

Biological Study Report
West Ridge
Wind Energy Project

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West Ridge Wind, LLC

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1.0 Introduction

This report identifies and describes wildlife, habitat, rare plant, and other field investigations that were completed as of October 20, 2008 or are ongoing for the West Ridge Wind Energy Project (Project) located in southeast Oregon. Ongoing studies will be completed during the appropriate season(s) in 2009.

These studies, requested by West Ridge Wind, LLC (WRW) will help assess the presence in and use of the Project area by special status wildlife and plant species occurring during the nesting and vegetative-growing season, as well as document use by wildlife during other seasons. The information will aid in siting of the wind project facility footprint and help in identifying sensitive areas where disturbance should be minimized or avoided. The 2009 field surveys will take place in the proposed micro-siting corridors in which the facilities will be located. The 2009 raptor nest survey area will include a two mile buffer of all turbines.

Descriptions of each of the following studies that have been conducted or will be conducted are provided within this report:

- Review of existing information and database search
- Habitat mapping
- Avian use surveys
- Special status wildlife surveys
- Aerial raptor nest survey
- Rare plant surveys
- Small-plot avian surveys

2.0 Study Area and Habitat

The Project area lies entirely within Harney County, Oregon, east of the small town of Frenchglen and on the lower western slopes of the Steens Mountains. The proposed turbines would be placed on McCoy Ridge, a north-south ridge that slopes off gently to the west, but is bounded on the east by steeper slopes to McCoy Creek. Habitat is primarily a mixture of shrub-steppe and grasslands, but portions contain an increasing juniper component. Slopes and hillsides contain stands of aspen and, to a lesser extent, mountain mahogany trees.

Streams are only ephemeral in these uplands, so little or no riparian systems are present. Small depressions are infrequent on this landscape, but these may hold water from snowmelt through the spring and into summer. The Project area itself contains small rock outcrops but no large cliffs or talus slopes. Such features are, however, present within two miles of the Project, to the east and south.

3.0 Study Methods

3.1 Review of Existing Information and Database Search

An initial database search was conducted to ascertain the endangered, threatened, and other special status species of wildlife and plants likely to be present in and near the Project area. The U.S. Fish and Wildlife Service maintains lists (by county) of endangered, threatened, proposed, and candidate species and species of concern, and these electronic file lists have been accessed for Harney County (USFWS 2008). Also searched was the Oregon Explorer Wildlife Viewer (maintained by OSU and ODFW; OSU and ODFW, 2008). The resulting list of special status wildlife species of known or potential occurrence in the Project area is attached as Appendix 1. In addition, a list of documented occurrences of rare, threatened, and endangered plant and wildlife species within 5 miles of the Project was requested from the Oregon Natural Heritage Information Center (ORNHIC) during late November 2008.

Using this information and the experienced botanist's knowledge of the general area, a list of rare plant taxa with the potential for occurrence at the West Ridge Wind Energy Project area was compiled. This list includes all rare taxa known to occur in the general vicinity from existing data (Oregon Natural Heritage Information Center [ORNHIC] 2007). Additional taxa were added after reviewing distribution maps and habitat/ecology descriptions for other rare plants in the region (Oregon Flora Project 2008; Mansfield 2000).

3.2 Habitat Mapping

Habitat mapping within the leased boundaries of the proposed West Ridge Wind Energy Project was conducted in late July and early August of 2008 (Figure 1). Utilizing a combination of aerial photograph interpretation and on-the-ground verification, this mapping effort characterized the range of vegetation types and structure present within the Project area from the perspective of wildlife use, both general (for species assemblages, i.e. shrub-steppe obligates) and specific (for individual taxa, i.e. special status species). Habitat type designations were chosen for consistency with Conservation Strategy Habitats as described by the Oregon Department of Fish and Wildlife (ODFW 2005); these follow a wildlife-use approach to vegetative habitat delineation with some practical considerations related to mapping scale.

