

**West Ridge Wind Energy Project
2009 Aerial Raptor Nest Survey
and
Preliminary Raptor Impact Assessment
Harney County, Oregon**

Prepared for:

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West Ridge Wind Energy Project 2009 Aerial Raptor Nest Survey and Preliminary Raptor Impact Assessment

1.0 INTRODUCTION

Northwest Wildlife Consultants, Inc. (NWC) based in Pendleton, Oregon was contracted by Columbia Energy Partners, LLC (CEP) to conduct an aerial raptor nest survey on and near CEP's proposed West Ridge Wind Energy Project (Project). This report summarizes the methods and results of that survey. The Project is located on the northern end of the Steens Mountains in Harney County, Oregon. Related habitat mapping (Gerhardt et al., 2008), special status wildlife species survey (Gerhardt and Gritski, 2009a), special status plant species survey, avian use survey, small-plot avian surveys (Gerhardt and Gritski, 2009b), and bat inventory studies (Gritski and Gerhardt, 2010a) for the Project are or will be summarized in separate reports.

2.0 METHODS

The objective of the raptor nest survey was to obtain information that will help predict potential impacts of the Project to nesting raptors and for micro-siting Project facilities during the planning stage to minimize potential direct and indirect impacts. Potential impacts include those that might occur during construction or operation of the Project and might involve disturbance during nesting, direct loss of nest structure, or death of nesting birds or fledglings through collision with turbines. Information gained from this study is expected to be useful for avoiding, minimizing and/or mitigating impacts and for designing the post-construction monitoring program.

One aerial survey of the area was conducted over three separate days (May 27, 28 and 29, 2009) via helicopter, using an experienced raptor ecologist and a helicopter pilot skilled at this type of survey. The surveyor identified all raptor and raven nests, both active and inactive, on the Project area and within a two-mile buffer of the turbine strings as proposed at the time of the survey (Figure 1). Raptors not included in this survey method were the ground-nesting owls and northern harrier (*Circus cyaneus*) and small cavity-nesters such as American kestrel (*Falco sparverius*), due to the difficulty in detecting these types of nests during a helicopter survey. Within the survey area, all potential nesting areas—trees, transmission lines, and rock formations—were examined.

The locations of all large bird nests detected were recorded with a hand-held Global Positioning System (GPS) unit (Figure 1). This included all confirmed and potential nests regardless of their activity status. To determine whether a nest was active or inactive, the biologist relied on clues that included behavior of adults and presence of eggs, young, or whitewash. Attempts were made to identify the species of raptor associated with each active nest. If detected, stick nests built by common ravens (*Corvus corax*) or black-billed magpies (*Pica hudsonia*) were also recorded, since these could be used by raptors in subsequent breeding seasons.

The number of active nests detected was divided by the area surveyed to obtain raptor nest densities, both by species and for all large diurnal raptors combined. These densities allowed for comparison with other Pacific Northwest wind energy projects for which similar data were available. These comparisons, together with results of fatality monitoring studies at some of these other sites, made possible a preliminary discussion of potential impacts to

raptors of the proposed Project. A more complete assessment of impacts to raptors will be included in the discussion section of the avian use study report.

3.0 RESULTS

The aerial raptor nest survey covered an area of approximately 63.1 square miles. Locations of all nests detected, both active and inactive, are shown in Figure 1. A total of twelve active nests and 13 inactive stick nests were found, including:

- 10 red-tailed hawk (*Buteo jamaicensis*)
- 1 great-horned owl (*Bubo jamaicensis*)
- 1 turkey vulture (*Cathartes aura*)
- 13 inactive stick nests

None of the active nests identified were occupied by Federal or State Listed, Candidate, or Proposed species, or of State Sensitive species. Special status species are species listed as Federal or State Endangered, Threatened, or Candidate, considered Federal Species of Concern, or species that have Oregon Sensitive status (summarized in Gerhardt and Gritski, 2009a).

Overall raptor nest density within the 2009 survey area was 0.17 nests per square mile (red-tailed hawk 0.16/mi², great-horned owl 0.015/mi²; Table 1). Although a single turkey vulture nest (nest density 0.015/mi²) was found during this aerial survey, in general nests of this species, as well as Cooper's hawk (*Accipiter cooperii*) and American kestrel, are difficult to find using the aerial survey method without extensive on-the-ground surveys. Therefore, for comparison with other sites, nest density of turkey vulture is not included in the total nest density or in Table 1. Nest density estimates also do not include common raven or inactive nests.

4.0 DISCUSSION

Factors such as mean use, raptor nest density and existing information (pre- and post-construction avian use and fatalities) at regional wind projects were reviewed to assess potential raptor risk and species at risk for the West Ridge Wind Energy Project.

