7	1	0	0	0	0	0	0	0
dark-eyed junco	6	3	0	0	0	0	0	0	0	0
orange-crowned warbler	5	5	0	1	0	0	0	0	0	0
lesser goldfinch	5	3	0	3	0	0	0	0	0	0
horned lark	5	2	0	4	0	0	0	0	0	0
western bluebird	4	2	0	0	0	0	0	0	0	0
unidentified hummingbird	4	3	0	0	2	1	0	0	0	0
white-crowned sparrow	3	1	0	0	0	0	0	0	0	0
northern mockingbird	3	3	1	0	0	0	1	1	0	0
Wilson's warbler	2	2	1	0	0	1	0	0	0	0
western wood-pewee	2	1	0	0	0	0	0	0	0	0
Townsend's Warbler	2	2	0	0	0	0	0	0	0	0
Scott's oriole	2	2	0	0	0	0	0	0	0	0
ruby-crowned kinglet	2	2	0	0	0	0	0	0	0	0
Cooper's hawk	2	2	0	1	0	0	0	0	1	0
blue-gray gnatcatcher	2	1	0	2	0	0	0	0	0	0
American kestrel	2	2	0	0	0	0	1	0	0	0
unidentified empidonax flycatcher	1	1	0	0	0	0	0	0	0	0
sage sparrow	1	1	0	0	0	0	0	0	0	0
pacific-slope flycatcher	1	1	0	0	0	0	0	0	0	0
prairie falcon	1	1	0	0	0	0	0	0	0	0
osprey	1	1	0	0	0	0	1	0	0	0
Nuttall's woodpecker	1	1	0	0	0	0	0	0	0	0
Nashville warbler	1	1	0	0	0	0	0	0	0	0
mountain chickadee	1	1	0	0	0	0	0	0	0	0
house wren	1	1	0	0	0	0	0	0	0	0

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
Hammond's flycatcher	1	1	0	0	0	0	0	0	0	0
golden eagle	1	1	0	0	0	0	0	0	0	0
downy woodpecker	1	1	0	0	0	0	0	0	0	0
double-crested cormorant	1	1	0	0	0	1	0	0	0	0
canyon wren	1	1	0	0	0	0	0	0	0	0
Anna's hummingbird	1	1	0	0	0	0	0	0	0	0
Grand Total	**972**	**749**	**48**	**71**	**58**	**55**	**63**	**44**	**33**	**55**

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
western scrub-jay	146	122	12	16	15	1	5	10	12	12
common raven	142	92	3	12	9	21	7	3	6	3
spotted towhee	61	59	7	11	3	2	1	6	3	4
turkey vulture	60	51	8	1	1	3	0	5	2	0
red-tailed hawk	49	40	2	5	1	0	4	2	5	4
wrentit	44	43	1	4	8	4	4	2	4	3
house finch	41	23	1	3	0	0	0	0	3	10
Bewick's wren	40	40	2	4	1	2	2	3	1	3
California towhee	39	36	3	3	2	0	1	1	1	1
California thrasher	36	35	1	4	4	1	0	1	2	4
white-throated swift	34	10	0	1	1	1	0	0	5	22
mourning dove	25	22	1	0	0	0	0	0	9	9
California quail	23	17	0	1	0	0	0	6	2	10
cliff swallow	22	3	0	0	0	0	0	0	1	20
black-throated sparrow	20	18	4	0	0	0	0	0	0	0
ash-throated flycatcher	16	14	4	0	0	0	0	1	0	7
oak titmouse	14	8	0	0	0	0	0	0	3	9
bushtit	13	3	0	0	0	0	0	0	0	3
black-chinned sparrow	11	10	0	0	1	0	2	1	3	4
phainopepla	10	5	1	0	0	0	0	1	0	0
northern flicker	10	9	0	0	0	0	0	0	5	3
acorn woodpecker	10	6	0	0	0	0	0	0	3	7
yellow-rumped warbler	9	7	0	0	0	0	0	0	2	7
black-headed grosbeak	9	8	0	1	3	0	0	0	1	1
unidentified songbird	8	7	0	0	0	0	0	2	0	0

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
Steller's jay	7	3	0	0	0	0	0	0	3	4
black-chinned hummingbird	7	7	1	0	0	0	1	2	2	0
dark-eyed junco	6	3	3	0	0	0	0	0	2	1
orange-crowned warbler	5	5	0	0	0	0	0	0	3	1
lesser goldfinch	5	3	0	0	0	0	0	0	1	1
horned lark	5	2	0	0	0	0	0	0	0	1
western bluebird	4	2	0	0	0	0	0	0	2	2
unidentified hummingbird	4	3	0	0	0	0	0	0	0	1
white-crowned sparrow	3	1	0	0	0	0	0	0	3	0
northern mockingbird	3	3	0	0	0	0	0	0	0	0
Wilson's warbler	2	2	0	0	0	0	0	0	0	0
western wood-pewee	2	1	0	0	0	0	0	0	0	2
Townsend's Warbler	2	2	0	0	0	0	0	0	0	2
Scott's oriole	2	2	0	0	0	0	0	0	0	2
ruby-crowned kinglet	2	2	0	0	0	0	0	0	1	1
Cooper's hawk	2	2	0	0	0	0	0	0	0	0
blue-gray gnatcatcher	2	1	0	0	0	0	0	0	0	0
American kestrel	2	2	0	0	1	0	0	0	0	0
unidentified empidonax flycatcher	1	1	0	0	0	0	0	0	0	1
sage sparrow	1	1	0	1	0	0	0	0	0	0
pacific-slope flycatcher	1	1	0	0	0	0	0	0	0	1
prairie falcon	1	1	0	0	0	0	0	0	1	0
osprey	1	1	0	0	0	0	0	0	0	0
Nuttall's woodpecker	1	1	0	0	0	0	0	0	0	1
Nashville warbler	1	1	0	0	0	0	0	0	0	1

Table 5c. Avian species observed by point during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
mountain chickadee	1	1	0	0	0	0	0	0	0	1
house wren	1	1	0	0	0	0	0	0	0	1
Hammond's flycatcher	1	1	0	0	0	0	0	0	0	1
golden eagle	1	1	0	0	1	0	0	0	0	0
downy woodpecker	1	1	0	0	0	0	0	0	1	0
double-crested cormorant	1	1	0	0	0	0	0	0	0	0
canyon wren	1	1	0	0	0	0	0	0	1	0
Anna's hummingbird	1	1	0	0	0	0	0	0	1	0
Grand Total	**972**	**749**	**54**	**67**	**51**	**35**	**27**	**46**	**94**	**171**

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
western scrub-jay	256	149	13	12	15	6	19	9	11	22
house finch	115	58	3	18	4	5	15	13	1	23
white-throated swift	95	18	0	0	5	3	0	0	0	0
turkey vulture	87	56	10	10	18	3	17	2	5	3
common raven	61	29	13	16	9	1	0	10	0	2
California towhee	55	44	7	6	1	4	1	4	0	8
wrentit	54	43	0	3	0	2	4	1	1	5
lesser goldfinch	53	17	0	0	0	1	0	0	0	2
red-tailed hawk	48	41	3	2	9	4	0	2	0	5
phainopepla	44	35	4	9	2	4	1	12	0	1
mourning dove	44	33	2	3	3	3	2	2	0	8
unidentified hummingbird	35	29	2	1	0	0	2	0	3	3
spotted towhee	34	31	1	2	0	0	2	2	2	4
bushtit	32	3	0	0	0	0	0	0	0	12
black-throated sparrow	29	22	2	10	1	1	0	2	1	0
sage sparrow	25	12	1	5	10	0	0	0	0	0
acorn woodpecker	23	13	0	0	0	0	0	0	0	2
rock wren	20	18	5	2	2	0	0	5	0	0
Bewick's wren	19	16	0	1	0	1	2	2	0	0
ash-throated flycatcher	19	17	2	1	1	0	0	3	1	3
northern flicker	17	17	2	0	1	0	1	0	0	3
Anna’s hummingbird	16	14	0	0	0	0	0	1	0	2
western bluebird	14	6	0	0	0	0	0	0	0	0
California thrasher	14	11	3	0	0	1	1	5	1	0
oak titmouse	13	9	0	0	0	0	0	2	0	0
California quail	13	8	0	0	0	0	0	8	0	0

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
black-chinned sparrow	13	10	0	0	0	0	0	0	0	0
Nuttall's woodpecker	12	11	0	0	0	0	1	0	0	3
black-headed grosbeak	11	10	0	0	0	0	0	0	0	1
unidentified swallow	10	3	0	0	8	0	0	0	0	2
Lawrence's goldfinch	8	4	0	0	0	0	0	0	0	0
cliff swallow	8	4	0	1	0	0	0	0	0	0
Steller's jay	7	4	0	0	0	0	0	0	0	0
northern mockingbird	7	5	0	3	2	0	0	0	0	0
American crow	7	4	0	0	0	0	0	0	0	6
western tanager	6	3	0	0	0	0	0	0	0	0
western kingbird	5	5	1	0	1	0	0	0	1	1
unidentified sparrow	5	4	0	2	1	0	0	2	0	0
Cooper's hawk	5	5	0	0	0	0	0	1	0	1
house wren	4	4	0	0	0	0	0	0	0	1
ladder-backed woodpecker	3	3	0	0	0	1	0	0	1	0
Wilson's warbler	2	2	0	0	0	0	0	0	0	0
western wood-pewee	2	2	0	0	0	0	0	0	0	0
unidentified falcon	2	1	0	0	0	0	0	0	0	0
Scott's oriole	2	2	0	0	0	0	0	0	0	0
savannah sparrow	2	1	0	0	0	0	0	0	0	0
pacific-slope flycatcher	2	2	0	0	0	0	0	1	0	0
northern rough-winged swallow	2	1	0	0	0	0	0	0	2	0
blue-gray gnatcatcher	2	2	0	0	0	0	0	0	0	0
black-chinned hummingbird	2	2	0	0	0	0	0	0	0	0
American kestrel	2	2	0	0	0	0	0	0	0	0
yellow warbler	1	1	0	0	0	0	0	0	0	1

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			1	2	3	4	5	6	7	8
unidentified woodpecker	1	1	0	0	0	0	0	0	0	0
unidentified warbler	1	1	0	0	0	0	0	1	0	0
unidentified songbird	1	1	0	0	0	0	0	0	0	0
unidentified empidonax flycatcher	1	1	0	0	0	0	0	0	0	0
sharp-shinned hawk	1	1	1	0	0	0	0	0	0	0
Say's phoebe	1	1	0	0	0	0	0	0	0	0
rufous-crowned sparrow	1	1	0	0	0	0	0	0	0	0
canyon wren	1	1	0	0	0	0	0	0	0	0
Cassin's kingbird	1	1	0	0	0	0	0	0	0	1
band-tailed pigeon	1	1	0	0	0	0	0	0	0	0
blue grosbeak	1	1	0	0	0	0	0	0	0	0
brown-headed cowbird	1	1	0	0	0	0	0	0	0	0
barn swallow	1	1	0	0	0	0	0	0	0	0
Grand Total	**1380**	**859**	**75**	**107**	**93**	**40**	**68**	**90**	**30**	**125**