Prior to field surveys, approximate leased boundaries were obtained from WRW. Within this project boundary, initial habitat mapping boundaries were delineated at a scale of 1:5,000 in a digital GIS environment using 1-meter resolution 2005 orthophotographs (NAIP 2005; image dates 8 and 10 July, 2005). Initial boundaries were delineated based on obvious differences in vegetation, land form, and land-use. Overlay of USGS (United States Geologic Survey) digital elevation model (DEM) data, hydrology, and transportation layers aided with these delineations. Polygon boundaries were subsequently verified by visits to the Project site between July 17, 2008 and

August 8, 2008. Field assessments were conducted in order to accurately classify the habitat types present, and to ground-truth habitat type boundaries. Any necessary boundary corrections were hand drawn on orthophoto topographic maps in the field and later transferred to the digital boundary layer. The mapping effort included reconnaissance sampling for species composition and cover in order to assess dominant, co-dominant, and other common plant species within each habitat type.

3.3 Avian Use Surveys

Five 800-meter-radius, non-overlapping study plots were delineated on the Project area (Figure 2). Plot placement was designed from the project layout received from ERW to maximize viewing and provide excellent coverage of the proposed turbine strings to allow for the establishment of micro-siting corridors. Surveys were initiated in July 2008 and were conducted weekly. Surveys are ongoing; data in this report are for surveys conducted through late fall 2008 (October 21, 2008).

These surveys followed a variable circular-plot method (Reynolds et al. 1980) to determine species composition and relative abundance of birds using the Project and flight altitudes associated with avian use of this area. Survey protocol was similar to that used at other wind projects located in the Columbia Basin of Oregon and Washington including the Leaning Juniper Phase I and Phase II Wind Projects (Kronner et al. 2005), Klondike I Wind Power Project (Johnson et al. 2002), and Klondike III Wind Power Project (Mabee et al. 2005). The avian use surveys will be conducted for more than one season if weather and travel conditions allow.

An experienced avian ecologist was positioned at the center of the plot and collect data on all wildlife seen or heard during a 20-minute observation period. During fall, two of the five plots were surveyed on a rotating basis for an additional 40 minutes each week in an effort to detect any migratory movement of raptors. This includes observations both within and outside the 800-meter radius plot (though several analyses use only the within-plot data). A full set of surveys (5 plots) was generally completed on the same survey day, and plots were surveyed equally during different times of day (morning, mid-day, and afternoon), to the extent feasible, to reduce temporal bias.

General data recorded included date, time, weather, and wildlife observed. For birds detected, data collected included species, number of individuals, habitat association, and behavior, including flight height and direction. In addition, flight paths of raptors and other species of interest were hand-plotted in the field at the time of observation. These were plotted on individual plot maps (topographic maps with study plot boundary delineation). Whenever special status species and species of interest (including raptors and sage-grouse) were observed while in-transit near the study plots, within the general Project area, these observations were also recorded. Data were entered into a Microsoft Access database.

3.4 Special Status Wildlife Species Surveys

Special status wildlife species surveys will be conducted in 2009. These surveys, which will aid in the Project facility micro-siting process, will be conducted with the walking transect method, through habitats in established micro-siting corridors. Special status wildlife species that may occur in the Project area include state endangered, threatened, candidate, sensitive status species, and/or federal "species of concern" or "birds of conservation concern" (Appendix 1). A few species with no current federal or ODFW status but that are tracked by ORNHIC are also included. Based upon ODFW, USFWS, and ORNHIC lists and a habitat review of the area utilizing aerial photos, 21 species of birds, 17 species of mammals, one species of reptile, and two species of amphibians were determined as possibly occurring during all or part of the year within the proposed boundaries of the West Ridge Wind Energy Project area. The proposed survey period to be implemented in 2009 corresponds to the breeding or rearing season for most of these species and where appropriate for the elevation, follow recommendations in the Oregon survey methodology manual for these survey periods (ODFW 1994).

