

Appendix D-6

Avian Interim Report Spring 2011

**Avian Baseline Studies for the
Alta East Wind Resource Area
Kern County, California**

**Late Summer – Early Spring Report
July 10, 2010 – May 4, 2011**



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NATURAL RESOURCES ♦ SCIENTIFIC SOLUTIONS

EXECUTIVE SUMMARY

In July of 2010, on behalf of CH2M HILL and Alta Windpower, LLC (Alta Windpower), Western EcoSystems Technology, Inc. (WEST) initiated a second year of avian studies in the Alta East Wind Resource Area (AEWRA) in Kern County, California. The results of the first year of avian studies conducted at the proposed wind energy facility in 2009 and 2010 indicated that a facility at the AEWRA, with appropriate avoidance and mitigation measures, would not have significant impacts to any avian species.

During the 2009 – 2010 surveys, use by golden eagles and two golden eagle nests were documented in areas outside the AEWRA boundary. The use by golden eagles occurred to the north, northeast, and west of the current AEWRA boundary, while the nests were located approximately 3.5 and 11 miles (5.6 and 17.7 kilometers [km]) from the boundary. Therefore, a second year of avian study was initiated to evaluate further the proposed wind-energy facility's potential effects on eagles, as well as to improve understanding of avian use of the AEWRA in general.

The second year of avian use studies was initiated at the AEWRA on July 10, 2010, and is scheduled to continue through June of 2011. This report presents the results of fixed-point bird use surveys conducted during the late summer and fall of 2010, the winter of 2010/2011, and the early spring of 2011. Seasonal reports are designed to provide CH2M HILL and Alta Windpower with an assessment of avian use within the study area.

A total of 119 hours of bird use surveys were conducted within the AEWRA during weekly visits to six observation points from July 10, 2010, to May 4, 2011. During these surveys, 44 unique bird species were observed, and a total of 2,390 individual bird observations within 694 separate groups were recorded. Passerines were the most frequently observed bird type, accounting for 69.5% of all observations. This was primarily due to relatively high numbers of sage sparrow, white-crowned sparrow, western bluebird, and western meadowlark. These four species represented only 9.1% of all species observed, yet accounted for 52.6% of the total bird observations. Large corvids (i.e., common ravens) were the second most frequently observed bird type, accounting for 18.8% of all observations.

Raptors accounted for 1.9% of all bird observations. Nine species of raptors were recorded during surveys, with red-tailed hawk (n=16), golden eagle (n=8), and American kestrel (n=7) comprising 67.4% of the overall diurnal raptor observations. All eagle observations were recorded from October 7, 2010, to February 25, 2011, suggesting a potential seasonal relationship with winter. Other raptors recorded in relatively low numbers (one to two individuals) included: Cooper's hawk, Swainson's hawk, northern harrier, peregrine falcon, prairie falcon, and osprey. During the summer, fall, winter, and spring observation periods, the adjusted mean diurnal raptor use in the AEWRA was low (0.02, 0.12, 0.18, and 0.16 raptors/plot/20-minute survey, respectively) relative to the other wind resource areas with data collected using similar methods during the same seasons.

No federally listed bird species were recorded during surveys; however, most are protected under the Federal Migratory Bird Treaty Act. A single state-listed species was recorded, Swainson's hawk (n=1; state-threatened). Five additional species designated as having special conservation status at the state and/or federal level were recorded. These included: loggerhead shrike (n=36), golden eagle (n=8), Le Conte's thrasher (n=3), northern harrier (n=2), and peregrine falcon (n=1).

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INTRODUCTION

Alta Windpower, LLC is proposing to develop the Alta East Wind Project, a wind energy facility located in Kern County, California. CH2M HILL, a contractor to Alta Windpower, LLC, contracted Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline avian studies in the Alta East Wind Project and surrounding area, defined in this report as the Alta East Wind Resource Area (AEWRA), with the purpose of documenting avian use patterns, identifying potential risk issues, and assisting with siting turbines to minimize impacts to avian resources. The protocols for the baseline study are similar to those used at other studies in California and throughout the western US with modifications to accommodate site-specific characteristics of the AEWRA. Additionally, the protocols follow guidance of the California Wind Energy Guidelines (CEC and CDFG 2007) and the US Fish and Wildlife Service (USFWS) Wind Turbine Guidelines Advisory Committee (WTGAC 2010).

The purpose of this report is to discuss the results of fixed-point bird use surveys conducted at the AEWRA from July 10, 2010, to May 4, 2011, and to bring items of biological interest to the attention of CH2M HILL and Alta Windpower, LLC, such as seasonal raptor use and the presence of special-status species. This current survey effort is scheduled to continue through June of 2011 and is designed to supplement a previous year-long avian use study conducted at the AEWRA (previously known as the Sun Creek Wind Resource Area) in 2009-2010 (see Chatfield et al. 2010a). The results of the first year of surveys indicated that a wind development at the AEWRA would not have significant impacts to avian species. Because use of adjacent areas by golden eagles (*Aquila chrysaetos*) was documented and golden eagle nests were located in the surrounding landscape, a second year of avian study was initiated to evaluate further the proposed project's potential effects on eagles, as well as to continue to better understand avian use of the project site in general.

STUDY AREA

The proposed AEWRA is located in southeastern Kern County, approximately two miles (3.2 kilometers [km]) north-northwest of the unincorporated city of Mojave, and 10 miles (16 km) east of the city of Tehachapi (Figure 1). The study area comprises undeveloped rangeland on a combination of privately-owned land and land administered by the Bureau of Land Management (BLM) within the proposed project and the surrounding area. The AEWRA falls within the high desert plains and hills on the western edge of the Mojave Desert. The Tehachapi Mountains are located to the north and west of the project area and transition into Mojave Desert towards the south and east.