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
western scrub-jay	256	149	11	25	23	12	14	9	36	19
house finch	115	58	3	6	2	2	1	2	2	15
white-throated swift	95	18	1	0	8	33	0	12	33	0
turkey vulture	87	56	6	4	0	0	0	6	2	1
common raven	61	29	0	1	7	1	1	0	0	0
California towhee	55	44	2	6	3	1	0	4	3	5
wrentit	54	43	2	2	7	3	5	2	8	9
lesser goldfinch	53	17	0	0	5	1	3	0	16	25
red-tailed hawk	48	41	2	0	3	3	1	2	6	6
phainopepla	44	35	0	1	0	3	0	3	1	3
mourning dove	44	33	2	6	0	1	0	2	3	7
unidentified hummingbird	35	29	1	1	7	4	8	1	2	0
spotted towhee	34	31	2	1	4	1	1	3	2	7
bushtit	32	3	0	0	0	0	0	0	0	20
black-throated sparrow	29	22	3	5	1	0	0	3	0	0
sage sparrow	25	12	1	2	0	0	0	5	1	0
acorn woodpecker	23	13	0	0	0	0	0	0	4	17
rock wren	20	18	4	1	1	0	0	0	0	0
Bewick's wren	19	16	1	3	1	0	3	2	1	2
ash-throated flycatcher	19	17	3	0	0	0	0	1	0	4
northern flicker	17	17	0	1	0	2	0	0	4	3
Anna’s hummingbird	16	14	1	1	0	2	0	0	0	9
western bluebird	14	6	0	0	0	0	0	0	0	14
California thrasher	14	11	0	3	0	0	0	0	0	0
oak titmouse	13	9	1	0	0	0	1	0	1	8

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
California quail	13	8	0	2	0	0	0	1	0	2
black-chinned sparrow	13	10	0	0	4	2	6	0	1	0
Nuttall's woodpecker	12	11	0	0	0	0	0	0	4	4
black-headed grosbeak	11	10	0	0	6	2	0	1	0	1
unidentified swallow	10	3	0	0	0	0	0	0	0	0
Lawrence's goldfinch	8	4	0	0	0	0	0	0	0	8
cliff swallow	8	4	0	0	4	3	0	0	0	0
Steller's jay	7	4	0	0	0	0	0	0	0	7
northern mockingbird	7	5	2	0	0	0	0	0	0	0
American crow	7	4	0	0	1	0	0	0	0	0
western tanager	6	3	0	0	0	0	0	0	1	5
western kingbird	5	5	0	0	0	0	0	0	1	0
unidentified sparrow	5	4	0	0	0	0	0	0	0	0
Cooper's hawk	5	5	0	0	0	0	0	1	0	2
house wren	4	4	0	0	0	0	0	0	1	2
ladder-backed woodpecker	3	3	1	0	0	0	0	0	0	0
Wilson's warbler	2	2	0	0	0	0	0	1	0	1
western wood-pewee	2	2	0	0	0	0	0	0	0	2
unidentified falcon	2	1	0	0	2	0	0	0	0	0
Scott's oriole	2	2	1	0	0	0	0	0	0	1
savannah sparrow	2	1	0	2	0	0	0	0	0	0
pacific-slope flycatcher	2	2	0	0	0	0	0	0	0	1
northern rough-winged swallow	2	1	0	0	0	0	0	0	0	0
blue-gray gnatcatcher	2	2	0	0	0	1	1	0	0	0
black-chinned hummingbird	2	2	0	0	0	1	0	0	0	1

Table 5d. Avian species observed by point during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number of Birds	Number of Obs.	Points (# of individuals)							
			9	10	11	12	13	14	15	16
American kestrel	2	2	0	0	0	0	0	0	2	0
yellow warbler	1	1	0	0	0	0	0	0	0	0
unidentified woodpecker	1	1	0	0	0	0	0	0	1	0
unidentified warbler	1	1	0	0	0	0	0	0	0	0
unidentified songbird	1	1	0	0	1	0	0	0	0	0
unidentified empidonax flycatcher	1	1	0	0	0	0	0	0	1	0
sharp-shinned hawk	1	1	0	0	0	0	0	0	0	0
Say's phoebe	1	1	0	1	0	0	0	0	0	0
rufous-crowned sparrow	1	1	0	0	0	0	0	0	1	0
canyon wren	1	1	0	0	0	0	0	0	0	1
Cassin's kingbird	1	1	0	0	0	0	0	0	0	0
band-tailed pigeon	1	1	0	0	0	0	0	0	1	0
blue grosbeak	1	1	0	0	0	0	0	0	0	1
brown-headed cowbird	1	1	0	0	1	0	0	0	0	0
barn swallow	1	1	0	0	0	1	0	0	0	0
Grand Total	**1380**	**859**	**50**	**74**	**91**	**79**	**45**	**61**	**139**	**213**

Table 6a. Summary of avian flight heights (includes flying birds only) in relation to the 3 MW turbine rotor swept area (RSA) during point count surveys at Tule Wind Resource Area, 2007-2008.

	Fall 2007				Winter 2007-2008				Spring 2008				Summer 2008				Overall			
	Observations		Individuals		Observations		Individuals		Observations		Individuals		Observations		Individuals		Observations		Individuals	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Non-raptors																				
Above RSA (>150m)	4	2.2%	8	1.7%	1	0.6%	1	0.3%	2	1.1%	5	1.5%	1	0.4%	12	2.2%	8	1.0%	26	1.5%
Below RSA (<60m)	148	82.7%	294	61.0%	140	89.7%	270	79.4%	161	85.2%	260	78.1%	247	88.8%	411	74.5%	696	86.8%	1235	72.3%
Within RSA (60m–150m)	27	15.1%	180	37.3%	15	9.6%	69	20.3%	26	13.8%	68	20.4%	30	10.8%	129	23.4%	98	12.2%	446	26.1%
Raptors/Vultures/Owls																				
Above RSA (>150m)	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.1%	3	2.7%	8	8.3%	9	6.7%	9	3.1%	12	3.3%
Below RSA (<60m)	17	39.5%	20	41.7%	34	57.6%	38	56.7%	41	44.6%	48	43.6%	33	34.4%	40	29.6%	125	43.1%	146	40.6%
Within RSA (60m–150m)	26	60.5%	28	58.3%	25	42.4%	29	43.3%	50	54.3%	59	53.6%	55	57.3%	86	63.7%	156	53.8%	202	56.1%

[1]These values assume a 3MW turbine with a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 6b. Summary of avian flight heights (includes flying birds only) in relation to the 1.5 MW turbine rotor swept area (RSA) during point count surveys at Tule Wind Resource Area, 2007-2008.

	Fall 2007				Winter 2007-2008				Spring 2008				Summer 2008				Overall			
	Observations		Individuals		Observations		Individuals		Observations		Individuals		Observations		Individuals		Observations		Individuals	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Non-raptors																				
Above RSA (>118.5m)	7	3.9%	38	7.9%	1	0.6%	1	0.3%	5	2.6%	10	3.0%	2	0.7%	15	2.7%	15	1.9%	64	3.7%
Below RSA (<41.5m)	136	76.0%	254	52.7%	133	85.3%	260	76.5%	150	79.4%	243	73.0%	241	86.7%	398	72.1%	660	82.3%	1155	67.7%
Within RSA (41.5m–118.5m)	36	20.1%	190	39.4%	22	14.1%	79	23.2%	34	18.0%	80	24.0%	35	12.6%	139	25.2%	127	15.8%	488	28.6%
Raptors/Vultures/Owls																				
Above RSA (>118.5m)	6	14.0%	8	16.7%	0	0.0%	0	0.0%	1	1.1%	3	2.7%	10	10.4%	11	8.1%	17	5.9%	22	6.1%
Below RSA (<41.5m)	11	25.6%	13	27.1%	25	42.4%	27	40.3%	29	31.5%	32	29.1%	21	21.9%	25	18.5%	86	29.7%	97	26.9%
Within RSA (41.5m–118.5m)	26	60.5%	27	56.3%	34	57.6%	40	59.7%	62	67.4%	75	68.2%	65	67.7%	99	73.3%	187	64.5%	241	66.9%

[1]These values assume a 1.5MW turbine with a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 7a. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
Vaux's swift	1.28	1.99 (0.00 - 5.26)	100.0	35.9	64.1	0.0
white-throated swift	0.81	1.09 (0.27 - 1.91)	100.0	24.7	74.0	1.4
common raven	0.48	1.37 (0.94 - 1.80)	87.1	51.3	40.0	8.8
red-tailed hawk	0.26	0.50 (0.35 - 0.65)	82.4	37.0	63.0	0.0
turkey vulture	0.07	0.13 (0.00 - 0.26)	100.0	44.4	55.6	0.0
Cooper's hawk	0.06	0.09 (0.03 - 0.15)	100.0	33.3	66.7	0.0
unidentified songbird	0.05	0.18 (0.07 - 0.29)	100.0	75.0	25.0	0.0
cliff swallow	0.04	0.04 (0.00 - 0.11)	100.0	0.0	100.0	0.0
barn swallow	0.04	0.07 (0.00 - 0.16)	100.0	40.0	60.0	0.0
unidentified hummingbird	0.02	0.06 (0.01 - 0.11)	100.0	75.0	25.0	0.0
golden eagle	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
American kestrel	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
wrentit	0.00	0.43 (0.27 - 0.59)	6.9	100.0	0.0	0.0
western scrub-jay	0.00	2.01 (1.53 - 2.49)	47.4	100.0	0.0	0.0
western bluebird	0.00	0.28 (0.00 - 0.63)	84.2	100.0	0.0	0.0
white-crowned sparrow	0.00	0.07 (0.00 - 0.17)	100.0	100.0	0.0	0.0
unidentified piranga tanager	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified sparrow	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified raptor	0.00	0.03 (0.00 - 0.08)	100.0	100.0	0.0	0.0
unidentified quail	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
sharp-shinned hawk	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
spotted towhee	0.00	0.09 (0.02 - 0.16)	33.3	100.0	0.0	0.0
rock wren	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
phainopepla	0.00	0.03 (0.00 - 0.06)	0.0	0.0	0.0	0.0
oak titmouse	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0

Table 7a. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA) [1] at the Tule Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
northern rough-winged swallow	0.00	0.07 (0.00 - 0.19)	100.0	100.0	0.0	0.0
northern harrier	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
northern flicker	0.00	0.09 (0.02 - 0.16)	33.3	100.0	0.0	0.0
loggerhead shrike	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.19 (0.06 - 0.32)	69.2	100.0	0.0	0.0
house finch	0.00	0.24 (0.11 - 0.37)	31.3	100.0	0.0	0.0
fox sparrow	0.00	0.12 (0.00 - 0.27)	87.5	100.0	0.0	0.0
dark-eyed junco	0.00	0.18 (0.03 - 0.33)	83.3	100.0	0.0	0.0
California thrasher	0.00	0.09 (0.02 - 0.16)	83.3	100.0	0.0	0.0
California quail	0.00	0.29 (0.00 - 0.73)	90.0	100.0	0.0	0.0
California towhee	0.00	0.34 (0.18 - 0.50)	47.8	100.0	0.0	0.0
bushtit	0.00	0.22 (0.00 - 0.49)	0.0	0.0	0.0	0.0
black-tailed gnatcatcher	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
Bewick's wren	0.00	0.16 (0.07 - 0.25)	9.1	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
American crow	0.00	0.07 (0.00 - 0.14)	100.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.03 (0.00 - 0.08)	0.0	0.0	0.0	0.0