Special status wildlife surveys will be conducted using standard, agency-acceptable protocols, conducting walking surveys with corridors representing a 400-foot buffer of all project facilities. The centerline of the buffer represents the anticipated facility development however the whole corridor is studied to allow for flexibility in facility placement within the full 800-foot wide micro-siting corridor when final Project engineering and study data are reviewed together.

General data recorded will include date, time, and weather variables. Locations of species detections will be recorded using hand-held Global Positioning System (GPS) units; data to be recorded in association with these locations include species and number, age and sex, behavior and habitat. GIS-generated maps will be prepared showing locations of individuals or groups of individuals for all special status wildlife species along with discussion of each species' relationships to habitats within the project areas. Species encountered in-transit while on site between survey corridors will also be recorded. Other products resulting from this study will include a list of avian, mammalian, reptile, and amphibian species using the Project area and associated analyses (including, but not limited to, diversity indices and a list of confirmed breeders).

Greater sage-grouse (*Centrocercus urophasianus*) are known to occur within the Project area. In addition to recording actual detections of this species, surveyors will record evidence of their presence, especially fecal material. This information will be used to identify areas of use by this species, which is considered "Sensitive-vulnerable" by ODFW and is a federal "species of concern."

3.5 Raptor Nest Survey

The objective of the raptor nest survey is to obtain information that will help predict potential impacts of the Project to nesting raptors from the turbines and structures in order to properly design the final turbine layout within the micro-siting corridors. 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.

A single aerial survey will be conducted in mid- to late spring 2009. It will be conducted from a helicopter, using an experienced raptor ecologist and a helicopter pilot experienced at this type of survey. The goal is to locate nests and determine their activity status on the Project area and within a two-mile buffer of the turbine strings and access road. All potential nesting areas—trees, transmission lines, and rock formations—will be flown to provide complete coverage of this area.

All raptor nests will be documented and their locations recorded with a hand-held GPS unit. This will include all confirmed and potential nests regardless of their activity status. To determine whether a nest is active or inactive, the experienced biologist will rely on clues including behavior of adults and presence of eggs, young, or whitewash, while minimizing disturbance as much as possible. Attempts will be made to identify the species of raptor associated with each active nest. Ground-based confirmation of nests and status, if possible, will be accomplished during the course of other studies. Stick nests (nests that are constructed with sticks) with no birds present will also be recorded, since these could be used by raptors in subsequent breeding seasons.

3.6 Rare Plant Survey

In order to aid in the micro-siting process, special status plant field surveys will be conducted in early summer of 2009. Survey time windows will be specifically designed to maximize the potential for accurate identification of as many taxa as possible in the field and hence to ensure adequate coverage with respect to potential occurrences of special status taxa. Surveys will cover an area extending 400 feet outwards from all proposed facilities. Searches will be conducted using an intuitively controlled survey method (USDA BLM 1998, Elzinga et al. 1998) where all survey corridors will be sufficiently traversed to locate all habitats of high suitability for target plant species. Once located, survey efforts will intensify within these high suitability habitats, with surveyors conducting transects to allow good visual scan for potential special status plant taxa. All plant surveys will be conducted by qualified botanists familiar with the Steens Mountain flora in general and/or with specific pre-field training to definitively identify all focal rare plant taxa.

During surveys, field crews will be equipped with reference literature, pre-field review data, orthophotos, and handheld GPS units, to ensure adequate survey coverage and to record the locations of any special status species encountered. All vascular plant species encountered during surveys will be identified to species where necessary to ensure that no potential rare taxa are misidentified. All plant taxa will be definitively identified on site or, if necessary, collected and pressed for later identification through comparison with documented herbarium specimens or other reference materials.

3.7 Small-Plot Avian Survey

Small-plot avian surveys complement the large-plot avian use surveys described above (Section 3.3). In particular, the small-plot surveys focus on smaller birds (passerines) utilizing the habitats of proposed developments during the breeding season. These data can aid in describing overall habitat quality and value for native wildlife, to be used later during avian impact assessment and the detailed facility micrositing process.