The concern for raptor collisions at wind projects arises largely from the fact that red-tailed hawks, northern harriers, golden eagles, American kestrels, prairie falcons, and turkey vultures have all collided with wind turbines at Altamont, California, although most of the raptor fatalities were red-tailed hawks (Erickson et al., 2001). Comparisons with only the Altamont Pass wind project would be misleading, however, because it contains many older generation wind turbines, and many newer generation wind turbines have caused fewer raptor fatalities. For example, the mean raptor fatality estimate from eight new generation wind projects in the Midwest and west (Stateline, OR/WA; Vansycle, OR; Klondike, OR; Nine Canyon, WA; Foote Creek, WY; Buffalo Ridge, MN; Wisconsin; Buffalo Mountain, TN) was 0.04 raptor fatalities/MW/yr compared to up to approximately one raptor fatality/MW/yr (i.e., 25 times greater) at older generation wind projects such as Altamont (NWCC, 2004). At the High Winds Power Project in Solano County, California, raptor use estimates were high compared to other areas studied, particularly for American kestrels and red-tailed hawks. Corresponding to the high use by these species at the High Winds project, and despite newer turbine technology, the avian species with the greatest number of recorded fatalities in the two years after construction were American kestrel (n=45) and red-tailed hawk (n=18) (Kerlinger et al., 2006). Overall, based on regression analysis conducted by

others (WEST, Inc. and others using various data sets), it appears that for raptors there is some correlation between avian use metrics from pre-construction surveys and avian fatalities during post-construction surveys (Strickland and Johnson NWCC presentation, 2006; Jeffrey et al., 2008) at some projects.

Overall raptor nest density within the 2009 survey area for the West Ridge Wind Energy Project was 0.17/mi² (not including turkey vulture, 0.015/mi², for purposes of comparison). This is on the low end of the range of values for 18 other wind projects in the region (average 0.29/mi²; Table 1). At West Ridge Wind Energy Project, red-tailed hawk nests comprised the majority of nests detected, whereas most other projects had greater diversity of nesting raptors.

In general, active nests identified in the West Ridge study area were at considerable distance from proposed turbines and proposed permanent access roads. A single red-tailed hawk nest was within the Project boundary and within ¼ mile of proposed turbines. The single great-horned owl nest and all active red-tailed hawk nests were within aspen stands, which tend to occupy the draws between, or the slopes of, the ridges on top of which turbines will be located. Nests were generally placed near the top of one of the tallest trees in the stand, which was either an aspen or a cottonwood.

Raptor species most at risk of turbine collision at the West Ridge Wind Energy Project—based on this raptor nest survey and the fact that these species are commonly found as fatalities at operating wind projects—are red-tailed hawk and American kestrel. In addition, use by these species documented during the avian use surveys (which will be discussed in a separate report), indicates presence onsite below, above, and within the turbine rotor swept area.

Ten red-tailed hawk nests were observed during the aerial raptor nest survey, and although American kestrel nests were not documented during surveys (due to the difficulty of locating this small falcon's nest while doing an aerial survey), this species was observed using the Project area during spring and summer avian use surveys (as will be discussed in a separate report of that study) and likely nests on-site. These two raptor species have been found as fatalities at other wind projects in the Pacific Northwest (Table 2).

Other nesting diurnal raptor species at risk for collision with turbines at West Ridge Wind Energy Project based on their presence on the Project and history of collision at other Pacific Northwest sites include prairie falcon (*Falco mexicanus*) and Cooper's hawk (*Accipiter cooperii*). Cooper's hawks likely nest in the aspen stands near the Project, but their nests are not usually detected through this type of survey; none were located during special status wildlife species surveys (Gerhardt and Gritski, 2009a). Prairie falcon nests were encountered during aerial nest surveys of the nearby East Ridge Wind Energy Project (three active nests; Gerhardt and Gritski, 2010b) and the west alternate Echanis transmission line (two nests; Gerhardt and Gritski, 2010c). Although not commonly found as fatalities, each of these species has been documented as a fatality at Pacific Northwest wind projects (Table 2).

Great-horned owls have been found as fatalities at regional wind projects (Table 2) and a single active nest was documented during this survey. Other owl species found as fatalities include barn owl (*Tyto alba*) and long-eared owl (*Asio otus*). No nocturnal surveys were conducted, and although no nests of these species were found during special status wildlife species surveys (Gerhardt and Gritski, 2009), there is potential for breeding by these and other owl species, particularly in the more mature aspen stands near the Project.

Further analysis and discussion of potential impacts to raptor species will be included in the West Ridge avian use study report.

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6.0 ACKNOWLEDGMENTS

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7.0 TABLES

Table 1. Estimated raptor nest densities from West Ridge Wind Energy Project and proposed and existing Pacific Northwest wind projects.