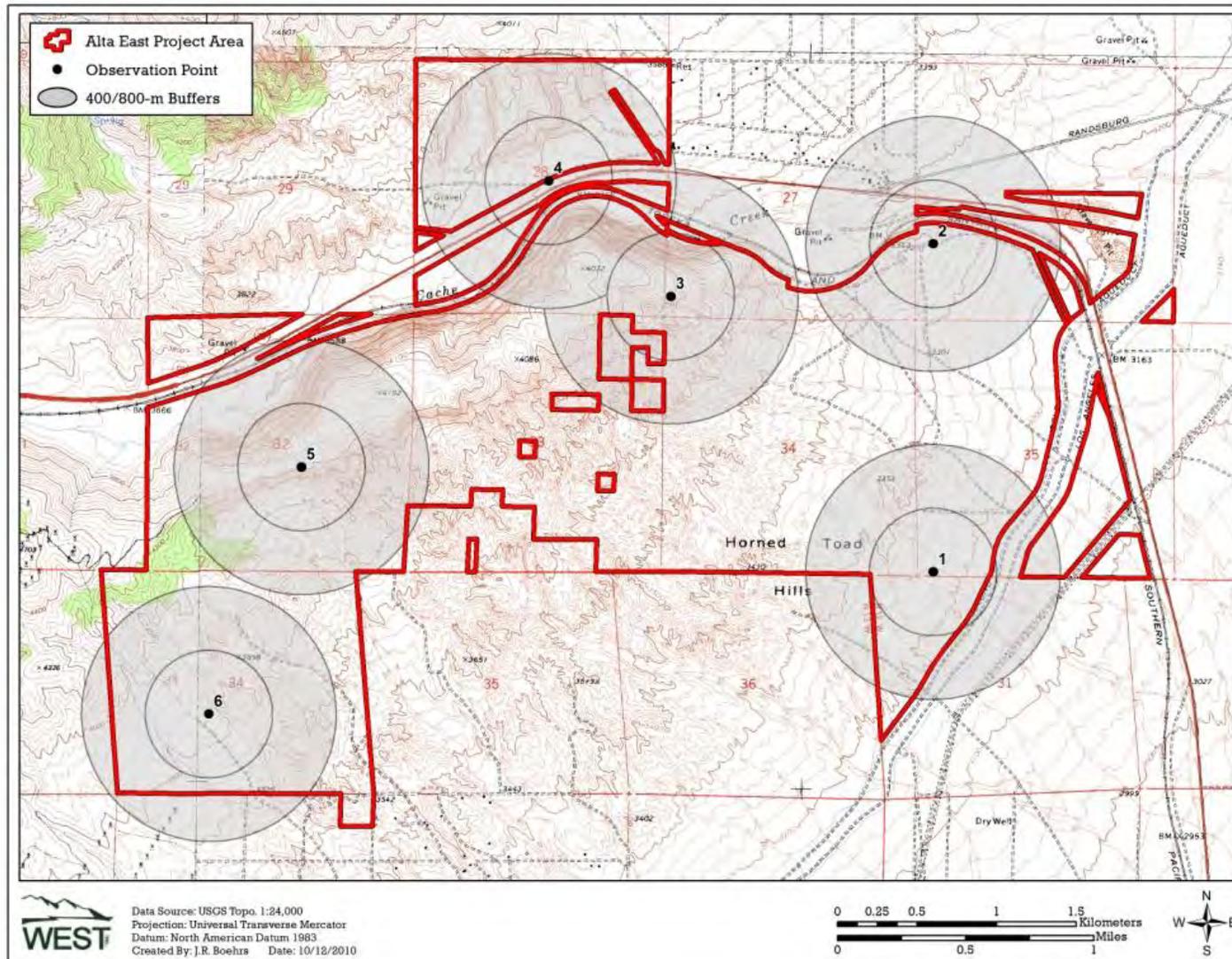


Figure 1. Study area map showing locations of fixed-point bird use survey stations conducted at the Alta East Wind Resource Area from July 10, 2010, through May 4, 2011.

Elevations within the study area range from approximately 3,100 to 4,200 feet (ft; 940 to 1,280 meters [m]) above sea level, with the highest elevations occurring in the northwestern portion of the study area (Figure 1). The habitat ranges from lowland creosote (*Larrea tridentata*) scrub and Joshua tree (*Yucca brevifolia*) woodland in the southeast to juniper (*Juniperus* spp.) shrubland on the steeper, rocky slopes in the north and west. Water within the AEWRA is limited to a network of ephemeral drainages; there are no perennial surface water sources within the study area. Highway 58 bisects the AEWRA, an underground portion of the Los Angeles Aqueduct runs along the southeast corner of the study area, and a network of dirt roads and off-highway vehicle (OHV) trails run throughout the study area.

METHODS

Fixed-Point Bird Use Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal and spatial use of the study area by birds, particularly diurnal raptors, defined here as kites, accipiters, buteos, harriers, eagles, falcons, and ospreys. Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). All birds seen during each 30-minute (min) fixed-point survey were recorded.

Bird Use Survey Plots

Six points were selected to survey representative habitats and topography of the study area while providing relatively even coverage (Figure 1). Each survey plot was an 800-m (2,625-ft) radius circle centered on the point. To the extent possible, survey stations were selected to be consistent with locations used in the 2009 – 2010 survey effort at the AEWRA (see Chatfield et al. 2010a). However, due to changes to land access and changes to the project boundary, points 4, 5, and 6 were relocated for the July 2010 through May 2011 survey period to more accurately assess the area currently planned for wind turbine installation (Figure 1).

Bird Survey Methods

All species of birds observed during fixed-point surveys were recorded. Observations of large birds beyond the 800-m radius were recorded, but were not included in the statistical analyses. For small birds, observations beyond a 100-m (328-ft) radius were excluded from the analysis. Large birds include waterbirds, waterfowl, rails/coots, shorebirds, diurnal raptors, owls, vultures, upland game birds, doves/pigeons, large corvids (e.g., common raven [*Corvus corax*]), goatsuckers, and large cuckoos (e.g., greater roadrunner [*Geococcyx californianus*]). Passerines (excluding large corvids), swifts/hummingbirds, and woodpeckers are considered small birds.

The date, start, and end time of the survey period, and weather information, such as temperature, wind speed, wind direction, and cloud cover, were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. Behavior and habitat type were

recorded based on the point of first observation. Approximate flight height and flight direction at first observation were recorded to the nearest 5-m (16-ft) interval. Other information recorded included whether or not the observation was auditory only and the 10-min interval of the 30-min survey in which the observation was initially noted.

Mean raptor use estimates (number of raptors divided by the number of 800-m plots) were calculated for the late summer, fall, winter, and early spring survey periods. To allow comparison with data collected at other US wind resource areas, raptor use estimates from this study were adjusted from 30-min to 20-min, by including only those raptors observed during the first 20-minutes of the survey period.

Observation Schedule

Sampling intensity was designed to document bird use by habitat and season within the study area. Surveys were conducted weekly during the summer (July 10 to August 31), fall (September 1 to November 15), winter (November 16 to February 28), and spring (March 1 to May 4). Surveys were conducted during daylight hours, and survey periods varied to approximately cover all daylight hours during a season. To the extent feasible, each point was surveyed the same number of times during the season.

RESULTS

This report presents the results of fixed-point bird use surveys conducted at the AEWRA from July 10, 2010, to May 4, 2011.

Fixed-Point Bird Use Surveys

A total of 119 hours of bird use surveys were conducted within AEWRA during weekly visits made to six survey stations from July 10, 2010, to May 4, 2011. A total of 54 fixed-point surveys were conducted in the summer during nine visits, 60 surveys were conducted in the fall during 10 visits, 76 surveys were conducted in the winter during 15 visits, and 48 surveys were conducted in the spring during nine visits.

Forty-four unique bird species were observed during fixed-point bird use surveys, and a total of 2,390 individual bird observations within 694 separate groups (defined as one or more individuals) were recorded (Table 1). Passerines were the most frequently observed bird type, accounting for 69.5% of all observations. This was primarily due to relatively high numbers of white-crowned sparrow (*Zonotrichia leucophrys*; n=398), sage sparrow (*Amphispiza belli*; n=390), western meadowlark (*Sturnella neglecta*; n=256), and western bluebird (*Sialia mexicana*; n=214). These four species represented only 9.1% of all species observed, yet together accounted for 52.6% of the total bird observations. The highest proportion (45.7%) of passerines was observed during the winter compared to the fall (21.5%), summer (5.2%), and spring (27.7%; Table 1). Large corvids, comprised solely of common ravens (*Corvus corax*; n=449), were the second most frequently observed bird type, accounting for 18.8% of all observations (Table 1). The majority (56.3%) of common ravens were recorded during winter surveys. Upland game birds, comprised of California quail (*Callipepla californica*) and chukar

(*Alectoris chukar*), accounted for 6.2% of the total bird observations. The majority (75.0%) of upland game birds were recorded in the summer.

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Alta East Wind Resource Area from July 10, 2010, to May 4, 2011.