These surveys will involve the establishment of eight fixed-radius points (Ralph et al. 1993) in spring 2009, each of which will be surveyed three times during the breeding season (May and June). Points will cover each habitat type in the Project construction corridors, and will also be spatially distributed. Plots will be 100-meters in radius. They will be surveyed by an avian ecologist for a ten-minute observation period, and all surveys will be conducted between sunrise and five hours after sunrise (consistent with standard protocols used nationwide). Surveys will not be conducted during inclement weather likely to hamper the researcher's ability to detect birds present.

General data to be recorded includes time, date, and weather variables. For each bird detected, associated data will include species and number, age and sex, behavior and habitat. Locations of all detections will be plotted on a map of the point. Species encountered while in-transit between survey points but not yet observed on the surveys will also be recorded. Products resulting from this study will include a list of avian species using the Project area during the breeding season and associated analyses (including, but not limited to, diversity indices and a list of confirmed breeders).

3.8 Big Game

Observations of big game and other mammals were recorded (and will be recorded) during all surveys and while in-transit to survey locations. No surveys were conducted specifically for deer, elk, or pronghorn, but their presence and numbers were documented for assessing the general use of the Project habitat by these game species.

4.0 Results

4.1 Review of Existing Information and Database Search

The review of existing information led to a list of special status wildlife species of known or potential occurrence in or near the Project area (Appendix 1). It includes 17 mammals, 21 birds, one reptile, and 2 amphibians. Also resulting from this review and database search is a list of 34 plant species with low, moderate, or high likelihood of presence at the Project site (Appendix 2). This list (which may be augmented once the requested ORNHIC data are received) was used to aid in the development of micrositeing corridors in conjunction with the habitat map and will be used to help guide and prioritize survey efforts through specific knowledge of the vegetative associations and habitats for rare taxa most likely to be encountered.

4.2 Habitat Mapping

Much of the West Ridge Wind Energy Project area consists of large, easily delineated tracts of homogenous vegetation type (mostly big sage shrub-steppe, aspen woodlands and juniper woodlands). Some areas were much more heterogeneous in composition and thus less easily delineated and classified. These areas of heterogeneity, consisting either of a fine-scale habitat mosaic (an inter-mixture of small [<2 acres] but discrete patches of different habitat) or of ecotones (areas where two adjacent discrete habitats blended together to form a unique habitat) were difficult to delineate at the scale of these mapping efforts. Wherever possible, areas of homogenous vegetation greater than 2-acres in size were delineated as polygons representing a single habitat type. Due to mapping constraints, finer-scale habitat mixtures were categorized by the dominant habitat type present. The results of this mapping contributed to the development of micrositeing corridors. For example, where feasible, potential disturbance will be avoided or minimized in habitats that are more sensitive to impacts from development, such as Riparian Meadow or Riparian Shrub-Woodland habitats. The resulting ten habitat types, along with total acreages and ODFW Conservation Strategy status are listed in Table 1.

Table 1. West Ridge wildlife habitat types with acreages and Oregon Department of Fish and Wildlife Conservation Priority status (ODFW 2005).

| Wildlife Habitat Type <i>(listed alphabetically)</i> | ODFW Habitat Status | Acres | % of total area |
|--|--------------------------------|---------------|--------------------------------|
| Aspen Woodland | Strategy | 1134.0 | 22.7% |
| Big Sagebrush Steppe | Strategy | 3130.2 | 62.7% |
| Dwarf Shrub-Steppe | | 10.9 | <1.0% |
| Escarpment/Talus | Specialized and Local | 32.2 | <1.0% |
| Juniper Woodland | Specialized and Local | 443.4 | 8.9% |
| Native Grassland | Strategy | 147.7 | 3.0% |
| Pond | Strategy | 0.5 | <1.0% |
| Riparian Meadow | Strategy | 13.8 | <1.0% |
| Riparian Shrub-Woodland | Strategy | 62.8 | 1.3% |
| Upland Montane Shrubland | | 17.0 | <1.0% |
| Total Acres | | 4992.2 | |