[1]These values assume a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 7b. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Winter 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
violet-green swallow	0.29	0.29 (0.00 - 0.77)	100.0	0.0	100.0	0.0
red-tailed hawk	0.17	0.52 (0.41 - 0.63)	74.6	55.8	44.2	0.0
common raven	0.15	0.73 (0.57 - 0.89)	86.0	74.4	24.4	1.2
white-throated swift	0.04	0.08 (0.01 - 0.15)	100.0	54.5	45.5	0.0
turkey vulture	0.04	0.07 (0.02 - 0.12)	100.0	50.0	50.0	0.0
unidentified gull	0.02	0.02 (0.00 - 0.06)	100.0	0.0	100.0	0.0
American kestrel	0.01	0.01 (0.00 - 0.03)	100.0	50.0	50.0	0.0
wrentit	0.00	0.17 (0.10 - 0.24)	4.3	100.0	0.0	0.0
western scrub-jay	0.00	1.39 (1.14 - 1.64)	37.4	100.0	0.0	0.0
western bluebird	0.00	0.25 (0.10 - 0.40)	67.6	100.0	0.0	0.0
white-crowned sparrow	0.00	0.04 (0.00 - 0.08)	20.0	100.0	0.0	0.0
unidentified raptor	0.00	0.02 (0.00 - 0.04)	33.3	100.0	0.0	0.0
unidentified songbird	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
Steller's jay	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
spotted towhee	0.00	0.15 (0.09 - 0.21)	20.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.02)	100.0	100.0	0.0	0.0
phainopepla	0.00	0.02 (0.00 - 0.04)	66.7	100.0	0.0	0.0
oak titmouse	0.00	0.09 (0.04 - 0.14)	0.0	0.0	0.0	0.0
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
northern harrier	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
northern flicker	0.00	0.09 (0.04 - 0.14)	0.0	0.0	0.0	0.0
mourning dove	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
mountain chickadee	0.00	0.03 (0.00 - 0.08)	100.0	100.0	0.0	0.0
mountain bluebird	0.00	0.07 (0.00 - 0.15)	100.0	100.0	0.0	0.0
mallard	0.00	0.18 (0.00 - 0.47)	100.0	100.0	0.0	0.0
lesser goldfinch	0.00	0.04 (0.00 - 0.09)	66.7	100.0	0.0	0.0

Table 7b. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA) at the Tule Wind Resource Area, during Winter 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
ladder-backed woodpecker	0.00	0.03 (0.01 - 0.05)	50.0	100.0	0.0	0.0
house finch	0.00	0.08 (0.03 - 0.13)	63.6	100.0	0.0	0.0
fox sparrow	0.00	0.04 (0.01 - 0.07)	83.3	100.0	0.0	0.0
dark-eyed junco	0.00	0.11 (0.02 - 0.20)	53.3	100.0	0.0	0.0
California thrasher	0.00	0.31 (0.22 - 0.40)	7.0	100.0	0.0	0.0
California quail	0.00	0.09 (0.00 - 0.18)	0.0	0.0	0.0	0.0
California towhee	0.00	0.25 (0.16 - 0.34)	14.7	100.0	0.0	0.0
bushtit	0.00	0.17 (0.00 - 0.37)	95.7	100.0	0.0	0.0
black-throated sparrow	0.00	0.04 (0.00 - 0.08)	60.0	100.0	0.0	0.0
band-tailed pigeon	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
Bewick's wren	0.00	0.07 (0.03 - 0.11)	10.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.04 (0.00 - 0.10)	0.0	0.0	0.0	0.0

[1]These values assume a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 7c. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
common raven	0.36	1.33 (1.05 - 1.61)	86.6	65.0	30.8	4.2
turkey vulture	0.29	0.56 (0.43 - 0.69)	100.0	48.3	51.7	0.0
red-tailed hawk	0.25	0.46 (0.34 - 0.58)	87.8	30.2	62.8	7.0
cliff swallow	0.19	0.21 (0.00 - 0.52)	100.0	9.1	90.9	0.0
white-throated swift	0.10	0.32 (0.11 - 0.53)	97.1	67.7	32.3	0.0
prairie falcon	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
double-crested cormorant	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
yellow-rumped warbler	0.00	0.08 (0.01 - 0.15)	33.3	100.0	0.0	0.0
wrentit	0.00	0.41 (0.29 - 0.53)	0.0	0.0	0.0	0.0
Wilson's warbler	0.00	0.02 (0.00 - 0.04)	100.0	100.0	0.0	0.0
western wood-pewee	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
western scrub-jay	0.00	1.36 (1.13 - 1.59)	21.9	100.0	0.0	0.0
western bluebird	0.00	0.04 (0.00 - 0.08)	100.0	100.0	0.0	0.0
white-crowned sparrow	0.00	0.03 (0.00 - 0.08)	0.0	0.0	0.0	0.0
unidentified songbird	0.00	0.07 (0.02 - 0.12)	87.5	100.0	0.0	0.0
unidentified hummingbird	0.00	0.04 (0.00 - 0.08)	50.0	100.0	0.0	0.0
unidentified empidonax flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
Townsend's Warbler	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
Steller's jay	0.00	0.07 (0.00 - 0.14)	0.0	0.0	0.0	0.0
spotted towhee	0.00	0.57 (0.44 - 0.70)	1.6	100.0	0.0	0.0
Scott's oriole	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
sage sparrow	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
pacific-slope flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
phainopepla	0.00	0.09 (0.01 - 0.17)	80.0	100.0	0.0	0.0
osprey	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0

Table 7c. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
orange-crowned warbler	0.00	0.05 (0.01 - 0.09)	60.0	100.0	0.0	0.0
oak titmouse	0.00	0.13 (0.02 - 0.24)	7.1	100.0	0.0	0.0
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
northern mockingbird	0.00	0.03 (0.00 - 0.06)	0.0	0.0	0.0	0.0
northern flicker	0.00	0.09 (0.03 - 0.15)	0.0	0.0	0.0	0.0
Nashville warbler	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
mourning dove	0.00	0.23 (0.14 - 0.32)	56.0	100.0	0.0	0.0
mountain chickadee	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.05 (0.00 - 0.10)	80.0	100.0	0.0	0.0
house wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
horned lark	0.00	0.05 (0.00 - 0.11)	80.0	100.0	0.0	0.0
house finch	0.00	0.38 (0.21 - 0.55)	73.2	100.0	0.0	0.0
Hammond’s flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
golden eagle	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
downy woodpecker	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
dark-eyed junco	0.00	0.06 (0.00 - 0.12)	83.3	100.0	0.0	0.0
Cooper's hawk	0.00	0.02 (0.00 - 0.04)	100.0	100.0	0.0	0.0
California thrasher	0.00	0.34 (0.24 - 0.44)	11.1	100.0	0.0	0.0
California quail	0.00	0.21 (0.12 - 0.30)	0.0	0.0	0.0	0.0
canyon wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
California towhee	0.00	0.36 (0.26 - 0.46)	7.7	100.0	0.0	0.0
bushtit	0.00	0.12 (0.00 - 0.24)	76.9	100.0	0.0	0.0
black-throated sparrow	0.00	0.19 (0.09 - 0.29)	10.0	100.0	0.0	0.0
black-headed grosbeak	0.00	0.08 (0.03 - 0.13)	22.2	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
Bewick's wren	0.00	0.37 (0.27 - 0.47)	5.0	100.0	0.0	0.0

Table 7c. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
black-chinned sparrow	0.00	0.10 (0.04 - 0.16)	9.1	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.07 (0.02 - 0.12)	71.4	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.15 (0.07 - 0.23)	31.3	100.0	0.0	0.0
Anna's hummingbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
American kestrel	0.00	0.02 (0.00 - 0.04)	100.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.09 (0.01 - 0.17)	20.0	100.0	0.0	0.0

[1]These values assume a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 7d. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
white-throated swift	0.71	0.95 (0.46 - 1.44)	100.0	12.6	74.7	12.6
turkey vulture	0.64	0.87 (0.57 - 1.17)	100.0	20.7	73.6	5.7
common raven	0.30	0.61 (0.32 - 0.90)	90.2	46.3	53.7	0.0
red-tailed hawk	0.17	0.48 (0.34 - 0.62)	81.3	48.7	43.6	7.7
western scrub-jay	0.12	2.56 (2.14 - 2.98)	29.7	84.2	15.8	0.0
unidentified swallow	0.10	0.10 (0.00 - 0.21)	100.0	0.0	100.0	0.0
house finch	0.07	1.15 (0.81 - 1.49)	63.5	90.9	9.1	0.0
Cooper's hawk	0.03	0.05 (0.01 - 0.09)	100.0	20.0	60.0	20.0
cliff swallow	0.03	0.08 (0.00 - 0.16)	100.0	62.5	37.5	0.0
unidentified falcon	0.02	0.02 (0.00 - 0.05)	100.0	0.0	100.0	0.0
barn swallow	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
yellow warbler	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
wrentit	0.00	0.54 (0.38 - 0.70)	0.0	0.0	0.0	0.0
Wilson's warbler	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
western wood-pewee	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
western tanager	0.00	0.06 (0.00 - 0.12)	83.3	100.0	0.0	0.0
western kingbird	0.00	0.05 (0.01 - 0.09)	60.0	100.0	0.0	0.0
western bluebird	0.00	0.14 (0.01 - 0.27)	64.3	100.0	0.0	0.0
unidentified woodpecker	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified warbler	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified sparrow	0.00	0.05 (0.01 - 0.09)	100.0	100.0	0.0	0.0
unidentified songbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified hummingbird	0.00	0.35 (0.22 - 0.48)	100.0	100.0	0.0	0.0
unidentified empidonax flycatcher	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
Steller's jay	0.00	0.07 (0.00 - 0.14)	42.9	100.0	0.0	0.0
sharp-shinned hawk	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0

Table 7d. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
spotted towhee	0.00	0.34 (0.24 - 0.44)	8.8	100.0	0.0	0.0
Scott's oriole	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
savannah sparrow	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
Say's phoebe	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
sage sparrow	0.00	0.25 (0.10 - 0.40)	52.0	100.0	0.0	0.0
rock wren	0.00	0.20 (0.12 - 0.28)	20.0	100.0	0.0	0.0
rufous-crowned sparrow	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
pacific-slope flycatcher	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
phainopepla	0.00	0.44 (0.30 - 0.58)	61.4	100.0	0.0	0.0
oak titmouse	0.00	0.13 (0.05 - 0.21)	7.7	100.0	0.0	0.0
Nuttall's woodpecker	0.00	0.12 (0.06 - 0.18)	25.0	100.0	0.0	0.0
northern rough-winged swallow	0.00	0.02 (0.00 - 0.05)	100.0	100.0	0.0	0.0
northern mockingbird	0.00	0.07 (0.01 - 0.13)	57.1	100.0	0.0	0.0
northern flicker	0.00	0.17 (0.10 - 0.24)	5.9	100.0	0.0	0.0
mourning dove	0.00	0.44 (0.31 - 0.57)	75.0	100.0	0.0	0.0
lesser goldfinch	0.00	0.53 (0.24 - 0.82)	67.9	100.0	0.0	0.0
ladder-backed woodpecker	0.00	0.03 (0.00 - 0.06)	33.3	100.0	0.0	0.0
Lawrence’s goldfinch	0.00	0.08 (0.00 - 0.16)	50.0	100.0	0.0	0.0
house wren	0.00	0.04 (0.01 - 0.07)	25.0	100.0	0.0	0.0
California thrasher	0.00	0.14 (0.06 - 0.22)	0.0	0.0	0.0	0.0
California quail	0.00	0.13 (0.03 - 0.23)	0.0	0.0	0.0	0.0
canyon wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
California towhee	0.00	0.55 (0.39 - 0.71)	21.8	100.0	0.0	0.0
Cassin's kingbird	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
bushtit	0.00	0.32 (0.01 - 0.63)	37.5	100.0	0.0	0.0
black-throated sparrow	0.00	0.29 (0.18 - 0.40)	10.3	100.0	0.0	0.0

Table 7d. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
band-tailed pigeon	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
blue grosbeak	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
black-headed grosbeak	0.00	0.11 (0.04 - 0.18)	63.6	100.0	0.0	0.0
brown-headed cowbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
Bewick's wren	0.00	0.19 (0.11 - 0.27)	5.3	100.0	0.0	0.0
black-chinned sparrow	0.00	0.13 (0.04 - 0.22)	15.4	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.19 (0.11 - 0.27)	26.3	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.16 (0.08 - 0.24)	43.8	100.0	0.0	0.0
American kestrel	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
American crow	0.00	0.07 (0.01 - 0.13)	57.1	100.0	0.0	0.0
acorn woodpecker	0.00	0.23 (0.08 - 0.38)	8.7	100.0	0.0	0.0