Species/Type	Scientific Name	Summer		Fall		Winter		Spring		Total	
		# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
Diurnal Raptors		2	2	12	12	21	22	10	10	45	46
<u>Accipiters</u>		1	1	0	0	0	0	1	1	2	2
Cooper's hawk	<i>Accipiter cooperii</i>	0	0	0	0	0	0	1	1	1	1
unidentified accipiter		1	1	0	0	0	0	0	0	1	1
<u>Buteos</u>		1	1	5	5	7	7	4	4	17	17
red-tailed hawk	<i>Buteo jamaicensis</i>	1	1	5	5	7	7	3	3	16	16
Swainson's hawk	<i>Buteo swainsoni</i>	0	0	0	0	0	0	1	1	1	1
<u>Northern Harrier</u>		0	0	0	0	2	2	0	0	2	2
northern harrier	<i>Circus cyaneus</i>	0	0	0	0	2	2	0	0	2	2
<u>Eagles</u>		0	0	1	1	6	7	0	0	7	8
golden eagle	<i>Aquila chrysaetos</i>	0	0	1	1	6	7	0	0	7	8
<u>Falcons</u>		0	0	5	5	2	2	3	3	10	10
American kestrel	<i>Falco sparverius</i>	0	0	5	5	0	0	2	2	7	7
peregrine falcon	<i>Falco peregrinus</i>	0	0	0	0	1	1	0	0	1	1
prairie falcon	<i>Falco mexicanus</i>	0	0	0	0	1	1	1	1	2	2
<u>Osprey</u>		0	0	0	0	0	0	1	1	1	1
osprey	<i>Pandion haliaetus</i>	0	0	0	0	0	0	1	1	1	1
<u>Other Raptors</u>		0	0	1	1	4	4	1	1	6	6
unidentified hawk		0	0	1	1	4	4	1	1	6	6
Vultures		0	0	0	0	0	0	3	22	3	22
turkey vulture	<i>Cathartes aura</i>	0	0	0	0	0	0	3	22	3	22
Upland Game Birds		9	111	3	13	4	10	7	14	23	148
California quail	<i>Callipepla californica</i>	8	84	1	1	4	10	7	14	20	109
chukar	<i>Alectoris chukar</i>	1	27	2	12	0	0	0	0	3	39
Doves/Pigeons		8	9	2	2	1	1	1	1	12	13
mourning dove	<i>Zenaida macroura</i>	8	9	2	2	0	0	1	1	11	12
rock pigeon	<i>Columba livia</i>	0	0	0	0	1	1	0	0	1	1
Large Corvids		5	7	40	137	79	253	24	52	148	449
common raven	<i>Corvus corax</i>	5	7	40	137	79	253	24	52	148	449
Large Cuckoos		0	0	2	2	0	0	0	0	2	2
greater roadrunner	<i>Geococcyx californianus</i>	0	0	2	2	0	0	0	0	2	2
Passerines		55	86	126	357	144	759	127	460	452	1,662
ash-throated flycatcher	<i>Myiarchus cinerascens</i>	0	0	1	1	0	0	0	0	1	1
barn swallow	<i>Hirundo rustica</i>	0	0	0	0	0	0	1	4	1	4
black-throated sparrow	<i>Amphispiza bilineata</i>	0	0	0	0	0	0	1	2	1	2
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	0	0	0	0	0	0	1	2	1	2

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Alta East Wind Resource Area from July 10, 2010, to May 4, 2011.

Species/Type	Scientific Name	Summer		Fall		Winter		Spring		Total	
		# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
cactus wren	<i>Campylorhynchus brunneicapillus</i>	21	24	6	7	6	7	5	7	38	45
chipping sparrow	<i>Spizella passerina</i>	0	0	4	21	5	14	0	0	9	35
dark-eyed junco	<i>Junco hyemalis</i>	0	0	3	7	7	75	1	2	11	84
European starling	<i>Sturnus vulgaris</i>	0	0	0	0	3	6	9	12	12	18
horned lark	<i>Eremophila alpestris</i>	0	0	6	9	0	0	3	7	9	16
house finch	<i>Carpodacus mexicanus</i>	0	0	8	49	0	0	9	25	17	74
lark sparrow	<i>Chondestes grammacus</i>	0	0	0	0	0	0	2	7	2	7
Le Conte's thrasher	<i>Toxostoma lecontei</i>	2	2	1	1	0	0	0	0	3	3
loggerhead shrike	<i>Lanius ludovicianus</i>	9	12	3	3	15	16	5	5	32	36
rock wren	<i>Salpinctes obsoletus</i>	0	0	1	1	2	5	1	1	4	7
sage sparrow	<i>Amphispiza belli</i>	17	34	64	172	19	63	20	121	120	390
savannah sparrow	<i>Passerculus sandwichensis</i>	0	0	0	0	0	0	1	1	1	1
Say's phoebe	<i>Sayornis saya</i>	0	0	1	1	0	0	0	0	1	1
Scott's oriole	<i>Icterus parisorum</i>	0	0	0	0	0	0	1	1	1	1
tree swallow	<i>Tachycineta bicolor</i>	0	0	0	0	0	0	1	8	1	8
unidentified gnatcatcher		0	0	0	0	1	1	0	0	1	1
unidentified sparrow		1	1	0	0	0	0	0	0	1	1
unidentified swallow		1	7	1	7	0	0	1	1	3	15
unidentified warbler		0	0	1	1	0	0	1	1	2	2
western bluebird	<i>Sialia mexicana</i>	0	0	2	5	16	199	1	10	19	214
western meadowlark	<i>Sturnella neglecta</i>	3	5	11	44	22	112	27	95	63	256
western scrub-jay	<i>Aphelocoma californica</i>	1	1	1	1	0	0	2	2	4	4
white-crowned sparrow	<i>Zonotrichia leucophrys</i>	0	0	11	25	43	239	32	134	86	398
yellow-rumped warbler	<i>Dendroica coronata</i>	0	0	1	2	5	22	2	12	8	36
Swifts/Hummingbirds		3	3	1	1	0	0	1	1	5	5
unidentified hummingbird		2	2	1	1	0	0	1	1	4	4
white-throated swift	<i>Aeronautes saxatalis</i>	1	1	0	0	0	0	0	0	1	1
Woodpeckers		1	1	0	0	0	0	1	1	2	2
ladder-backed woodpecker	<i>Picoides scalaris</i>	1	1	0	0	0	0	1	1	2	2
Unidentified Birds		0	0	0	0	2	41	0	0	2	41
unidentified small bird		0	0	0	0	2	41	0	0	2	41
Overall		83	219	186	524	251	1,086	174	561	694	2,390

A total of 46 diurnal raptors, representing nine distinct species, were recorded during surveys, accounting for 1.9% of all bird observations. The greatest proportion (46.2%) of raptors was recorded in the winter, with red-tailed hawk (*Buteo jamaicensis*; n=7) and golden eagle (n=7) being the most frequently observed raptor species during winter. Other diurnal raptors observed in winter included northern harrier (*Circus cyaneus*; n=2), peregrine falcon (*Falco peregrinus*; n=1), and prairie falcon (*Falco mexicanus*; n=1; Table 1). During the summer, only a single red-tailed hawk and a single unidentified accipiter (*Accipiter* spp.) were observed, while during the fall, red-tailed hawk (n=5) and American kestrel (*Falco sparverius*; n=5) were the most frequently observed diurnal raptors (Table 1). During spring, relatively low numbers of red-tailed hawk (n=3), American kestrel (n=2), Cooper's hawk (*Accipiter cooperii*; n=1), osprey (*Pandion haliaetus*; n=1), prairie falcon (n=1), and Swainson's hawk (*Buteo swainsoni*; n=1) were recorded. Vultures, comprised solely of turkey vultures (*Cathartes aura*), were observed only during the spring (n=22; Table 1).

Flight paths for all diurnal raptor observations were digitized and mapped by season (Figures 2a-d).