Wildlife Habitat Type Summaries

Aspen Woodland

On Steens Mountain, aspen woodlands typically occur in mesic sites above the Western Juniper Woodland habitat and below Montane Shrub-steppe Habitat. At the West Ridge site, aspen woodlands are a common habitat type, concentrated mostly in the southern half of the project area on northwest to northeast aspects above 1800 meters (5900 feet). These open woodlands are typically even-aged clonal aspen (varying in total age and height) over a well-developed understory of diverse forb, grass and shrub species. Common understory species include snowberry (*Symphoricarpos rotundifolius*), gooseberries (*Ribes* spp.), orange sneezeweed (*Dugaldia hoopesii*), paintbrushes (*Castilleja* spp.), lupines (*Lupinus* spp.), California brome (*Bromus carinatus*), sedges (*Carex* spp.) and bluegrass (*Poa* spp.). Juniper and mountain mahogany often invade from adjacent Western Juniper habitat, especially on drier sites with more westerly aspects. Common understory species in these more arid sites include mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and squirreltail (*Elymus elymoides* ssp. *californicus*).

Aspen woodlands is particularly important habitat for nesting songbirds and foraging bats and provides cover for numerous other wildlife species, including mule deer and elk.

Big Sagebrush Steppe

Big sagebrush habitats are the most extensive type on the project site and include both mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) communities. Mountain big sagebrush dominates at montane and

subalpine elevations where it occurs in nearly all slope positions, especially on sites with deeper soils and southerly aspects. Wyoming big sagebrush communities occur more commonly at lower elevations and on shallower, drier soils. All big sagebrush communities often intergrade into adjacent aspen and juniper woodlands. Structurally, these habitats are dominated by 2 to 6 foot (0.75 to 2 meters) tall, widely-spaced sagebrush, scattered green rabbitbrush (*Chrysothamnus viscidiflorus*) and a well-developed, diverse understory of perennial bunchgrasses and forbs. Among the most common forbs and grasses are needlegrasses (*Achnatherum* spp.), bluebunch wheatgrass (*Pseudoroegneria spicata*), lupines, paintbrushes, desertparsleys (*Lomatium* spp.), common yarrow (*Achillea millefolium*), hawksbeards (*Crepis* spp.), common yampah (*Perideridia gairdneri* ssp. *borealis*).

Big sagebrush habitats have high structural and species diversity and provide excellent foraging and nesting habitat to numerous species of birds, mammals and reptiles, including several listed species (greater sage-grouse, ferruginous hawk, sage sparrow, black-throated sparrow, Preble's shrew, night snake and sagebrush lizard; ODFW 2005).

Dwarf Shrub-Steppe

Dwarf shrub habitats are a very small element within the project area where they occur only where shallow, rocky soils and relatively flat ridge top positions create relatively xeric conditions. A short but well-developed layer of low sagebrush (*Artemisia arbuscula* ssp. *arbuscula*) is the dominant feature in these communities. Forb and grass layers are relatively sparse but Sandberg's bluegrass (*Poa secunda*), desertparsleys, and fleabanes (*Erigeron* spp.) are consistently present. Though not specifically listed as a conservation priority by the ODFW, dwarf shrub-steppe habitats do provide important winter foraging areas for greater sage-grouse (Hagen 2005) as well as year round foraging for golden eagles, peregrine falcons and grasshopper sparrows (Owyhee Watershed Council 2004)