[1]These values assume a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 7e. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
Vaux's swift	1.40	1.99 (0.00 - 5.26)	100.0	29.8	70.2	0.0
common raven	0.69	1.37 (0.94 - 1.80)	87.1	31.3	57.5	11.3
white-throated swift	0.52	1.09 (0.27 - 1.91)	100.0	12.3	47.9	39.7
red-tailed hawk	0.23	0.50 (0.35 - 0.65)	82.4	25.9	55.6	18.5
turkey vulture	0.07	0.13 (0.00 - 0.26)	100.0	11.1	55.6	33.3
northern rough-winged swallow	0.07	0.07 (0.00 - 0.19)	100.0	0.0	100.0	0.0
Cooper's hawk	0.07	0.09 (0.03 - 0.15)	100.0	16.7	83.3	0.0
barn swallow	0.07	0.07 (0.00 - 0.16)	100.0	0.0	100.0	0.0
unidentified songbird	0.05	0.18 (0.07 - 0.29)	100.0	75.0	25.0	0.0
cliff swallow	0.04	0.04 (0.00 - 0.11)	100.0	0.0	100.0	0.0
unidentified hummingbird	0.02	0.06 (0.01 - 0.11)	100.0	75.0	25.0	0.0
golden eagle	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
American kestrel	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
wrentit	0.00	0.43 (0.27 - 0.59)	6.9	100.0	0.0	0.0
western scrub-jay	0.00	2.01 (1.53 - 2.49)	47.4	100.0	0.0	0.0
western bluebird	0.00	0.28 (0.00 - 0.63)	84.2	100.0	0.0	0.0
white-crowned sparrow	0.00	0.07 (0.00 - 0.17)	100.0	100.0	0.0	0.0
unidentified piranga tanager	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified sparrow	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified raptor	0.00	0.03 (0.00 - 0.08)	100.0	100.0	0.0	0.0
unidentified quail	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
sharp-shinned hawk	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
spotted towhee	0.00	0.09 (0.02 - 0.16)	33.3	100.0	0.0	0.0
rock wren	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
phainopepla	0.00	0.03 (0.00 - 0.06)	0.0	0.0	0.0	0.0

Table 7e. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
oak titmouse	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
northern harrier	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
northern flicker	0.00	0.09 (0.02 - 0.16)	33.3	100.0	0.0	0.0
loggerhead shrike	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.19 (0.06 - 0.32)	69.2	100.0	0.0	0.0
house finch	0.00	0.24 (0.11 - 0.37)	31.3	100.0	0.0	0.0
fox sparrow	0.00	0.12 (0.00 - 0.27)	87.5	100.0	0.0	0.0
dark-eyed junco	0.00	0.18 (0.03 - 0.33)	83.3	100.0	0.0	0.0
California thrasher	0.00	0.09 (0.02 - 0.16)	83.3	100.0	0.0	0.0
California quail	0.00	0.29 (0.00 - 0.73)	90.0	100.0	0.0	0.0
California towhee	0.00	0.34 (0.18 - 0.50)	47.8	100.0	0.0	0.0
bushtit	0.00	0.22 (0.00 - 0.49)	0.0	0.0	0.0	0.0
black-tailed gnatcatcher	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
Bewick's wren	0.00	0.16 (0.07 - 0.25)	9.1	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
American crow	0.00	0.07 (0.00 - 0.14)	100.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.03 (0.00 - 0.08)	0.0	0.0	0.0	0.0

[1]These values assume a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 7f. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Winter 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
violet-green swallow	0.29	0.29 (0.00 - 0.77)	100.0	0.0	100.0	0.0
red-tailed hawk	0.24	0.52 (0.41 - 0.63)	74.6	38.5	61.5	0.0
common raven	0.22	0.73 (0.57 - 0.89)	86.0	64.0	34.9	1.2
white-throated swift	0.04	0.08 (0.01 - 0.15)	100.0	45.5	54.5	0.0
turkey vulture	0.04	0.07 (0.02 - 0.12)	100.0	40.0	60.0	0.0
unidentified gull	0.02	0.02 (0.00 - 0.06)	100.0	0.0	100.0	0.0
northern harrier	0.01	0.01 (0.00 - 0.03)	100.0	50.0	50.0	0.0
American kestrel	0.01	0.01 (0.00 - 0.03)	100.0	50.0	50.0	0.0
wrentit	0.00	0.17 (0.10 - 0.24)	4.3	100.0	0.0	0.0
western scrub-jay	0.00	1.39 (1.14 - 1.64)	37.4	100.0	0.0	0.0
western bluebird	0.00	0.25 (0.10 - 0.40)	67.6	100.0	0.0	0.0
white-crowned sparrow	0.00	0.04 (0.00 - 0.08)	20.0	100.0	0.0	0.0
unidentified raptor	0.00	0.02 (0.00 - 0.04)	33.3	100.0	0.0	0.0
unidentified songbird	0.00	0.03 (0.00 - 0.06)	50.0	100.0	0.0	0.0
Steller's jay	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
spotted towhee	0.00	0.15 (0.09 - 0.21)	20.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.02)	100.0	100.0	0.0	0.0
phainopepla	0.00	0.02 (0.00 - 0.04)	66.7	100.0	0.0	0.0
oak titmouse	0.00	0.09 (0.04 - 0.14)	0.0	0.0	0.0	0.0
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
northern flicker	0.00	0.09 (0.04 - 0.14)	0.0	0.0	0.0	0.0
mourning dove	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
mountain chickadee	0.00	0.03 (0.00 - 0.08)	100.0	100.0	0.0	0.0
mountain bluebird	0.00	0.07 (0.00 - 0.15)	100.0	100.0	0.0	0.0
mallard	0.00	0.18 (0.00 - 0.47)	100.0	100.0	0.0	0.0
lesser goldfinch	0.00	0.04 (0.00 - 0.09)	66.7	100.0	0.0	0.0

Table 7f. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Winter 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
ladder-backed woodpecker	0.00	0.03 (0.01 - 0.05)	50.0	100.0	0.0	0.0
house finch	0.00	0.08 (0.03 - 0.13)	63.6	100.0	0.0	0.0
fox sparrow	0.00	0.04 (0.01 - 0.07)	83.3	100.0	0.0	0.0
dark-eyed junco	0.00	0.11 (0.02 - 0.20)	53.3	100.0	0.0	0.0
California thrasher	0.00	0.31 (0.22 - 0.40)	7.0	100.0	0.0	0.0
California quail	0.00	0.09 (0.00 - 0.18)	0.0	0.0	0.0	0.0
California towhee	0.00	0.25 (0.16 - 0.34)	14.7	100.0	0.0	0.0
bushtit	0.00	0.17 (0.00 - 0.37)	95.7	100.0	0.0	0.0
black-throated sparrow	0.00	0.04 (0.00 - 0.08)	60.0	100.0	0.0	0.0
band-tailed pigeon	0.00	0.01 (0.00 - 0.02)	0.0	0.0	0.0	0.0
Bewick's wren	0.00	0.07 (0.03 - 0.11)	10.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.04 (0.00 - 0.10)	0.0	0.0	0.0	0.0

[1]These values assume a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 7g. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
common raven	0.46	1.33 (1.05 - 1.61)	86.6	51.7	40.0	8.3
turkey vulture	0.37	0.56 (0.43 - 0.69)	100.0	33.3	66.7	0.0
red-tailed hawk	0.30	0.46 (0.34 - 0.58)	87.8	18.6	74.4	7.0
cliff swallow	0.19	0.21 (0.00 - 0.52)	100.0	9.1	90.9	0.0
white-throated swift	0.10	0.32 (0.11 - 0.53)	97.1	67.7	32.3	0.0
prairie falcon	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
mourning dove	0.01	0.23 (0.14 - 0.32)	56.0	92.9	7.1	0.0
double-crested cormorant	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
Cooper's hawk	0.01	0.02 (0.00 - 0.04)	100.0	50.0	50.0	0.0
American kestrel	0.01	0.02 (0.00 - 0.04)	100.0	50.0	50.0	0.0
yellow-rumped warbler	0.00	0.08 (0.01 - 0.15)	33.3	100.0	0.0	0.0
wrentit	0.00	0.41 (0.29 - 0.53)	0.0	0.0	0.0	0.0
Wilson's warbler	0.00	0.02 (0.00 - 0.04)	100.0	100.0	0.0	0.0
western wood-pewee	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
western scrub-jay	0.00	1.36 (1.13 - 1.59)	21.9	100.0	0.0	0.0
western bluebird	0.00	0.04 (0.00 - 0.08)	100.0	100.0	0.0	0.0
white-crowned sparrow	0.00	0.03 (0.00 - 0.08)	0.0	0.0	0.0	0.0
unidentified songbird	0.00	0.07 (0.02 - 0.12)	87.5	100.0	0.0	0.0
unidentified hummingbird	0.00	0.04 (0.00 - 0.08)	50.0	100.0	0.0	0.0
unidentified empidonax flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
Townsend's Warbler	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
Steller's jay	0.00	0.07 (0.00 - 0.14)	0.0	0.0	0.0	0.0
spotted towhee	0.00	0.57 (0.44 - 0.70)	1.6	100.0	0.0	0.0
Scott's oriole	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
sage sparrow	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
ruby-crowned kinglet	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0

Table 7g. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
pacific-slope flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
phainopepla	0.00	0.09 (0.01 - 0.17)	80.0	100.0	0.0	0.0
osprey	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
orange-crowned warbler	0.00	0.05 (0.01 - 0.09)	60.0	100.0	0.0	0.0
oak titmouse	0.00	0.13 (0.02 - 0.24)	7.1	100.0	0.0	0.0
Nuttall's woodpecker	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
northern mockingbird	0.00	0.03 (0.00 - 0.06)	0.0	0.0	0.0	0.0
northern flicker	0.00	0.09 (0.03 - 0.15)	0.0	0.0	0.0	0.0
Nashville warbler	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
mountain chickadee	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.05 (0.00 - 0.10)	80.0	100.0	0.0	0.0
house wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
horned lark	0.00	0.05 (0.00 - 0.11)	80.0	100.0	0.0	0.0
house finch	0.00	0.38 (0.21 - 0.55)	73.2	100.0	0.0	0.0
Hammond’s flycatcher	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
golden eagle	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
downy woodpecker	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
dark-eyed junco	0.00	0.06 (0.00 - 0.12)	83.3	100.0	0.0	0.0
California thrasher	0.00	0.34 (0.24 - 0.44)	11.1	100.0	0.0	0.0
California quail	0.00	0.21 (0.12 - 0.30)	0.0	0.0	0.0	0.0
canyon wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
California towhee	0.00	0.36 (0.26 - 0.46)	7.7	100.0	0.0	0.0
bushtit	0.00	0.12 (0.00 - 0.24)	76.9	100.0	0.0	0.0
black-throated sparrow	0.00	0.19 (0.09 - 0.29)	10.0	100.0	0.0	0.0
black-headed grosbeak	0.00	0.08 (0.03 - 0.13)	22.2	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0

Table 7g. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Spring 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
Bewick's wren	0.00	0.37 (0.27 - 0.47)	5.0	100.0	0.0	0.0
black-chinned sparrow	0.00	0.10 (0.04 - 0.16)	9.1	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.07 (0.02 - 0.12)	71.4	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.15 (0.07 - 0.23)	31.3	100.0	0.0	0.0
Anna's hummingbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.09 (0.01 - 0.17)	20.0	100.0	0.0	0.0