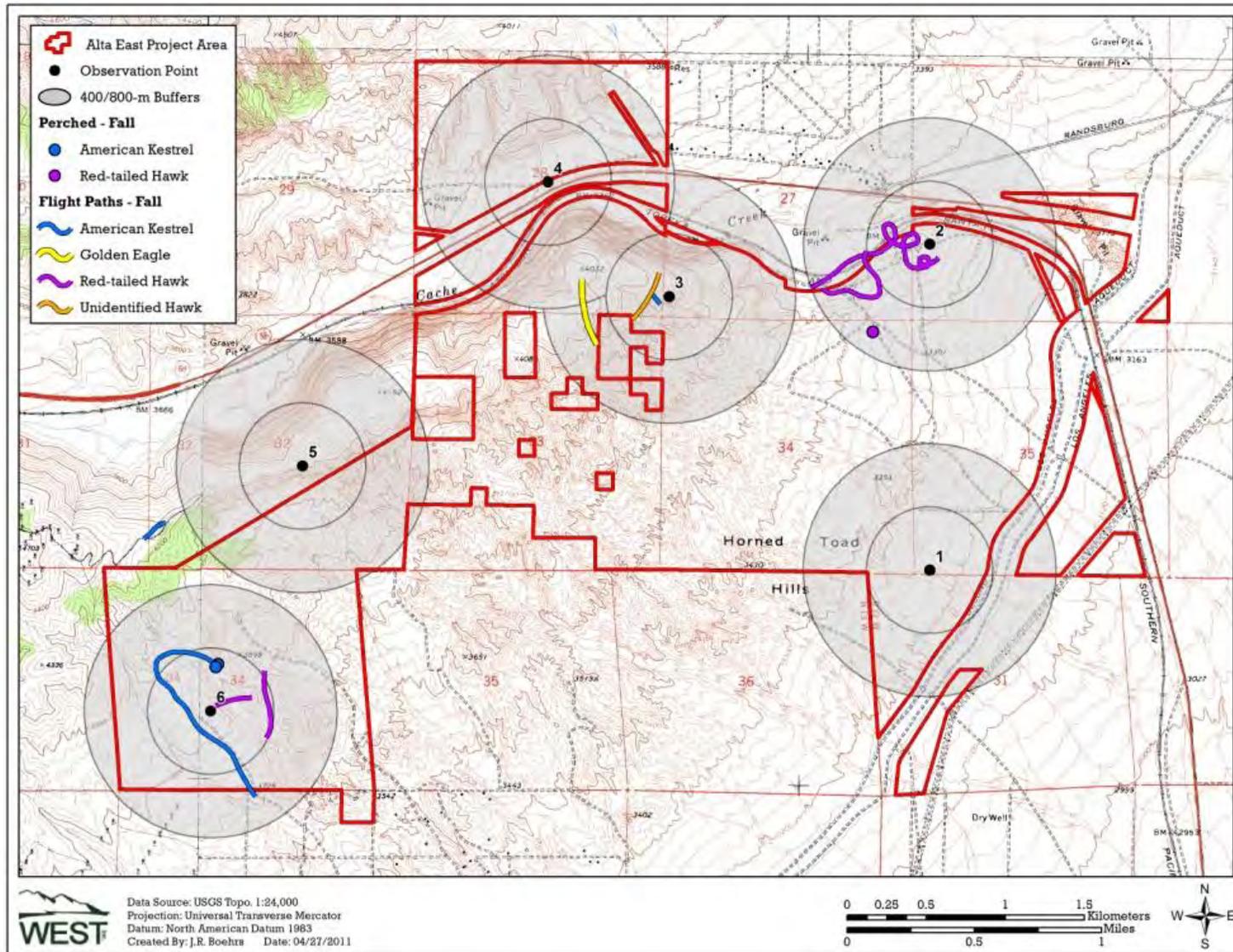


Figure 2b. Flight paths of raptors observed during fixed-point bird use surveys conducted in fall (September 1 – November 15, 2010) at the Alta East Wind Resource Area.

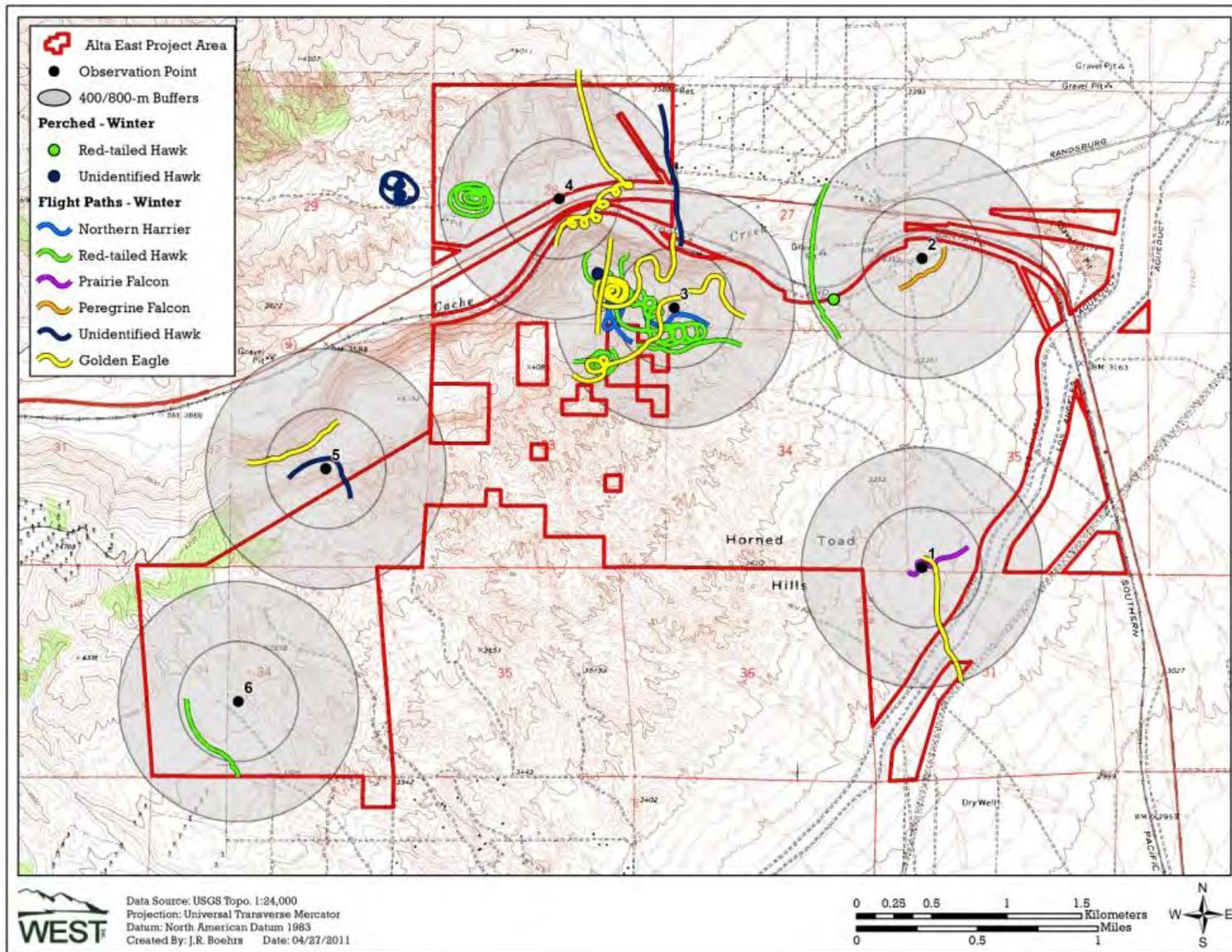


Figure 2c. Flight paths of raptors observed during fixed-point bird use surveys conducted in winter (November 16, 2010 – February 28, 2011) at the Alta East Wind Resource Area.