Escarpment/Talus

Escarpments and talus tend to be closely associated features and have similar wildlife use values and were thus mapped together in this study. Escarpment/talus patches large enough to show at map scale (>2 acrea) are limited to the steep, upper reaches of McCoy Creek Gorge (in the south-central portion of the project area). Escarpments are comprised of linear Steens Basalt outcroppings from 10 to 30 feet (3 to 9 meters) in height, usually with associated bands of poorly vegetated talus beneath. A few other, smaller occurrences of escarpment/talus are found in similar canyon ridge positions nearby but, due to their small size, could not reasonably be mapped separately. Escarpment/talus habitats can also harbor small, perched high-quality grassy patches dominated by bluebunch wheatgrass and Sandberg's bluegrass and with occasional shrubs such as wax currant and big sagebrush. Plant diversity and cover is generally quite low on escarpments and talus, but several potentially

occurring rare plant taxa are associated with these rocky habitats, including Cusick's draba (*Draba cusickii*), whitestem goldenbrush (*Ericameria discoidea* var. *discoidea*), western white-flower penstemon (*Penstemon pratensis*) and orpine stonecrop (*Sedum debile*).

Escarpmments can serve as critical perching and nesting habitat for several raptor species, including prairie falcon, ferruginous hawk, and golden eagle, and can supply important roosting habitat for bats in areas with suitable rock crevices (Nagorsen and Brigham 1993). Associated talus slopes are also important habitat for reptiles and mammals such as marmots and bobcats (Verts and Carraway 1998).

Juniper Woodland

Juniper woodlands are also a major habitat element at the West Ridge site. They are located throughout the project area but are most prevalent on upland flats, slopes with at least some west to south aspect, and at lower elevations; all factors contributing to relatively arid conditions. Juniper woodlands often grade ecotonally into more xeric sagebrush steppe and more mesic riparian and aspen habitats. They are comprised largely of sparse (~30%) western juniper (*Juniperus occidentalis*) cover of varying age. The understory is frequently dominated by big sagebrush but with high cover of native perennial bunchgrasses (including bluebunch wheatgrass, Sandberg's bluegrass, needlegrasses and California brome) and a diverse forb layer (pussytoes, common yarrow, paintbrushes, and lupines as some of the most common). In some locations, curl-leaf mountain mahogany (*Cercocarpus ledifolius*) is common in a narrow strip along upper slope breaks.

These open woodlands have high wildlife value, providing forage, cover, and nesting habitat for several raptors (golden eagle, prairie falcon, Swainson's hawk and ferruginous hawk), loggerhead shrike, and numerous other passerines (Johnson and O'Neil 2001). In eastern Oregon, overall avian diversity has been documented to be higher in juniper woodlands than in other upland habitats (Miller 2001). Numerous species of small mammals and bats are also associated with upland woodlands (Johnson and O'Neil 2001). This habitat is also important as thermal cover for mule deer during the winter months.

Native Grassland

Grassland communities are of limited extent at West Ridge. They occur throughout the Project area in a variety of landscape settings, including on relatively steep canyon slopes with talus/escarpment, on more gently sloped draws, and on upland flats, where they often grade ecotonally into adjacent shrub-steppe and dwarf shrub-steppe habitats. The ecological condition of these grasslands is generally fair to good, especially on canyon slopes where grazing disturbance has been minimal. Significant amounts of native grassland occur as small patches finely intermixed within areas dominated by extensive shrub-steppe and juniper woodlands. Due to mapping scale constraints, these occurrences could not be mapped at the scale of these efforts (see Methods).

Native perennial grasslands are characterized by a relatively consistent, high percent cover of bluebunch wheatgrass, Sandberg's bluegrass, usually with some amount of needlegrass (*Acnatherum* sp.), prairie Junegrass (*Koeleria cristata*) and California brome. The forb layer is diverse but lupines, sandwort (*Arenaria* spp.), hawksbeards, yarrow and several desertparsleys are consistent elements. Native grasslands provide high-quality nesting, cover, and foraging habitat for numerous bird and small mammal species, including several special-status species (greater sage-grouse, vesper sparrow, grasshopper sparrow, ferruginous hawk, golden eagle, and long-billed curlew; Johnson and O'Neil 2001; ODFW 2005). Mule deer and pronghorn antelope also commonly forage in native grasslands.