Project Site*	Raptor Nest Density (#/mi ²), rounded							
	All Raptor Species Combined	Buteos				Eagle	Falcon	Owl
		SWHA	RTHA	FEHA	UNBU	GOEA	PRFA	GHOW
West Ridge, OR	0.17	0.00	0.16	0.00	0.00	0.00	0.00	0.015
Willow Creek Winds, OR	0.80	0.44	0.07	0.25	0.00	0.00	0.00	0.04
Rattlesnake Road, OR	0.45	0.19	0.13	0.05	0.00	0.00	0.08	0.00
Hopkins Ridge, WA	0.42	0.01	0.27	0.01	0.05	0.00	0.00	0.08
Leaning Juniper I and II, OR	0.41	0.18	0.16	0.03	0.00	0.00	0.02	0.02
Leaning Juniper IIB, OR	0.40	0.19	0.13	0.06	0.00	0.00	0.02	0.00
Harvest Wind-East, WA	0.40	0.12	0.25	0.00	0.00	0.00	0.03	0.00
Harvest Wind-West, WA	0.28	0.00	0.19	0.00	0.00	0.05	0.00	0.00
Wheat Field, OR	0.26	0.06	0.12	0.03	0.00	0.00	0.06	0.00
Golden Hills, OR	0.25	0.04	0.16	0.00	0.00	0.00	0.00	0.05
Pebble Springs, OR	0.24 (2009 Project area only)	0.18	0.06	0.00	0.00	0.00	0.00	0.00
Klondike I and II, OR	0.23 (5 mile radius survey area)	0.07	0.11	0.00	0.00	0.01	0.00	0.04
Stateline OR/WA	0.21	0.03	0.08	0.03	0.00	0.00	0.00	0.07
Klondike III, OR	0.20	0.04	0.11	0.00	0.01	0.00	0.00	0.03
Hay Canyon, OR	0.18	0.02	0.16	0.00	0.00	0.00	0.00	0.00
Wild Horse, WA	0.16	0.00	0.12	0.00	0.00	0.00	0.02	0.02
Klickitat County, WA	0.12	0.00	0.09	0.00	0.00	0.00	0.01	0.03
Big Horn, WA	0.11	0.00	0.06	0.00	0.00	0.00	0.01	0.04
Star Point, OR	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.00
Average of Other Projects (not including West Ridge)	0.29							

Species Codes:

SWHA = Swainson's hawk

RTHA = red-tailed hawk

FEHA = ferruginous hawk

GOEA = golden eagle

PRFA = prairie falcon

GHOW = great-horned owl

UNBU = unknown species of the genus *Buteo*

American kestrel, short-eared owl, long-eared owl, turkey vulture, and burrowing owl are omitted for purposes of comparison due to general difficulty in determining nesting of these species with the raptor nest survey method (helicopter survey) employed in this and other studies.

*References for projects: Big Horn (Johnson and Erickson, 2004), Golden Hills (Jeffrey et al., 2008), Harvest Wind East and West (Kronner et al., 2008a), Hay Canyon (formerly Grass Valley; Gritski et al., 2007), Hopkins Ridge (Young et al., 2003), Klickitat County (Johnson et al., 2003), Klondike I and II (Johnson et al., 2002), Klondike III (Mabee et al., 2005), Leaning Juniper I and II (Kronner et al., 2005), Leaning Juniper IIB (NWC, 2009), Pebble Springs (post-construction study, Gritski et al., 2009c), Rattlesnake Road (Kronner et al., 2007a), Star Point (NWC, 2008b), Stateline (Erickson et al., 2004; NWC and WEST, 2001), Summit Ridge (Gerhardt, et. al, 2009), Wheat Field (Kronner et al., 2008b), Wild Horse (Erickson et al., 2003a), Willow Creek Winds (Kronner et al., 2007b).

Table 2. Number and species composition of bird fatalities* found at Columbia Plateau Ecoregion wind projects where fatality monitoring studies have been completed or are in progress (data obtained from public files).**