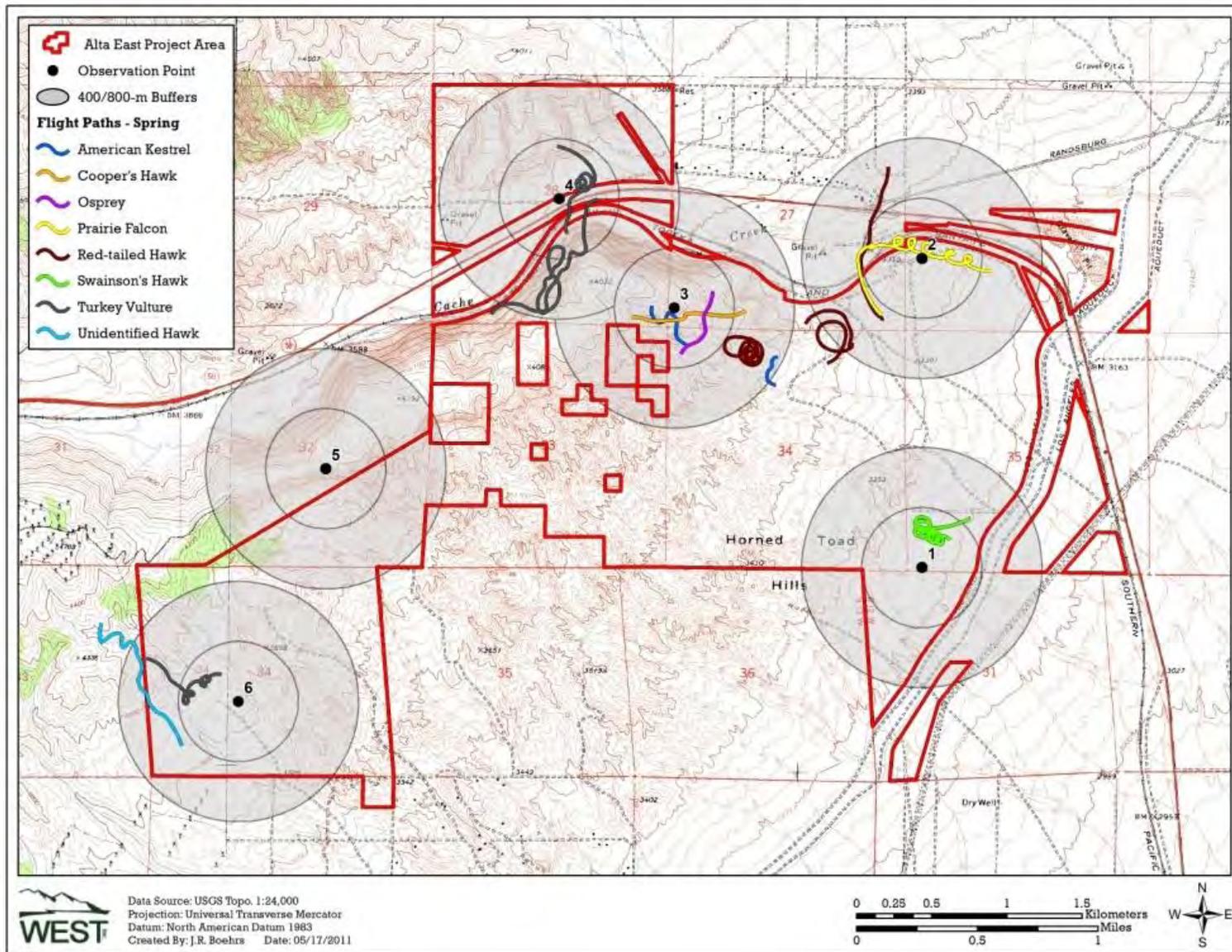


Figure 2d. Flight paths of raptors observed during fixed-point bird use surveys conducted in spring (March 1 – May 4, 2011) at the Alta East Wind Resource Area.

Sensitive Species

Six species designated as having special conservation status at the state and/or federal level (BGEPA 1940, CDFG 2011, USFWS 2011) were recorded (Table 2). These included loggerhead shrike (*Lanius ludovicianus*), golden eagle, Le Conte's thrasher (*Toxostoma lecontei*), northern harrier, peregrine falcon, and Swainson's hawk.

Table 2. Summary of sensitive species (number of groups [# grps] and number of individuals [# obs]) observed at the Alta East Wind Resource Area during fixed-point bird use surveys from July 10, 2010, to May 4, 2011.

Species	Scientific Name	Status	# of grps	# of obs
loggerhead shrike	<i>Lanius ludovicianus</i>	SSC, FSC	32	36
golden eagle	<i>Aquila chrysaetos</i>	SFP, EA	7	8
Le Conte's thrasher	<i>Toxostoma lecontei</i>	FSC	3	3
northern harrier	<i>Circus cyaneus</i>	SSC	2	2
peregrine falcon	<i>Falco peregrinus</i>	SFP, FSC	1	1
Swainson's hawk	<i>Buteo swainsoni</i>	ST	1	1
Total	6 species		46	51

SSC= State species of special concern (CDFG 2011)

FSC= Federal species of concern (USFWS 2011)

SFP=State fully-protected species (CDFG 2011)

EA=Protected under the federal Bald and Golden Eagle Protection Act (1940)

ST=State Threatened (CDFG 2011)

DISCUSSION

This study was designed to supplement a previous year of avian surveys conducted at the AEWRA in 2009 – 2010 (Chatfield et al. 2010a). The results reported in this document are part of a larger one-year study effort, and surveys are scheduled to continue through June of 2011. Data from the previous study indicated that wind energy development within the AEWRA, with appropriate avoidance and mitigation measures, would not have significant impacts to avian species. The current study found use of the AEWRA by golden eagles during late fall and winter, which was not detected during the 2009 – 2010 surveys; however, the results of this study are consistent with other wind energy facilities in the area that have documented low use by golden eagles (Chatfield et al. 2009; 2010b), with use occurring primarily in the fall and winter.

Fixed Point Bird Use Surveys

Species diversity of birds observed during fixed-point bird use surveys was consistent with the expected avian community occurring in the desert scrub habitats comprising the AEWRA and is consistent with results from the previous year of bird surveys (see Chatfield et al. 2010a). Resident, breeding birds of dry, open shrubland and Joshua tree woodland were dominant in the summer. Upland game birds, such as California quail and chukar, and passerines, such as sage sparrow, cactus wren (*Campylorhynchus brunneicapilus*), and loggerhead shrike were commonly observed throughout the summer season. The only raptors observed during the summer were a single red-tailed hawk and a single unidentified accipiter.

During the fall, the number and diversity of species increased from the summer. South-bound migrants pass through the region at this time, and many species are arriving on their desert wintering grounds. Approximately 22% of recorded passerines were observed during the fall, with migrating and/or wintering species (e.g., chipping sparrow [*Spizella passerina*], house finch [*Carpodacus mexicanus*], sage sparrow, and white-crowned sparrow [*Zonotrichia leucophrys*]), commonly recorded during the fall season. Twelve of the 46 raptor observations were recorded during the fall, with red-tailed hawk and American kestrel being the most frequently recorded diurnal raptors during this season.

While species diversity again decreased during the winter (20 unique species observed during winter versus 28 in fall), the total number of observations more than doubled (1,086 individual observations in the winter versus 524 in fall). This was primarily due to relatively large numbers of wintering common ravens, dark-eyed juncos (*Junco hyemalis*), western bluebirds, western meadowlarks, and white-crowned sparrows, which together comprised approximately 80% of the total bird observations in winter. Twenty-two of the 46 raptors observed during the study were recorded during the winter, with red-tailed hawk and golden eagle being the most frequently observed during this season.

Species diversity was highest during the spring season (32 unique species); however, the overall number of observations decreased from the winter (561 observations in spring versus 1,086 in winter). Approximately 23% of all bird observations were recorded in spring. Ten of the 46 raptor observations, representing six distinct species, were recorded during this season. All of the 22 vultures observed during the study, were recorded during the spring.