[1]These values assume a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 7h. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
white-throated swift	0.70	0.95 (0.46 - 1.44)	100.0	10.5	73.7	15.8
turkey vulture	0.70	0.87 (0.57 - 1.17)	100.0	11.5	80.5	8.0
common raven	0.34	0.61 (0.32 - 0.90)	90.2	38.9	61.1	0.0
red-tailed hawk	0.24	0.48 (0.34 - 0.62)	81.3	30.8	61.5	7.7
western scrub-jay	0.12	2.56 (2.14 - 2.98)	29.7	84.2	15.8	0.0
unidentified swallow	0.10	0.10 (0.00 - 0.21)	100.0	0.0	100.0	0.0
house finch	0.08	1.15 (0.81 - 1.49)	63.5	89.1	10.9	0.0
cliff swallow	0.07	0.08 (0.00 - 0.16)	100.0	12.5	87.5	0.0
Cooper's hawk	0.03	0.05 (0.01 - 0.09)	100.0	20.0	60.0	20.0
unidentified falcon	0.02	0.02 (0.00 - 0.05)	100.0	0.0	100.0	0.0
mourning dove	0.02	0.44 (0.31 - 0.57)	75.0	93.8	6.3	0.0
barn swallow	0.01	0.01 (0.00 - 0.03)	100.0	0.0	100.0	0.0
yellow warbler	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
wrentit	0.00	0.54 (0.38 - 0.70)	0.0	0.0	0.0	0.0
Wilson's warbler	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
western wood-pewee	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
western tanager	0.00	0.06 (0.00 - 0.12)	83.3	100.0	0.0	0.0
western kingbird	0.00	0.05 (0.01 - 0.09)	60.0	100.0	0.0	0.0
western bluebird	0.00	0.14 (0.01 - 0.27)	64.3	100.0	0.0	0.0
unidentified woodpecker	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified warbler	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified sparrow	0.00	0.05 (0.01 - 0.09)	100.0	100.0	0.0	0.0
unidentified songbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
unidentified hummingbird	0.00	0.35 (0.22 - 0.48)	100.0	100.0	0.0	0.0
unidentified empidonax flycatcher	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
Steller's jay	0.00	0.07 (0.00 - 0.14)	42.9	100.0	0.0	0.0

Table 7h. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
sharp-shinned hawk	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
spotted towhee	0.00	0.34 (0.24 - 0.44)	8.8	100.0	0.0	0.0
Scott's oriole	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
savannah sparrow	0.00	0.02 (0.00 - 0.05)	0.0	0.0	0.0	0.0
Say's phoebe	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
sage sparrow	0.00	0.25 (0.10 - 0.40)	52.0	100.0	0.0	0.0
rock wren	0.00	0.20 (0.12 - 0.28)	20.0	100.0	0.0	0.0
rufous-crowned sparrow	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
pacific-slope flycatcher	0.00	0.02 (0.00 - 0.04)	0.0	0.0	0.0	0.0
phainopepla	0.00	0.44 (0.30 - 0.58)	61.4	100.0	0.0	0.0
oak titmouse	0.00	0.13 (0.05 - 0.21)	7.7	100.0	0.0	0.0
Nuttall's woodpecker	0.00	0.12 (0.06 - 0.18)	25.0	100.0	0.0	0.0
northern rough-winged swallow	0.00	0.02 (0.00 - 0.05)	100.0	100.0	0.0	0.0
northern mockingbird	0.00	0.07 (0.01 - 0.13)	57.1	100.0	0.0	0.0
northern flicker	0.00	0.17 (0.10 - 0.24)	5.9	100.0	0.0	0.0
lesser goldfinch	0.00	0.53 (0.24 - 0.82)	67.9	100.0	0.0	0.0
ladder-backed woodpecker	0.00	0.03 (0.00 - 0.06)	33.3	100.0	0.0	0.0
Lawrence’s goldfinch	0.00	0.08 (0.00 - 0.16)	50.0	100.0	0.0	0.0
house wren	0.00	0.04 (0.01 - 0.07)	25.0	100.0	0.0	0.0
California thrasher	0.00	0.14 (0.06 - 0.22)	0.0	0.0	0.0	0.0
California quail	0.00	0.13 (0.03 - 0.23)	0.0	0.0	0.0	0.0
canyon wren	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
California towhee	0.00	0.55 (0.39 - 0.71)	21.8	100.0	0.0	0.0
Cassin's kingbird	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
bushtit	0.00	0.32 (0.01 - 0.63)	37.5	100.0	0.0	0.0
black-throated sparrow	0.00	0.29 (0.18 - 0.40)	10.3	100.0	0.0	0.0

Table 7h. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, during Summer 2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
band-tailed pigeon	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
blue grosbeak	0.00	0.01 (0.00 - 0.03)	0.0	0.0	0.0	0.0
black-headed grosbeak	0.00	0.11 (0.04 - 0.18)	63.6	100.0	0.0	0.0
brown-headed cowbird	0.00	0.01 (0.00 - 0.03)	100.0	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
Bewick's wren	0.00	0.19 (0.11 - 0.27)	5.3	100.0	0.0	0.0
black-chinned sparrow	0.00	0.13 (0.04 - 0.22)	15.4	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.19 (0.11 - 0.27)	26.3	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.16 (0.08 - 0.24)	43.8	100.0	0.0	0.0
American kestrel	0.00	0.02 (0.00 - 0.04)	50.0	100.0	0.0	0.0
American crow	0.00	0.07 (0.01 - 0.13)	57.1	100.0	0.0	0.0
acorn woodpecker	0.00	0.23 (0.08 - 0.38)	8.7	100.0	0.0	0.0

[1]These values assume a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 7i. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
white-throated swift	0.34	0.52 (0.00 - 1.08)	99.5	27.1	66.7	6.2
common raven	0.29	0.96 (0.40 - 1.52)	87.1	61.2	35.0	3.8
turkey vulture	0.25	0.40 (0.00 - 0.96)	100.0	33.7	63.3	3.0
Vaux's swift	0.21	0.33 (0.00 - 1.00)	100.0	35.9	64.1	0.0
red-tailed hawk	0.21	0.49 (0.00 - 1.05)	80.7	44.1	52.2	3.7
violet-green swallow	0.10	0.10 (0.00 - 0.57)	100.0	0.0	100.0	0.0
cliff swallow	0.06	0.08 (0.00 - 0.64)	100.0	21.2	78.8	0.0
western scrub-jay	0.03	1.77 (1.21 - 2.33)	33.5	95.1	4.9	0.0
unidentified swallow	0.02	0.02 (0.00 - 0.58)	100.0	0.0	100.0	0.0
Cooper's hawk	0.02	0.03 (0.00 - 0.59)	100.0	38.5	53.8	7.7
unidentified songbird	0.01	0.06 (0.00 - 0.62)	88.0	85.7	14.3	0.0
unidentified gull	0.01	0.01 (0.00 - 0.48)	100.0	0.0	100.0	0.0
house finch	0.01	0.44 (0.00 - 1.00)	62.8	94.8	5.2	0.0
barn swallow	0.01	0.01 (0.00 - 0.57)	100.0	33.3	66.7	0.0
yellow warbler	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
yellow-rumped warbler	0.00	0.02 (0.00 - 0.56)	33.3	100.0	0.0	0.0
wrentit	0.00	0.36 (0.00 - 0.92)	2.0	100.0	0.0	0.0
Wilson's warbler	0.00	0.01 (0.00 - 0.57)	50.0	100.0	0.0	0.0
western wood-pewee	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
western tanager	0.00	0.01 (0.00 - 0.57)	83.3	100.0	0.0	0.0
western kingbird	0.00	0.01 (0.00 - 0.57)	60.0	100.0	0.0	0.0
western bluebird	0.00	0.17 (0.00 - 0.73)	73.2	100.0	0.0	0.0
white-crowned sparrow	0.00	0.03 (0.00 - 0.57)	46.2	100.0	0.0	0.0
unidentified piranga tanager	0.00	0.00 (0.00 - 0.68)	100.0	100.0	0.0	0.0
unidentified woodpecker	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
unidentified warbler	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0

Table 7i. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
unidentified sparrow	0.00	0.01 (0.00 - 0.57)	100.0	100.0	0.0	0.0
unidentified raptor	0.00	0.01 (0.00 - 0.49)	60.0	100.0	0.0	0.0
unidentified quail	0.00	0.00 (0.00 - 0.68)	0.0	0.0	0.0	0.0
unidentified hummingbird	0.00	0.10 (0.00 - 0.66)	95.3	97.5	2.5	0.0
unidentified falcon	0.00	0.00 (0.00 - 0.56)	100.0	0.0	100.0	0.0
unidentified empidonax flycatcher	0.00	0.00 (0.00 - 0.56)	50.0	100.0	0.0	0.0
Townsend's Warbler	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
Steller's jay	0.00	0.04 (0.00 - 0.60)	18.8	100.0	0.0	0.0
sharp-shinned hawk	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
spotted towhee	0.00	0.29 (0.00 - 0.85)	8.3	100.0	0.0	0.0
Scott's oriole	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
savannah sparrow	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
Say's phoebe	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
sage sparrow	0.00	0.06 (0.00 - 0.62)	53.8	100.0	0.0	0.0
rock wren	0.00	0.05 (0.00 - 0.61)	22.7	100.0	0.0	0.0
rufous-crowned sparrow	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.55)	60.0	100.0	0.0	0.0
pacific-slope flycatcher	0.00	0.01 (0.00 - 0.56)	0.0	0.0	0.0	0.0
prairie falcon	0.00	0.00 (0.00 - 0.54)	100.0	0.0	100.0	0.0
phainopepla	0.00	0.14 (0.00 - 0.70)	62.7	100.0	0.0	0.0
osprey	0.00	0.00 (0.00 - 0.54)	100.0	100.0	0.0	0.0
orange-crowned warbler	0.00	0.01 (0.00 - 0.55)	60.0	100.0	0.0	0.0
oak titmouse	0.00	0.10 (0.00 - 0.65)	5.0	100.0	0.0	0.0
Nuttall's woodpecker	0.00	0.04 (0.00 - 0.59)	26.7	100.0	0.0	0.0
northern rough-winged swallow	0.00	0.02 (0.00 - 0.57)	100.0	100.0	0.0	0.0
northern mockingbird	0.00	0.02 (0.00 - 0.58)	40.0	100.0	0.0	0.0

Table 7i. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
northern harrier	0.00	0.01 (0.00 - 0.68)	100.0	100.0	0.0	0.0
northern flicker	0.00	0.11 (0.00 - 0.67)	6.7	100.0	0.0	0.0
Nashville warbler	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
mourning dove	0.00	0.17 (0.00 - 0.73)	65.3	100.0	0.0	0.0
mountain chickadee	0.00	0.01 (0.00 - 0.55)	80.0	100.0	0.0	0.0
mountain bluebird	0.00	0.02 (0.00 - 0.50)	100.0	100.0	0.0	0.0
mallard	0.00	0.06 (0.00 - 0.53)	100.0	100.0	0.0	0.0
loggerhead shrike	0.00	0.00 (0.00 - 0.68)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.19 (0.00 - 0.74)	68.8	100.0	0.0	0.0
ladder-backed woodpecker	0.00	0.02 (0.00 - 0.57)	42.9	100.0	0.0	0.0
Lawrence's goldfinch	0.00	0.02 (0.00 - 0.58)	50.0	100.0	0.0	0.0
house wren	0.00	0.01 (0.00 - 0.57)	20.0	100.0	0.0	0.0
horned lark	0.00	0.01 (0.00 - 0.55)	80.0	100.0	0.0	0.0
Hammond's flycatcher	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
golden eagle	0.00	0.00 (0.00 - 0.54)	100.0	50.0	50.0	0.0
fox sparrow	0.00	0.03 (0.00 - 0.51)	85.7	100.0	0.0	0.0
downy woodpecker	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
dark-eyed junco	0.00	0.08 (0.00 - 0.62)	69.7	100.0	0.0	0.0
double-crested cormorant	0.00	0.00 (0.00 - 0.54)	100.0	0.0	100.0	0.0
California thrasher	0.00	0.24 (0.00 - 0.80)	12.1	100.0	0.0	0.0
California quail	0.00	0.17 (0.00 - 0.72)	26.1	100.0	0.0	0.0
canyon wren	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
California towhee	0.00	0.37 (0.00 - 0.92)	20.5	100.0	0.0	0.0
Cassin's kingbird	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
bushtit	0.00	0.20 (0.00 - 0.76)	53.0	100.0	0.0	0.0
black-throated sparrow	0.00	0.13 (0.00 - 0.69)	14.8	100.0	0.0	0.0