Species	% Composition (Includes Scheduled Searches Only)	Number of Fatalities on Scheduled Searches	Number of Fatalities Found as Incidentals***
horned lark	32.3	280	27
golden-crowned kinglet	5.9	51	3
gray partridge (n)	5.5	48	2
ring-necked pheasant (n)	5.1	44	14
European starling (n)	3.2	28	3
western meadowlark	3.2	28	1
chukar (n)	3.0	26	4
mourning dove	2.9	25	1
unidentified passerine	2.9	25	3
American kestrel	2.8	24	6
dark-eyed junco	2.3	20	5
white-crowned sparrow	2.2	19	3
unidentified bird	1.8	16	2
yellow-rumped warbler	1.5	13	1
winter wren	1.4	12	0
rock pigeon (n)	1.3	11	0
Townsend's warbler	1.3	11	0
red-tailed hawk	1.2	10	8
ruby-crowned kinglet	1.0	9	2
northern flicker	0.9	8	0
short-eared owl	0.9	8	1
American robin	0.8	7	2
black-billed magpie	0.8	7	0
red-breasted nuthatch	0.8	7	0
savannah sparrow	0.8	7	0
unidentified kinglet	0.8	7	0
house wren	0.7	6	0
golden-crowned sparrow	0.6	5	0
unidentified sparrow	0.5	4	0
Brewer's sparrow	0.3	3	4
Canada goose	0.3	3	1
common nighthawk	0.3	3	5
great blue heron	0.3	3	0
great-horned owl	0.3	3	0
mallard	0.3	3	0
song sparrow	0.3	3	1
American coot	0.2	2	0
American goldfinch	0.2	2	0
Cassin's vireo	0.2	2	0
chipping sparrow	0.2	2	0
common raven	0.2	2	0
downy woodpecker	0.2	2	0
ferruginous hawk	0.2	2	2
northern harrier	0.2	2	1
orange-crowned warbler	0.2	2	0
rough-legged hawk	0.2	2	3
sage thrasher	0.2	2	0
spotted towhee	0.2	2	1
Swainson's hawk	0.2	2	5

Species	% Composition (Includes Scheduled Searches Only)	Number of Fatalities on Scheduled Searches	Number of Fatalities Found as Incidentals***
unidentified buteo	0.2	2	0
unidentified warbler	0.2	2	0
vesper sparrow	0.2	2	1
Virginia rail	0.2	2	0
western tanager	0.2	2	0
acorn woodpecker	0.1	1	0
American pipit	0.1	1	0
barn owl	0.1	1	0
black-throated sparrow	0.1	1	0
Brewer's blackbird	0.1	1	0
brown-headed cowbird	0.1	1	0
California quail	0.1	1	0
common yellowthroat	0.1	1	0
Cooper's hawk	0.1	1	0
golden eagle	0.1	1	0
grasshopper sparrow	0.1	1	0
hairy woodpecker	0.1	1	0
hermit thrush	0.1	1	1
horned grebe	0.1	1	0
house finch	0.1	1	1
house sparrow (n)	0.1	1	1
killdeer	0.1	1	0
Lewis's woodpecker	0.1	1	0
Lincoln's sparrow	0.1	1	0
long-billed curlew	0.1	1	0
long-eared owl	0.1	1	0
MacGillivray's warbler	0.1	1	1
merlin	0.1	1	0
mountain bluebird	0.1	1	1
pine siskin	0.1	1	0
red-winged blackbird	0.1	1	0
ruddy duck	0.1	1	0
sharp-shinned hawk	0.1	1	0
Swainson's thrush	0.1	1	0
Townsend's solitaire	0.1	1	0
tree swallow	0.1	1	0
unidentified accipiter	0.1	1	0
unidentified duck	0.1	1	0
unidentified flycatcher	0.1	1	0
unidentified owl	0.1	1	0
unidentified thrush	0.1	1	0
unidentified vireo	0.1	1	0
varied thrush	0.1	1	0
Vaux's swift	0.1	1	1
warbling vireo	0.1	1	0
western grebe	0.1	1	1
western kingbird	0.1	1	0
western wood-pewee	0.1	1	0
white-throated swift	0.1	1	1
yellow warbler	0.1	1	0
American crow	0.0	0	1
bufflehead	0.0	0	1

Species	% Composition (Includes Scheduled Searches Only)	Number of Fatalities on Scheduled Searches	Number of Fatalities Found as Incidentals***
gray catbird	0.0	0	1
prairie falcon	0.0	0	1
sage sparrow	0.0	0	1
Williamson's sapsucker	0.0	0	1
Total (93 species identified) (87 native identified, 6 non-native)	100.0	868	126

* assumed to have been killed by the operating wind project

** with similar study protocols.

*** not all project data were verified. Includes most, but not all incidentals found during formal monitoring studies, and one incidental found after monitoring was complete.

n = non-native species

¹ Data from the following formal monitoring studies during the monitoring periods stated below. Includes one incidental found after monitoring was complete. For full reference, see reference Section 5.0. These are observed fatalities and not final estimates of fatalities, which are higher.

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- Young, Jr., D.P., J.D. Jeffrey, K. Bay, and W.P. Erickson. 2009. Puget Sound Energy, Hopkins Ridge Wind Project Phase 1, post-construction avian and bat monitoring, second annual report, January–December 2008. Bat Monitoring First Annual Report. January–December 2006.
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8.0 FIGURES