Sensitive Species

The loggerhead shrike (a state species of special concern and a federal species of concern; CDFG 2011, USFWS 2011), a common year-round resident of the area, was observed frequently during all seasons, while Le Conte's thrasher (a state species of special concern; USFWS 2011), also a year-round resident, was observed on only three occasions (twice in summer and once in fall). A single golden eagle (a state fully-protected species and protected under the BGEPA; BGEPA 1940, CDFG 2011) was observed during fall surveys, while the remaining seven golden eagle observations were made during the winter surveys. Two northern harriers (a state species of special concern; CDFG 2011) and a single peregrine falcon (a state fully-protected species and a federal species of concern; CDFG 2011, USFWS 2011) were observed during the winter surveys. Both of these species are likely migrants and occasional winter visitors to the AEWRA. The single Swainson's hawk (state-threatened species; CDFG 2011) recorded during the surveys was observed in the spring (April 1, 2011) near point 1 (Figure 2d). Due to the timing of this observations and the fact that this was the only Swainson's hawk recorded in the study area, this individual was likely a migrant passing through the study area.

Comparison of Seasonal Raptor Use

Based on the results from other wind resource areas with similar data, mean adjusted raptor use (number of raptors divided by the number of 800-m plots and the total number of surveys) in the AEWRA during the summer (0.02 raptors/plot/20-min survey), fall (0.12 raptors/plot/20-min survey), winter (0.18 raptors/plot/20-min survey), and spring (0.16 raptor/plot/20-min survey) was low relative to data similarly collected at other existing and proposed wind energy facilities with data for these same seasons (Figures 3, 4, 5, and 6). The results from the current study are similar to those reported during the first year of studies covering all seasons at the AEWRA (see Chatfield et al. 2010a).

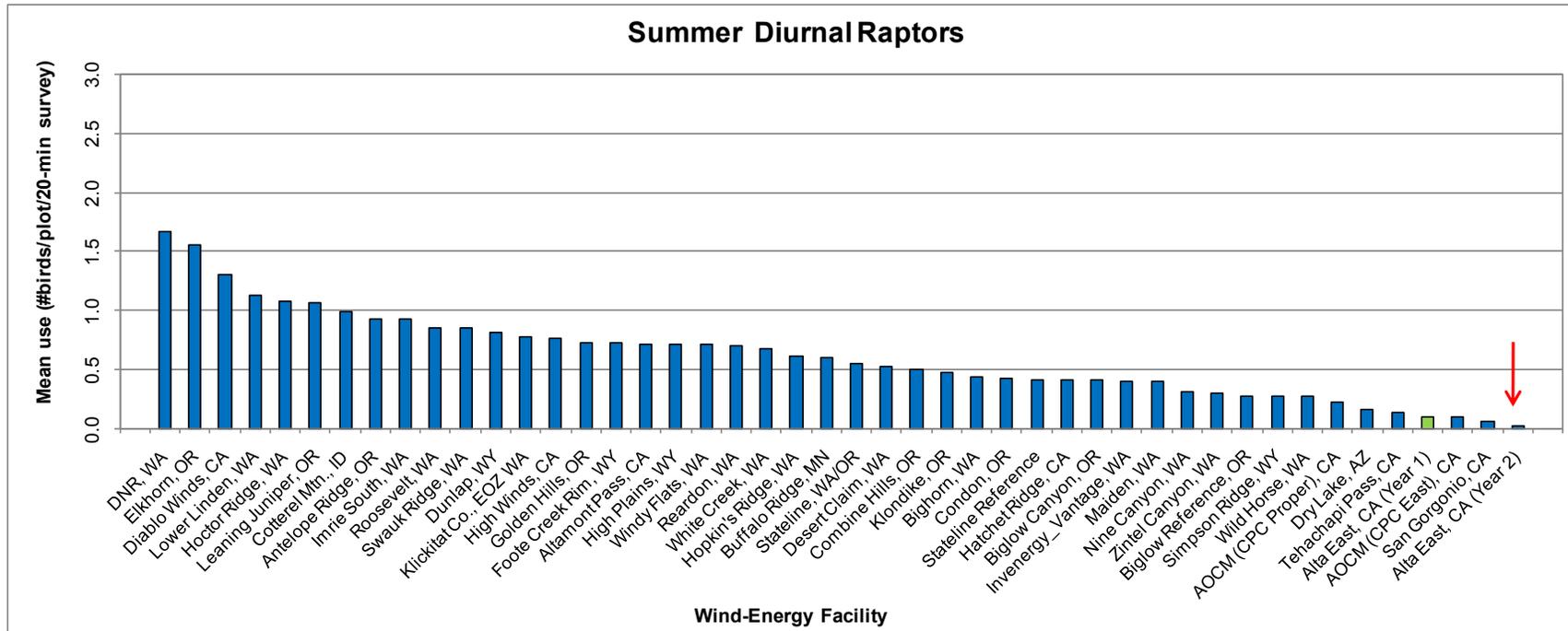


Figure 3. Comparison of summer raptor use between the Alta East Wind Resource Area and other US wind energy facilities. Data from the Alta East Wind Resource Area for this study is highlighted in red, and the data from the previous study is green.

Data from the following sources

Alta East, CA (Year 2)	This study.				
Alta East, CA (Year 1)	Chatfield et al. 2010a				
DNR, WA	Johnson et al. 2006c	Foote Creek Rim, WY	Erickson et al. 2002b	Hatchet Ridge, CA	Young et al. 2007a
Elkhorn, OR	WEST 2005a	Altamont Pass, CA	Erickson et al. 2002b	Biglow Canyon, OR	WEST 2005c
Diablo Winds, CA	WEST 2006	High Plains, WY	Johnson et al. 2009b	Invenergy_Vantage, WA	WEST 2007
Lower Linden, WA	Johnson et al. 2007a	Windy Flats, WA	Johnson et al. 2007b	Maiden, WA	Erickson et al. 2002b
Hector Ridge, WA	Johnson et al. 2006d	Reardon, WA	WEST 2005b	Nine Canyon, WA	Erickson et al. 2001
Leaning Juniper, OR	Kronner et al. 2005	White Creek, WA	NWC and WEST 2005	Zintel Canyon, WA	Erickson et al. 2002a
Cottarel Mtn., ID	BLM 2006	Hopkin's Ridge, WA	Young et al. 2003a	Biglow Reference, OR	WEST 2005c
Antelope Ridge, OR	WEST 2009	Buffalo Ridge, MN	Erickson et al. 2002b	Simpson Ridge, WY	Johnson et al. 2000
Imrie South, WA	Johnson et al. 2006e	Stateline, WA/OR	Erickson et al. 2002b	AOCM (CPC Proper), CA	Chatfield et al. 2009
Roosevelt, WA	NWC and WEST 2004	Desert Claim, WA	Young et al. 2003b	Wild Horse, WA	Erickson et al. 2003b
Swauk Ridge, WA	Erickson et al. 2003a	Combine Hills, OR	Young et al. 2003c	Dry Lake, AZ	Young et al. 2007b
Dunlap, WY	Johnson et al. 2009a	Klondike, OR	Johnson et al. 2002	Tehachapi Pass, CA	Erickson et al. 2002b
Klickitat Co., EOZ WA	WEST and NWC 2003	Bighorn, WA	Johnson and Erickson 2004	AOCM (CPC East), CA	Chatfield et al. 2009
High Winds, CA	Kerlinger et al. 2005	Condon, OR	Erickson et al. 2002b	San Gorgonio, CA	Erickson et al. 2002b
Golden Hills, OR	Jeffrey et al. 2008	Stateline Reference	URS et al. 2001		