Table 7i. Avian flight height characteristics in relation to the 3 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
band-tailed pigeon	0.00	0.00 (0.00 - 0.56)	50.0	100.0	0.0	0.0
black-tailed gnatcatcher	0.00	0.00 (0.00 - 0.68)	100.0	100.0	0.0	0.0
blue grosbeak	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
black-headed grosbeak	0.00	0.05 (0.00 - 0.60)	45.0	100.0	0.0	0.0
brown-headed cowbird	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
Bewick's wren	0.00	0.19 (0.00 - 0.75)	6.3	100.0	0.0	0.0
black-chinned sparrow	0.00	0.06 (0.00 - 0.61)	12.5	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.02 (0.00 - 0.58)	66.7	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.08 (0.00 - 0.64)	28.6	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.04 (0.00 - 0.60)	50.0	100.0	0.0	0.0
American kestrel	0.00	0.02 (0.00 - 0.57)	85.7	66.7	33.3	0.0
American crow	0.00	0.03 (0.00 - 0.59)	75.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.10 (0.00 - 0.66)	9.8	100.0	0.0	0.0

[1]These values assume a 3MW turbine with a rotor diameter of 90 (m) and a hub height of 105 (m)

Table 7j. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
common raven	0.39	0.96 (0.40 - 1.52)	87.1	47.9	46.2	5.9
white-throated swift	0.30	0.52 (0.00 - 1.08)	99.5	21.4	57.6	21.0
turkey vulture	0.29	0.40 (0.00 - 0.96)	100.0	21.1	72.9	6.0
red-tailed hawk	0.25	0.49 (0.00 - 1.05)	80.7	29.2	64.0	6.8
Vaux's swift	0.23	0.33 (0.00 - 1.00)	100.0	29.8	70.2	0.0
violet-green swallow	0.10	0.10 (0.00 - 0.57)	100.0	0.0	100.0	0.0
cliff swallow	0.07	0.08 (0.00 - 0.64)	100.0	9.1	90.9	0.0
western scrub-jay	0.03	1.77 (1.21 - 2.33)	33.5	95.1	4.9	0.0
unidentified swallow	0.02	0.02 (0.00 - 0.58)	100.0	0.0	100.0	0.0
house finch	0.02	0.44 (0.00 - 1.00)	62.8	93.8	6.3	0.0
Cooper's hawk	0.02	0.03 (0.00 - 0.59)	100.0	23.1	69.2	7.7
unidentified songbird	0.01	0.06 (0.00 - 0.62)	88.0	85.7	14.3	0.0
unidentified gull	0.01	0.01 (0.00 - 0.48)	100.0	0.0	100.0	0.0
northern rough-winged swallow	0.01	0.02 (0.00 - 0.57)	100.0	28.6	71.4	0.0
mourning dove	0.01	0.17 (0.00 - 0.73)	65.3	93.5	6.5	0.0
barn swallow	0.01	0.01 (0.00 - 0.57)	100.0	0.0	100.0	0.0
American kestrel	0.01	0.02 (0.00 - 0.57)	85.7	50.0	50.0	0.0
yellow warbler	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
yellow-rumped warbler	0.00	0.02 (0.00 - 0.56)	33.3	100.0	0.0	0.0
wrentit	0.00	0.36 (0.00 - 0.92)	2.0	100.0	0.0	0.0
Wilson's warbler	0.00	0.01 (0.00 - 0.57)	50.0	100.0	0.0	0.0
western wood-pewee	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
western tanager	0.00	0.01 (0.00 - 0.57)	83.3	100.0	0.0	0.0
western kingbird	0.00	0.01 (0.00 - 0.57)	60.0	100.0	0.0	0.0
western bluebird	0.00	0.17 (0.00 - 0.73)	73.2	100.0	0.0	0.0
white-crowned sparrow	0.00	0.03 (0.00 - 0.57)	46.2	100.0	0.0	0.0

Table 7j. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
unidentified piranga tanager	0.00	0.00 (0.00 - 0.68)	100.0	100.0	0.0	0.0
unidentified woodpecker	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
unidentified warbler	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
unidentified sparrow	0.00	0.01 (0.00 - 0.57)	100.0	100.0	0.0	0.0
unidentified raptor	0.00	0.01 (0.00 - 0.49)	60.0	100.0	0.0	0.0
unidentified quail	0.00	0.00 (0.00 - 0.68)	0.0	0.0	0.0	0.0
unidentified hummingbird	0.00	0.10 (0.00 - 0.66)	95.3	97.5	2.5	0.0
unidentified falcon	0.00	0.00 (0.00 - 0.56)	100.0	0.0	100.0	0.0
unidentified empidonax flycatcher	0.00	0.00 (0.00 - 0.56)	50.0	100.0	0.0	0.0
Townsend's Warbler	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
Steller's jay	0.00	0.04 (0.00 - 0.60)	18.8	100.0	0.0	0.0
sharp-shinned hawk	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
spotted towhee	0.00	0.29 (0.00 - 0.85)	8.3	100.0	0.0	0.0
Scott's oriole	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
savannah sparrow	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
Say's phoebe	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
sage sparrow	0.00	0.06 (0.00 - 0.62)	53.8	100.0	0.0	0.0
rock wren	0.00	0.05 (0.00 - 0.61)	22.7	100.0	0.0	0.0
rufous-crowned sparrow	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
ruby-crowned kinglet	0.00	0.01 (0.00 - 0.55)	60.0	100.0	0.0	0.0
pacific-slope flycatcher	0.00	0.01 (0.00 - 0.56)	0.0	0.0	0.0	0.0
prairie falcon	0.00	0.00 (0.00 - 0.54)	100.0	0.0	100.0	0.0
phainopepla	0.00	0.14 (0.00 - 0.70)	62.7	100.0	0.0	0.0
osprey	0.00	0.00 (0.00 - 0.54)	100.0	100.0	0.0	0.0
orange-crowned warbler	0.00	0.01 (0.00 - 0.55)	60.0	100.0	0.0	0.0
oak titmouse	0.00	0.10 (0.00 - 0.65)	5.0	100.0	0.0	0.0

Table 7j. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
Nuttall's woodpecker	0.00	0.04 (0.00 - 0.59)	26.7	100.0	0.0	0.0
northern mockingbird	0.00	0.02 (0.00 - 0.58)	40.0	100.0	0.0	0.0
northern harrier	0.00	0.01 (0.00 - 0.68)	100.0	66.7	33.3	0.0
northern flicker	0.00	0.11 (0.00 - 0.67)	6.7	100.0	0.0	0.0
Nashville warbler	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
mountain chickadee	0.00	0.01 (0.00 - 0.55)	80.0	100.0	0.0	0.0
mountain bluebird	0.00	0.02 (0.00 - 0.50)	100.0	100.0	0.0	0.0
mallard	0.00	0.06 (0.00 - 0.53)	100.0	100.0	0.0	0.0
loggerhead shrike	0.00	0.00 (0.00 - 0.68)	0.0	0.0	0.0	0.0
lesser goldfinch	0.00	0.19 (0.00 - 0.74)	68.8	100.0	0.0	0.0
ladder-backed woodpecker	0.00	0.02 (0.00 - 0.57)	42.9	100.0	0.0	0.0
Lawrence’s goldfinch	0.00	0.02 (0.00 - 0.58)	50.0	100.0	0.0	0.0
house wren	0.00	0.01 (0.00 - 0.57)	20.0	100.0	0.0	0.0
horned lark	0.00	0.01 (0.00 - 0.55)	80.0	100.0	0.0	0.0
Hammond’s flycatcher	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
golden eagle	0.00	0.00 (0.00 - 0.54)	100.0	50.0	50.0	0.0
fox sparrow	0.00	0.03 (0.00 - 0.51)	85.7	100.0	0.0	0.0
downy woodpecker	0.00	0.00 (0.00 - 0.54)	0.0	0.0	0.0	0.0
dark-eyed junco	0.00	0.08 (0.00 - 0.62)	69.7	100.0	0.0	0.0
double-crested cormorant	0.00	0.00 (0.00 - 0.54)	100.0	0.0	100.0	0.0
California thrasher	0.00	0.24 (0.00 - 0.80)	12.1	100.0	0.0	0.0
California quail	0.00	0.17 (0.00 - 0.72)	26.1	100.0	0.0	0.0
canyon wren	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
California towhee	0.00	0.37 (0.00 - 0.92)	20.5	100.0	0.0	0.0
Cassin's kingbird	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
bushtit	0.00	0.20 (0.00 - 0.76)	53.0	100.0	0.0	0.0

Table 7j. Avian flight height characteristics in relation to the 1.5 MW turbine rotor swept area (RSA)[1] at the Tule Wind Resource Area, from 2007-2008.

Species	Encounter Rate	Mean Use # birds/ 30 min. (90% confidence interval)	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
black-throated sparrow	0.00	0.13 (0.00 - 0.69)	14.8	100.0	0.0	0.0
band-tailed pigeon	0.00	0.00 (0.00 - 0.56)	50.0	100.0	0.0	0.0
black-tailed gnatcatcher	0.00	0.00 (0.00 - 0.68)	100.0	100.0	0.0	0.0
blue grosbeak	0.00	0.00 (0.00 - 0.56)	0.0	0.0	0.0	0.0
black-headed grosbeak	0.00	0.05 (0.00 - 0.60)	45.0	100.0	0.0	0.0
brown-headed cowbird	0.00	0.00 (0.00 - 0.56)	100.0	100.0	0.0	0.0
blue-gray gnatcatcher	0.00	0.01 (0.00 - 0.57)	25.0	100.0	0.0	0.0
Bewick's wren	0.00	0.19 (0.00 - 0.75)	6.3	100.0	0.0	0.0
black-chinned sparrow	0.00	0.06 (0.00 - 0.61)	12.5	100.0	0.0	0.0
black-chinned hummingbird	0.00	0.02 (0.00 - 0.58)	66.7	100.0	0.0	0.0
ash-throated flycatcher	0.00	0.08 (0.00 - 0.64)	28.6	100.0	0.0	0.0
Anna’s hummingbird	0.00	0.04 (0.00 - 0.60)	50.0	100.0	0.0	0.0
American crow	0.00	0.03 (0.00 - 0.59)	75.0	100.0	0.0	0.0
acorn woodpecker	0.00	0.10 (0.00 - 0.66)	9.8	100.0	0.0	0.0

[1]These values assume a 1.5MW turbine with a rotor diameter of 77 (m) and a hub height of 80 (m)

Table 8. Incidental observations of birds during point counts at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007	Winter 2007-2008	Spring 2008	Summer 2008	Overall
	Number of individuals	Number of individuals	Number of individuals	Number of individuals	Number of individuals
bushtit	107	790	23	0	**920**
dark-eyed junco	150	425	35	0	**610**
red-tailed hawk	117	125	47	73	**362**
western scrub-jay	41	173	72	0	**286**
California quail	72	20	21	146	**259**
common raven	91	106	39	8	**244**
western bluebird	79	118	3	0	**200**
turkey vulture	4	20	45	118	**187**
oak titmouse	17	55	45	0	**117**
acorn woodpecker	56	46	5	0	**107**
red-winged blackbird	65	15	0	0	**80**
house finch	72	8	0	0	**80**
California thrasher	7	43	12	12	**74**
mountain quail	20	11	1	35	**67**
Brewer's blackbird	10	50	6	0	**66**
spotted towhee	15	30	19	0	**64**
California towhee	17	27	13	0	**57**
white-throated swift	33	5	11	0	**49**
white-crowned sparrow	16	18	13	0	**47**
yellow-rumped warbler	39	0	2	0	**41**
Bewick's wren	8	18	15	0	**41**
northern flicker	14	16	5	0	**35**
Cooper's hawk	17	6	3	8	**34**
wrentit	12	12	7	0	**31**
Steller's jay	4	13	14	0	**31**
lesser goldfinch	26	0	4	0	**30**
Vaux's swift	28	0	0	0	**28**