Pond

One very small occurrence within the upland flats near the southern project boundary. This small pond is shallow (less than ~2 feet [~0.5 meter]) and may dry completely during the late summers of very dry years. Vegetation varies from shallow-water aquatics such as watermilfoil (*Myriophyllum* spp.) and pondweed (*Potamogeton* spp.) in open water, to wetland sedges, common spikerush (*Eleocharis palustris*), creeping buttercup (*Ranunculus flammula*) and creeping bentgrass (*Agrostis stolonifera*) in saturated soils along the pond margins. This unique wetland habitat supports wetland plant species found nowhere else within the project area and was thus specifically delineated below the 2 acre mapping minimum threshold used in delineating other habitats.

Riparian Meadow

Very limited in extent, riparian meadows are found in two general locations; around seeps and springs at the headwaters of Bridge Creek (south project area) and along the upper reaches of Krumbo Creek (north project area). They occur as small patches within deep soils kept saturated by perennially flowing water. Vegetation is characterized by a dense graminoid layer of meadow grasses, sedges and rushes (*Juncus* spp.) along with lesser cover from a variety of forbs. Headwater seeps and springs are important habitat for breeding amphibians, nesting birds, invertebrates, and rare plants (ODFW 2005).

Riparian Shrub-Woodland

Riparian shrubland/woodland cover is very limited, occurring only as narrow corridors along the bottoms of Kiger, Little Fir and Big Fir Creek drainages. They are characterized by finely interspersed patches of vegetation variably dominated by riparian forest and riparian shrub species. Woodland portions have an overstory consisting mostly of black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), aspen and taller willows (*Salix* spp.). Dominant shrub species include shrub willows, mountain alder (*Alnus incana*), elderberry (*Sambucus nigra*) and snowbrush ceanothus (*Ceanothus velutinus* var. *velutinus*). Graminoid

and forb cover is variable and diverse with a variety of wetland sedges, rushes and forbs represented.

Upland Montane Shrubland

This minor habitat element occurs in only one location; along the upper, north-facing flanks of McCoy Ridge (north project area). It consists almost entirely of dense clonal aspen seedlings and chokecherry (*Prunus virginiana*). This early-seral shrub community has developed as a result of stand-replacing disturbance (disease or fire) that occurred 15 to 20 years ago. This upland shrub habitat represents a unique contribution to habitat diversity in the area.

4.3 Avian Use Surveys

This section summarizes results of avian use surveys conducted between July 18 and October 20, 2008. Each of five survey points was visited fifteen times during this period (for a total of 75 surveys). Detections could have been of the same bird multiple times throughout the survey period.

Forty-one species of birds were detected during these surveys (Table 2). These included 6 species of raptors, 2 game birds, 1 dove, 1 hummingbird, 1 goatsucker, 27 songbirds, 1 corvid, and 2 woodpecker species.

In all, 106 detections of raptors (including vultures) were recorded. Raptors accounted for approximately 9.8% of all avian detections. Three species accounted for 90 of these detections; these were red-tailed hawk (31), American kestrel (33), and turkey vulture (26). There were eight detections of northern harrier, five of Cooper's hawk, and single sightings were made of golden eagle, rough-legged hawk, and sharp-shinned hawk.

Ninety-five detections of raptors and individuals of special-status bird species were observed while in-transit to survey points (Table 3). These included one species, white-faced ibis, not detected during the surveys themselves. A comprehensive list of all vertebrate wildlife species detected during surveys and while in-transit between surveys is included as Appendix 3.

Passerines comprised 80% of avian detections during the surveys. During this survey period, three species—mountain bluebird, unidentified blackbird, and Brewer's sparrow made up more than 47% of all bird detections. Northern flicker, American robin, Townsend's solitaire, and horned lark accounted for approximately 13% of all bird detections with each of the above mentioned contributing between 3.2% and 4.9% to the total observed composition.