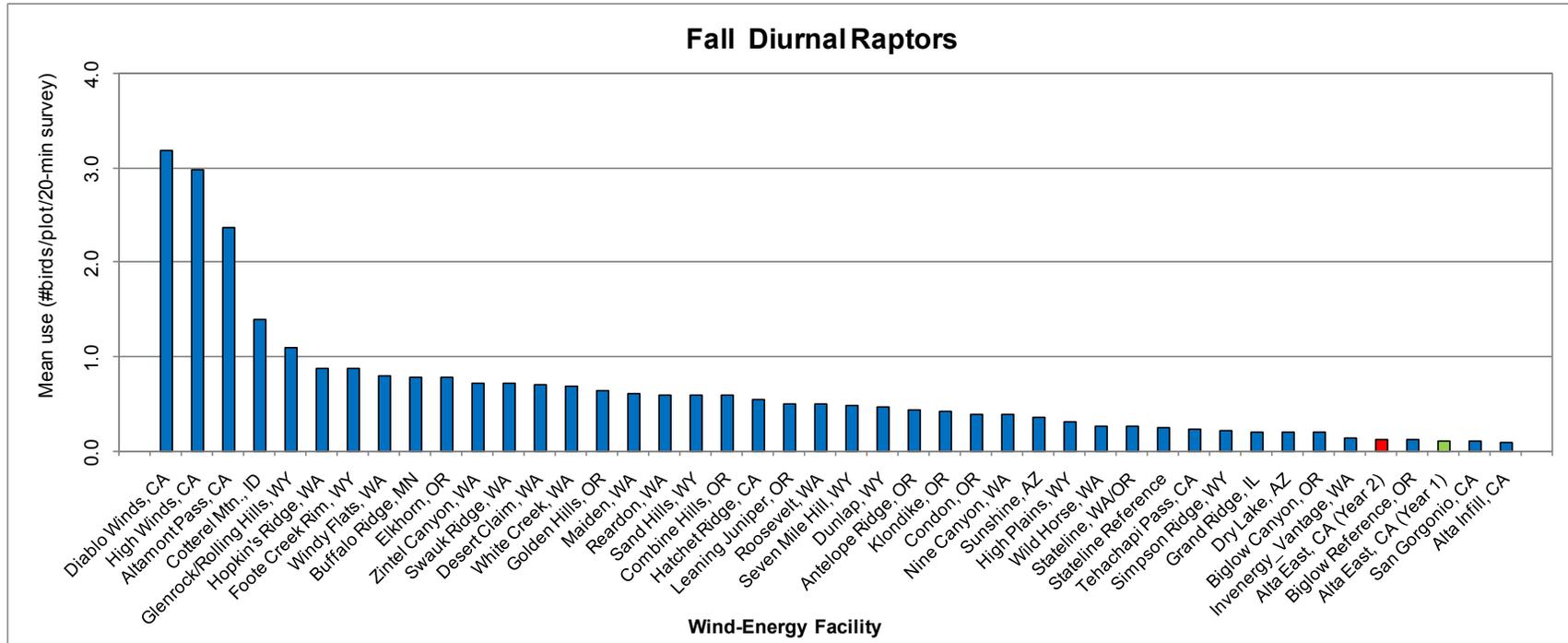


Figure 4. Comparison of fall raptor use between the Alta East Wind Resource Area and other US wind energy facilities. Data from the Alta East Wind Resource Area for this study is highlighted in red, and the data from the previous study is green.

Data from the following sources:

Alta East, CA (Year 2)	This study.			
Alta East, CA (Year 1)	Chatfield et al. 2010a			
Diablo Winds, CA	WEST 2006	Golden Hills, OR	Jeffrey et al. 2008	Sunshine, AZ
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	High Plains, WY
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	Wild Horse, WA
Cotterel Mtn., ID	BLM 2006	Sand Hills, WY	Johnson et al. 2006a	Stateline, WA/OR
Glenrock/Rolling Hills, WY	Johnson et al. 2008a	Combine Hills, OR	Young et al. 2003c	Stateline Reference
Hopkin's Ridge, WA	Young et al. 2003a	Hatchet Ridge, CA	Young et al. 2007a	Tehachapi Pass, CA
Foote Creek Rim, WY	Erickson et al. 2002b	Leaning Juniper, OR	Kronner et al. 2005	Simpson Ridge, WY
Windy Flats, WA	Johnson et al. 2007b	Roosevelt, WA	NWC and WEST 2004	Grand Ridge, IL
Buffalo Ridge, MN	Erickson et al. 2002b	Seven Mile Hill, WY	Johnson et al. 2008b	Dry Lake, AZ
Elkhorn, OR	WEST 2005a	Dunlap, WY	Johnson et al. 2009a	Biglow Canyon, OR
Zintel Canyon, WA	Erickson et al. 2002a	Antelope Ridge, OR	WEST 2009	Invenergy_Vantage, WA
Swauk Ridge, WA	Erickson et al. 2003a	Klondike, OR	Johnson et al. 2002	Biglow Reference, OR
Desert Claim, WA	Young et al. 2003b	Condon, OR	Erickson et al. 2002b	San Geronio, CA
White Creek, WA	NWC and WEST 2005	Nine Canyon, WA	Erickson et al. 2001	Alta Infill, CA
				WEST and CPRS 2006
				Johnson et al. 2009b
				Erickson et al. 2003b
				Erickson et al. 2002b
				URS et al. 2001
				Erickson et al. 2002b
				Johnson et al. 2000
				Derby et al. 2009
				Young et al. 2007b
				WEST 2005c
				WEST 2007
				WEST 2005c
				Erickson et al. 2002b
				Chatfield et al. 2010b

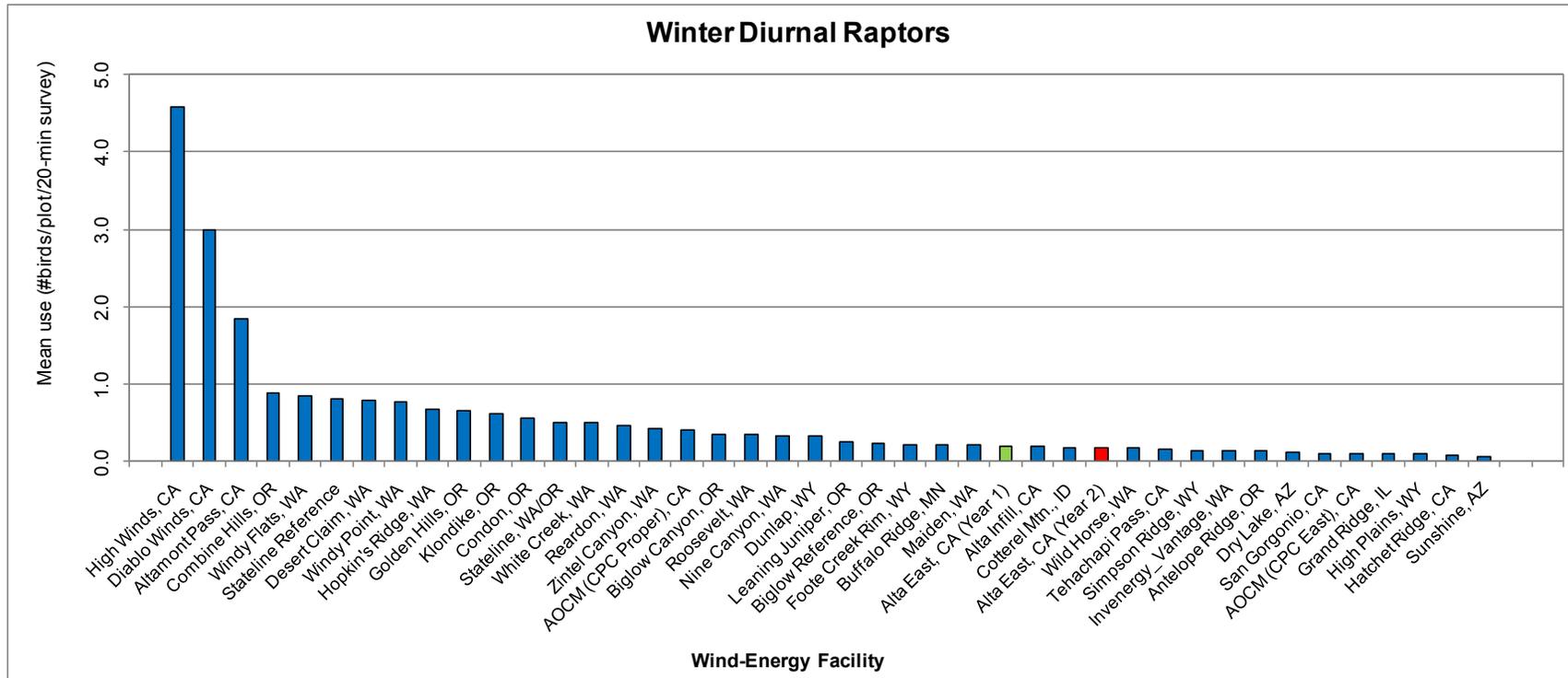


Figure 5. Comparison of winter raptor use between the Alta East Wind Resource Area and other US wind energy facilities. Data from the Alta East Wind Resource Area for this study is highlighted in red, and the data from the previous study is green.