Table 8. Incidental observations of birds during point counts at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007	Winter 2007-2008	Spring 2008	Summer 2008	Overall
	Number of individuals	Number of individuals	Number of individuals	Number of individuals	Number of individuals
American kestrel	5	4	8	8	**25**
horned lark	0	23	0	0	**23**
European starling	14	0	8	0	**22**
American crow	17	4	1	0	**22**
Cassin's finch	0	17	0	0	**17**
phainopepla	8	5	3	0	**16**
unidentified songbird	15	0	0	0	**15**
Nuttall's woodpecker	6	6	2	0	**14**
mourning dove	12	0	2	0	**14**
blue-gray gnatcatcher	1	0	3	10	**14**
American coot	12	0	2	0	**14**
sharp-shinned hawk	9	1	1	0	**11**
unidentified hummingbird	7	0	3	0	**10**
black-chinned sparrow	0	10	0	0	**10**
northern harrier	2	5	1	0	**8**
barn swallow	8	0	0	0	**8**
ruby-crowned kinglet	6	1	0	0	**7**
mallard	7	0	0	0	**7**
rock wren	3	2	1	0	**6**
orange-crowned warbler	2	0	4	0	**6**
fox sparrow	5	1	0	0	**6**
black-headed grosbeak	1	0	5	0	**6**
violet-green swallow	0	1	4	0	**5**
unidentified sparrow	0	5	0	0	**5**
loggerhead shrike	5	0	0	0	**5**
common poorwill	5	0	0	0	**5**
Brewer's sparrow	0	0	5	0	**5**

Table 8. Incidental observations of birds during point counts at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007	Winter 2007-2008	Spring 2008	Summer 2008	Overall
	Number of individuals	Number of individuals	Number of individuals	Number of individuals	Number of individuals
willow flycatcher	2	0	2	0	**4**
unidentified raptor	0	2	1	1	**4**
Say's phoebe	2	1	1	0	**4**
greater roadrunner	0	1	1	2	**4**
great horned owl	1	3	0	0	**4**
black-throated sparrow	4	0	0	0	**4**
ash-throated flycatcher	0	0	4	0	**4**
merlin	3	0	0	0	**3**
ladder-backed woodpecker	0	2	1	0	**3**
lazuli bunting	0	0	3	0	**3**
western kingbird	0	0	2	0	**2**
northern rough-winged swallow	2	0	0	0	**2**
mountain bluebird	0	2	0	0	**2**
hermit thrush	2	0	0	0	**2**
black-throated gray warbler	2	0	0	0	**2**
western wood-pewee	0	0	1	0	**1**
western tanager	0	0	1	0	**1**
western screech-owl	0	1	0	0	**1**
white-breasted nuthatch	1	0	0	0	**1**
unidentified woodpecker	0	1	0	0	**1**
unidentified bird	1	0	0	0	**1**
Scott's oriole	0	0	1	0	**1**
rufous hummingbird	0	1	0	0	**1**
pacific-slope flycatcher	0	0	1	0	**1**
prairie falcon	1	0	0	0	**1**
osprey	1	0	0	0	**1**
olive-sided flycatcher	0	0	0	1	**1**

Table 8. Incidental observations of birds during point counts at the Tule Wind Resource Area, 2007-2008.

Species	Fall 2007	Winter 2007-2008	Spring 2008	Summer 2008	Overall
	Number of individuals	Number of individuals	Number of individuals	Number of individuals	Number of individuals
northern mockingbird	0	0	1	0	**1**
mountain chickadee	1	0	0	0	**1**
long-eared owl	0	1	0	0	**1**
golden eagle	0	0	1	0	**1**
great blue heron	0	1	0	0	**1**
Gambel's quail	0	1	0	0	**1**
downy woodpecker	0	1	0	0	**1**
black phoebe	1	0	0	0	**1**
Grand Total	**1311**	**2253**	**534**	**422**	**4520**

Table 9. Comparison of raptor and other bird use per 30-minute survey with other studies of wind projects using the similar survey methodology.

Project Site	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Plot Radius	Reference	Correction factor [a]
	Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann				
Altamont Pass, CA	5.67	4.48	6.87	4.48							10	800m	Orloff and Flannery (1992)	x3
Cotterel Mountain, ID	2.52	2.82	2.22	0.27		21.28	16.75	11.42	13.22		20	800m	USDI, BLM (2005)	÷0.67
Hoctor Ridge, WA	2.12	1.99				14.93	26.75				20	800m	Johnson et al. (2006b)	÷0.67
Lower Linden Ranch, WA	2.04										20	800m	Johnson et al. (2007d)	÷0.67
Kittitas Valley, WA	1.51	1.54	1.09								20	800m	Erickson et al. (2003b)	÷0.67
Columbia Hills, WA	1.40	2.00	1.16	0.39							20	800m	Erickson et al. (2002)	÷0.67
Combine study of: Kittitas Valley; Desert Claim; Wild Horse, WA	1.33	1.27	1.13	0.76	1.12					16.24	20	800m	Young et al. (2003)	÷0.67
Tule, CA 2005-2006	1.29	0.74	0.43	0.39	0.71	11.47	14.53	13.70	7.61	11.83	30	800m	TtEC (2007)	
Buffalo Ridge Phase II, MN	1.25	1.03	1.24	0.15							20	800m	Erickson et al. (2002)	÷0.67
Elkhorn, OR	1.21	2.33	1.18			43.93	18.13	30.39			20	800m	WEST (2005b)	÷0.67
Combine Hills, OR	1.19	0.84	0.66	0.96		8.90	3.93	2.00	4.00		30	800m	Young et al. (2002b)	
Windy Point, WA	1.18			1.15		24.49			20.22		20	800m	Johnson et al. (2006a)	÷0.67

Table 9. Comparison of raptor and other bird use per 30-minute survey with other studies of wind projects using the similar survey methodology.

Project Site	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Plot Radius	Reference	Correction factor [a]
	Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann				
Windy Flats, WA	1.15	1.31	1.22	1.28		32.10	20.84	23.94	36.66		20	800m	Johnson et al. (2007b)	÷0.67
Tule, CA 2007-2008	1.08	1.45	0.81	0.64	0.98	8.00	12.35	9.97	4.95	8.37	30	800m	THIS STUDY	
Hatchet Ridge, CA	1.04	1.54	1.36	0.18	1.03	7.82	10.36	9.43	6.01	8.43	30	800m	Young et al. (2007b)	
Buffalo Ridge, MN	1.01	0.78	1.03	0.66							20	800m	Erickson et al. (2002)	÷0.67
Buffalo Ridge Phase I, MN	0.97	0.64	1.13	0.19							20	800m	Erickson et al. (2002)	÷0.67
Buffalo Ridge Phase III, MN	0.96	0.81	1.27	0.27							20	800m	Erickson et al. (2002)	÷0.67
Stateline Wind EIS, OR/WA	0.88	0.60	0.37	0.63		10.58	8.16				20	800m	URS and West (2001)	÷0.67
Foote Creek WEC, WY	0.73	1.13	1.45	0.31							40	800m	Johnson et al. (2000)	÷1.33
Klondike Phase I, OR	0.70	0.58	0.57	0.84							20	800m	Erickson et al. (2002)	÷0.67
White Creek, WA	0.69	1.30	0.84	0.57		14.79	13.58	22.75	16.43		20	800m	Kronner et al. (2005b)	÷0.67
Wild Horse, WA	0.69	0.69	0.46	0.21		8.63	8.63	6.00	5.36		30	800m	Erickson et al. (2003a)	
Shepherds Flat, OR	0.66	0.73	0.82	0.48		13.40	21.96	7.79	5.93		20	800m	Welch and Schleder (2006)	÷0.67
Bighorn Site, WA	0.60	0.66				14.51	14.99				20	800m	Johnson and Erickson (2004)	÷0.67

Table 9. Comparison of raptor and other bird use per 30-minute survey with other studies of wind projects using the similar survey methodology.

Project Site	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Plot Radius	Reference	Correction factor [a]
	Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann				
Leaning Juniper, OR	0.58	1.60	0.79	0.36		16.96	8.48	28.49	70.15		20	800m	Kronner et al. (2005a)	÷0.67
Biglow Canyon WRA, OR	0.55	0.51	0.16	0.37		10.09	7.60	10.01	25.48		30	800m	WEST (2005a)	
Nine Canyon, WA	0.52	0.30	0.24	0.46					.		20	800m	Erickson et al. (2002)	÷0.67
Sand Ridge, WA	0.51	0.69				9.24	7.78				20	800m	Johnson et al. (2007c)	÷0.67
Biglow Canyon project area, OR	0.46	0.58	0.28	0.48		15.18	4.99	10.72	17.40		30	800m	WEST (2005a)	
Maiden, WA	0.45	0.52	0.93	0.22		6.84	7.03	17.81	12.81		30	800m	Young et al. (2002a)	
Vantage, WA	0.43	0.60	0.21	0.22		15.78	13.18	5.52	7.31		20	800m	Jefferey et al. (2007)	÷0.67
Stateline Wind, OR/WA	0.42	0.39	0.24	0.03	0.33					34.45	10	800m	Erickson et al. (2004)	x 3
Zintel Canyon, WA	0.28	0.45	1.04	0.76							20	800m	Erickson et al. (2002)	÷0.67
Dry Lake, AZ	0.12	0.21	0.31	0.21	0.22	12.09	16.45	24.03	26.87	20.18	30	800m	Young et al. (2007a)	
High Winds, CA					10.03					707.46	20	800m	Kerlinger et al. (2005)	÷0.67

[a] Correction factor to standardize mean use to birds/30 min.

APPENDIX A

FLIGHT DIRECTIONS OF BIRDS OBSERVED DURING SUMMER POINT COUNT SURVEYS AT THE TULE WIND RESOURCE AREA, 2008

Appendix A-1. Flight directions of birds observed during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
Vaux's swift	135	7	0.0	0.0	3.0	0.0	97.0	0.0	0.0	0.0	0.0
common raven	78	36	21.8	2.6	2.6	0.0	20.5	11.5	11.5	11.5	17.9
white-throated swift	74	15	1.4	0.0	2.7	23.0	16.2	0.0	0.0	0.0	56.8
western scrub-jay	62	56	9.7	8.1	29.0	1.6	17.7	9.7	19.4	1.6	3.2
red-tailed hawk	23	20	17.4	4.3	8.7	0.0	17.4	17.4	0.0	4.3	30.4
California quail	18	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
western bluebird	16	2	12.5	0.0	0.0	0.0	0.0	87.5	0.0	0.0	0.0
unidentified songbird	12	9	25.0	0.0	8.3	8.3	8.3	0.0	25.0	25.0	0.0
California towhee	11	8	0.0	9.1	45.5	0.0	36.4	0.0	9.1	0.0	0.0
dark-eyed junco	10	3	0.0	0.0	40.0	0.0	20.0	0.0	40.0	0.0	0.0
turkey vulture	9	8	11.1	0.0	0.0	0.0	22.2	55.6	11.1	0.0	0.0
lesser goldfinch	9	4	33.3	0.0	0.0	0.0	0.0	0.0	33.3	33.3	0.0
fox sparrow	7	3	0.0	14.3	14.3	0.0	0.0	0.0	71.4	0.0	0.0
Cooper's hawk	6	6	0.0	0.0	16.7	16.7	50.0	0.0	0.0	0.0	16.7
white-crowned sparrow	5	2	0.0	0.0	20.0	0.0	0.0	0.0	80.0	0.0	0.0
northern rough-winged	5	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
house finch	5	3	60.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0
California thrasher	5	5	0.0	0.0	20.0	0.0	20.0	0.0	40.0	20.0	0.0
barn swallow	5	2	0.0	0.0	0.0	60.0	40.0	0.0	0.0	0.0	0.0
American crow	5	3	0.0	0.0	0.0	0.0	0.0	60.0	40.0	0.0	0.0
unidentified hummingbird	4	4	50.0	0.0	0.0	0.0	25.0	25.0	0.0	0.0	0.0
cliff swallow	3	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0