Data from the following sources:

Alta East, CA (Year 2)	This study.			
Alta East, CA (Year 1)	Chatfield et al. 2010a			
High Winds, CA	Kerlinger et al. 2005	Reardon, WA	WEST 2005b	Wild Horse, WA
Diablo Winds, CA	WEST 2006	Zintel Canyon, WA	Erickson et al. 2002a	Tehachapi Pass, CA
Altamont Pass, CA	Erickson et al. 2002b	AOCM (CPC Proper), CA	Chatfield et al. 2009	Simpson Ridge, WY
Combine Hills, OR	Young et al. 2003c	Biglow Canyon, OR	WEST 2005c	Invenergy_Vantage, WA
Windy Flats, WA	Johnson et al. 2007b	Roosevelt, WA	NWC and WEST 2004	Antelope Ridge, OR
Stataline Reference	URS et al. 2001	Nine Canyon, WA	Erickson et al. 2001	Dry Lake, AZ
Desert Claim, WA	Young et al. 2003b	Dunlap, WY	Johnson et al. 2009a	San Gorgonio, CA
Windy Point, WA	Johnson et al. 2006b	Leaning Juniper, OR	Kronner et al. 2005	AOCM (CPC East), CA
Hopkins Ridge, WA	Young et al. 2003a	Biglow Reference, OR	WEST 2005c	Grand Ridge, IL
Golden Hills, OR	Jeffrey et al. 2008	Footo Creek Rim, WY	Erickson et al. 2002b	High Plains, WY
Klondike, OR	Johnson et al. 2002	Buffalo Ridge, MN	Erickson et al. 2002b	Hatchet Ridge, CA
Condon, OR	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b	Sunshine, AZ
Stataline, WA/OR	Erickson et al. 2002b	Alta Infill, CA	Chatfield et al. 2010b	
White Creek, WA	NWC and WEST 2005	Cotterel Mtn., ID	BLM 2006	

Spring Diurnal Raptors

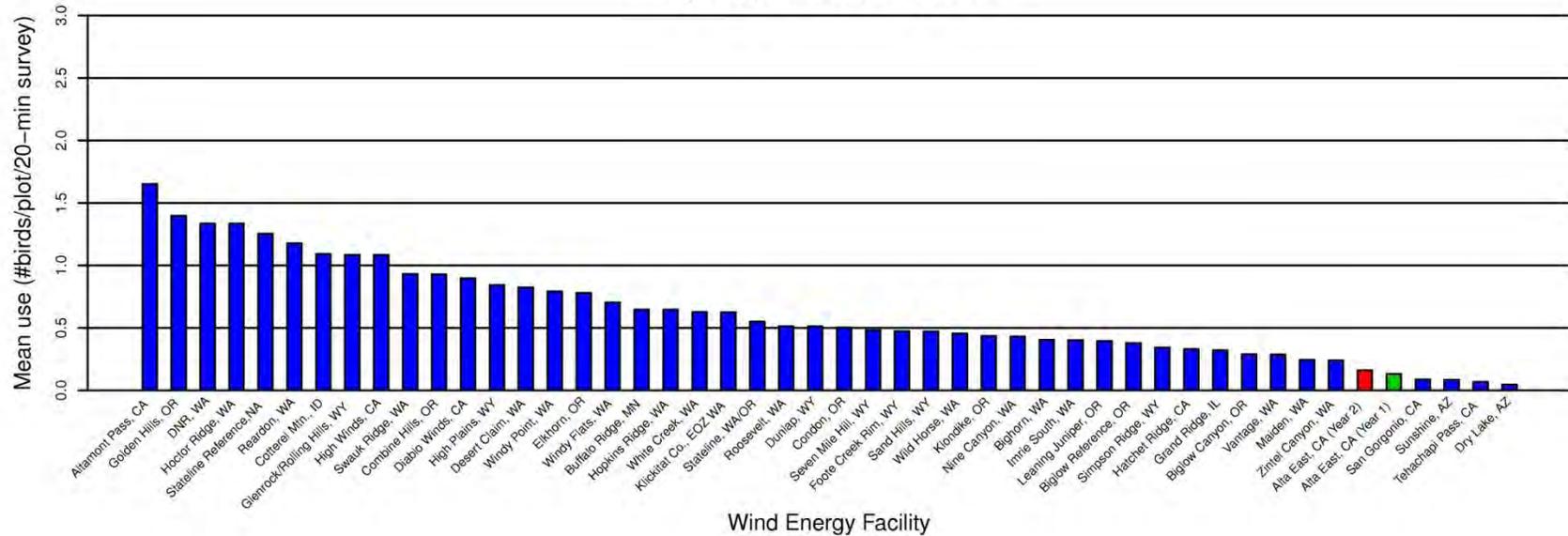


Figure 6. Comparison of spring raptor use between the Alta East Wind Resource Area and other US wind energy facilities. Data from the Alta East Wind Resource Area for this study is highlighted in red, and the data from the previous study is green.

Data from the following sources:

Alta East, CA (Year 2)	This study.			
Alta East, CA (Year 1)	Chatfield et al. 2010a			
High Winds, CA	Kerlinger et al. 2005	Reardon, WA	WEST 2005b	Wild Horse, WA
Diablo Winds, CA	WEST 2006	Zintel Canyon, WA	Erickson et al. 2002a	Tehachapi Pass, CA
Altamont Pass, CA	Erickson et al. 2002b	AOCM (CPC Proper), CA	Chatfield et al. 2009	Simpson Ridge, WY
Combine Hills, OR	Young et al. 2003c	Biglow Canyon, OR	WEST 2005c	Invenergy_Vantage, WA
Windy Flats, WA	Johnson et al. 2007b	Roosevelt, WA	NWC and WEST 2004	Antelope Ridge, OR
State Line Reference	URS et al. 2001	Nine Canyon, WA	Erickson et al. 2001	Dry Lake, AZ
Desert Claim, WA	Young et al. 2003b	Dunlap, WY	Johnson et al. 2009a	San Geronio, CA
Windy Point, WA	Johnson et al. 2006b	Leaning Juniper, OR	Kronner et al. 2005	AOCM (GPC East), CA
Hopkins Ridge, WA	Young et al. 2003a	Biglow Reference, OR	WEST 2005c	Grand Ridge, IL
Golden Hills, OR	Jeffrey et al. 2008	Foot Creek Rim, WY	Erickson et al. 2002b	High Plains, WY
Klondike, OR	Johnson et al. 2002	Buffalo Ridge, MN	Erickson et al. 2002b	Hatchet Ridge, CA
Condon, OR	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b	Sunshine, AZ
State Line, WA/OR	Erickson et al. 2002b	Alta Infill, CA	Chatfield et al. 2010b	
White Creek, WA	NWC and WEST 2005	Cotterel Mtn., ID	BLM 2006	

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