Appendix A-1. Flight directions of birds observed during Fall point count surveys at the Tule Wind Resource Area, 2007.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
wrentit	2	2	0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0
unidentified raptor	2	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
spotted towhee	2	2	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0
northern flicker	2	2	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified piranga tanager	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
unidentified sparrow	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sharp-shinned hawk	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
rock wren	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	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
Nuttall's woodpecker	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
northern harrier	1	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
golden eagle	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Bewick's wren	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Anna’s hummingbird	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
American kestrel	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total	**526**	**217**	**8.7**	**1.9**	**9.1**	**8.0**	**38.0**	**8.4**	**9.3**	**4.0**	**12.5**

Appendix A-2. Flight directions of birds observed during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
common raven	82	49	30.5	2.4	9.8	1.2	22.0	3.7	8.5	2.4	19.5
western scrub-jay	71	53	23.9	11.3	29.6	0.0	14.1	0.0	14.1	0.0	7.0
red-tailed hawk	44	39	9.1	6.8	6.8	11.4	18.2	9.1	11.4	2.3	25.0
violet-green swallow	40	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mallard	24	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
western bluebird	23	5	30.4	43.5	13.0	0.0	13.0	0.0	0.0	0.0	0.0
bushtit	22	2	68.2	0.0	31.8	0.0	0.0	0.0	0.0	0.0	0.0
white-throated swift	11	7	0.0	0.0	18.2	0.0	18.2	9.1	0.0	9.1	45.5
mountain bluebird	9	2	0.0	0.0	0.0	0.0	33.3	0.0	66.7	0.0	0.0
turkey vulture	8	7	25.0	12.5	0.0	12.5	25.0	25.0	0.0	0.0	0.0
dark-eyed junco	8	3	12.5	25.0	0.0	0.0	62.5	0.0	0.0	0.0	0.0
house finch	6	4	0.0	16.7	0.0	0.0	50.0	0.0	33.3	0.0	0.0
fox sparrow	5	4	40.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0
California towhee	5	5	0.0	0.0	40.0	0.0	0.0	0.0	40.0	20.0	0.0
spotted towhee	4	2	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0
mountain chickadee	4	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
lesser goldfinch	4	2	0.0	0.0	0.0	0.0	25.0	0.0	75.0	0.0	0.0
unidentified gull	3	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
California thrasher	3	3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
black-throated sparrow	3	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
unidentified songbird	2	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
phainopepla	2	2	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix A-2. Flight directions of birds observed during Winter point count surveys at the Tule Wind Resource Area, 2007-2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
northern harrier	2	2	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
ladder-backed woodpecker	2	2	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
American kestrel	2	2	50.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0
wrentit	1	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	0.0	0.0	0.0	0.0	100.0	0.0	0.0
unidentified raptor	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
ruby-crowned kinglet	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Bewick's wren	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Grand Total	**394**	**206**	**30.5**	**7.1**	**12.2**	**2.0**	**17.3**	**4.1**	**16.0**	**1.5**	**9.4**

Appendix A-3. Flight directions of birds observed during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
common raven	116	72	19.0	6.9	14.7	8.6	17.2	6.9	17.2	0.9	8.6
turkey vulture	49	44	22.4	10.2	6.1	6.1	16.3	4.1	10.2	8.2	16.3
red-tailed hawk	36	29	11.1	5.6	13.9	2.8	5.6	5.6	5.6	2.8	47.2
western scrub-jay	32	24	18.8	0.0	40.6	3.1	9.4	3.1	18.8	6.3	0.0
white-throated swift	31	8	0.0	0.0	0.0	3.2	9.7	0.0	3.2	0.0	83.9
house finch	30	14	30.0	6.7	6.7	20.0	6.7	0.0	13.3	16.7	0.0
cliff swallow	22	3	0.0	0.0	0.0	0.0	9.1	0.0	0.0	0.0	90.9
mourning dove	14	11	0.0	7.1	7.1	0.0	42.9	14.3	28.6	0.0	0.0
bushtit	10	2	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
phainopepla	8	3	0.0	0.0	0.0	0.0	12.5	37.5	50.0	0.0	0.0
unidentified songbird	6	5	16.7	33.3	0.0	0.0	16.7	16.7	0.0	16.7	0.0
dark-eyed junco	5	2	0.0	0.0	0.0	40.0	0.0	0.0	60.0	0.0	0.0
black-chinned hummingbird	5	5	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0
ash-throated flycatcher	5	4	20.0	0.0	60.0	0.0	0.0	20.0	0.0	0.0	0.0
western bluebird	4	2	0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0
lesser goldfinch	4	2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
horned lark	4	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
California thrasher	4	3	25.0	0.0	25.0	0.0	0.0	50.0	0.0	0.0	0.0
yellow-rumped warbler	3	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
orange-crowned warbler	3	3	0.0	0.0	66.7	0.0	33.3	0.0	0.0	0.0	0.0
California towhee	3	3	0.0	33.3	0.0	33.3	0.0	0.0	33.3	0.0	0.0
Wilson's warbler	2	2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0

Appendix A-3. Flight directions of birds observed during Spring point count surveys at the Tule Wind Resource Area, 2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
unidentified hummingbird	2	2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooper's hawk	2	2	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
black-throated sparrow	2	2	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0
black-headed grosbeak	2	2	0.0	0.0	0.0	50.0	0.0	0.0	50.0	0.0	0.0
Bewick's wren	2	2	0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0
American kestrel	2	2	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	50.0
acorn woodpecker	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
spotted towhee	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Scott's oriole	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
sage sparrow	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
ruby-crowned kinglet	1	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
prairie falcon	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
osprey	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
oak titmouse	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
golden eagle	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
double-crested cormorant	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
black-chinned sparrow	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Anna’s hummingbird	1	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Grand Total	**421**	**267**	**15.2**	**5.2**	**13.8**	**7.4**	**12.8**	**5.7**	**16.9**	**3.3**	**19.7**

Appendix A-4 Flight directions of birds observed during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
white-throated swift	95	18	0.0	1.1	18.9	0.0	3.2	0.0	0.0	0.0	76.8
turkey vulture	87	56	13.8	1.1	4.6	13.8	13.8	9.2	10.3	4.6	26.4
western scrub-jay	76	36	9.2	9.2	13.2	18.4	22.4	1.3	18.4	0.0	7.9
house finch	55	29	12.7	5.5	9.1	16.4	18.2	9.1	21.8	7.3	0.0
common raven	54	24	20.4	5.6	20.4	5.6	7.4	3.7	14.8	1.9	20.4
red-tailed hawk	36	29	11.1	0.0	8.3	8.3	8.3	8.3	11.1	19.4	25.0
lesser goldfinch	36	9	0.0	0.0	8.3	8.3	33.3	27.8	13.9	8.3	0.0
unidentified hummingbird	34	28	8.8	0.0	17.6	0.0	11.8	5.9	38.2	0.0	17.6
mourning dove	32	22	15.6	6.3	37.5	6.3	12.5	0.0	12.5	9.4	0.0
phainopepla	26	21	34.6	0.0	23.1	3.8	23.1	11.5	3.8	0.0	0.0
sage sparrow	13	5	0.0	0.0	92.3	0.0	0.0	7.7	0.0	0.0	0.0
California towhee	12	8	16.7	16.7	25.0	0.0	16.7	0.0	25.0	0.0	0.0
bushtit	12	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
western bluebird	9	3	22.2	0.0	0.0	33.3	0.0	44.4	0.0	0.0	0.0
unidentified swallow	8	2	0.0	0.0	0.0	0.0	75.0	0.0	25.0	0.0	0.0
cliff swallow	8	4	0.0	0.0	0.0	12.5	0.0	12.5	25.0	0.0	50.0
black-headed grosbeak	7	6	14.3	14.3	0.0	0.0	0.0	28.6	42.9	0.0	0.0
Anna’s hummingbird	7	6	0.0	0.0	42.9	0.0	14.3	0.0	42.9	0.0	0.0
western tanager	5	2	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	60.0
Cooper's hawk	5	5	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	40.0
ash-throated flycatcher	5	4	60.0	0.0	0.0	0.0	20.0	0.0	20.0	0.0	0.0
unidentified sparrow	4	3	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0

Appendix A-4 Flight directions of birds observed during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
northern mockingbird	4	4	0.0	0.0	0.0	0.0	25.0	0.0	75.0	0.0	0.0
Lawrence's goldfinch	4	2	0.0	0.0	0.0	0.0	25.0	0.0	75.0	0.0	0.0
American crow	4	2	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0
western kingbird	3	3	33.3	0.0	33.3	0.0	0.0	0.0	33.3	0.0	0.0
Steller's jay	3	2	0.0	0.0	0.0	0.0	66.7	0.0	0.0	33.3	0.0
spotted towhee	3	3	33.3	0.0	0.0	0.0	0.0	0.0	66.7	0.0	0.0
rock wren	3	3	0.0	0.0	0.0	0.0	0.0	33.3	33.3	33.3	0.0
Nuttall's woodpecker	3	3	66.7	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0
black-throated sparrow	3	2	33.3	0.0	0.0	0.0	0.0	0.0	66.7	0.0	0.0
unidentified falcon	2	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
northern rough-winged	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
black-chinned sparrow	2	2	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0
acorn woodpecker	2	2	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0
yellow warbler	1	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
western wood-pewee	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	0.0	0.0	0.0	100.0	0.0	0.0	0.0
unidentified warbler	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
unidentified songbird	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
unidentified empidonax	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
sharp-shinned hawk	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Say's phoebe	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
oak titmouse	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0

Appendix A-4 Flight directions of birds observed during Summer point count surveys at the Tule Wind Resource Area, 2008.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
northern flicker	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
ladder-backed woodpecker	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
house wren	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
band-tailed pigeon	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
brown-headed cowbird	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bewick's wren	1	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
black-chinned hummingbird	1	1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
barn swallow	1	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
American kestrel	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total	**682**	**369**	**12.6**	**2.9**	**14.8**	**7.6**	**14.5**	**7.3**	**16.0**	**3.8**	**20.1**

APPENDIX B

RAPTOR NEST DETAILS FOR THE TULE WIND RESOURCE AREA, SPRING 2008

Appendix B: Raptor nests observed at the Tule Wind Resource Area, 2008.

Nest Number	Dates Surveyed	Species	Status	Substrate	Nest Height (m)	Nest Condition
1	4/30/2008	Cooper's hawk	Active	Oak	10	Excellent
2	4/30/2008	NA	Inactive	Oak	8	Fair
3	4/30/2008	NA	Inactive	Oak	17	Good
4	4/30/2008	NA	Inactive	Oak	25	Excellent
5	4/30/2008	red-tailed hawk	Active	Cottonwood	30	Excellent
6	4/30/2008	NA	Inactive	Oak		Remnant
7	4/30/2008	NA	Inactive	Oak	15	Poor
8	4/30/2008	NA	Inactive			
9	4/1/2008	NA	Inactive	Oak	15	Excellent
10	4/30/2008	NA	Inactive	Oak	26	Good
11	4/30/2008	NA	Inactive	Oak		Gone
12	4/30/2008	NA	Inactive	Oak	20	Good
13	4/30/2008	NA	Inactive	Oak	22	Good

Appendix B: Raptor nests observed at the Tule Wind Resource Area, 2008.

Nest Number	Dates Surveyed	Species	Status	Substrate	Nest Height (m)	Nest Condition
14	4/30/2008	NA	Inactive	Oak	18	Good