Table 2. Species observed within 800m in the West Ridge Wind Energy study during the period between July 18 and October 20, 2008.

| Species/Groups | # Individuals Observed | | |
|-------------------------|-------------------------------|--|------------|
| | 1 st 20-min period | 2 nd , 3 rd 20-min periods | Total |
| Raptors | 93 | 13 | 106 |
| <i>northern harrier</i> | 7 | 1 | 8 |
| <i>accipiter</i> | 2 | 4 | 6 |
| Cooper's hawk | 2 | 3 | 5 |
| sharp-shinned hawk | 0 | 1 | 1 |
| <i>Buteos</i> | 30 | 2 | 32 |
| rough-legged hawk | 1 | 0 | 1 |
| red-tailed hawk | 29 | 2 | 31 |
| <i>Falcons</i> | 32 | 1 | 33 |
| American kestrel | 32 | 1 | 33 |
| <i>Eagles</i> | 1 | 0 | 1 |
| golden eagle | 1 | 0 | 1 |
| <i>Vultures</i> | 21 | 5 | 26 |
| turkey vulture | 21 | 5 | 26 |
| Game birds | 4 | 5 | 9 |
| California quail | 0 | 3 | 3 |
| greater sage-grouse | 4 | 2 | 6 |
| Doves | 21 | 0 | 21 |
| mourning dove | 21 | 0 | 21 |
| Hummingbird | 1 | 0 | 1 |
| rufous hummingbird | 1 | 0 | 1 |
| Goatsucker | 26 | 0 | 26 |
| common nighthawk | 26 | 0 | 26 |
| Passerines | 754 | 137 | 891 |
| <i>Songbirds</i> | 742 | 137 | 879 |
| American goldfinch | 5 | 12 | 17 |
| American robin | 45 | 64 | 109 |
| Brewer's blackbird | 14 | 0 | 14 |
| Brewer's sparrow | 147 | 15 | 162 |
| Bullock's oriole | 1 | 0 | 1 |
| chipping sparrow | 1 | 0 | 1 |
| cliff swallow | 0 | 3 | 3 |
| dark-eyed junco | 6 | 0 | 6 |
| dusky flycatcher | 1 | 0 | 1 |
| green-tailed towhee | 5 | 0 | 5 |
| horned lark | 30 | 19 | 49 |
| house finch | 25 | 1 | 26 |
| house wren | 1 | 2 | 3 |
| lesser goldfinch | 8 | 0 | 8 |
| mountain bluebird | 154 | 2 | 156 |
| pine siskin | 0 | 7 | 7 |
| red-breasted nuthatch | 1 | 0 | 1 |
| rock wren | 6 | 0 | 6 |
| sage thrasher | 4 | 3 | 7 |
| savannah sparrow | 1 | 0 | 1 |
| Townsend's solitaire | 32 | 1 | 33 |
| tree swallow | 16 | 0 | 16 |
| unidentified blackbird | 150 | 0 | 150 |
| unidentified finch | 12 | 0 | 12 |
| unidentified passerine | 5 | 0 | 5 |
| unidentified sparrow | 0 | 1 | 1 |
| unidentified swallow | 10 | 0 | 10 |

| Species/Groups | # Individuals Observed | | |
|-----------------------|-------------------------------|--|-------------|
| | 1 st 20-min period | 2 nd , 3 rd 20-min periods | Total |
| vesper sparrow | 17 | 1 | 18 |
| violet-green swallow | 15 | 0 | 15 |
| western meadowlark | 9 | 0 | 9 |
| white-crowned sparrow | 13 | 5 | 18 |
| yellow-rumped warbler | 8 | 1 | 9 |
| <i>Corvids</i> | 12 | 0 | 12 |
| common raven | 12 | 0 | 12 |
| Woodpecker | 47 | 5 | 52 |
| Lewis's woodpecker | 1 | 0 | 1 |
| northern flicker | 46 | 5 | 51 |
| Totals | 946 | 160 | 1106 |

Table 3. Raptors and special status avian species and number of observations recorded while in-transit to avian use surveys at West Ridge Wind Energy Project, during the period between July 18 and October 20, 2008.

| Common Name | Observed Only In-Transit | Number Observed |
|---------------------|--------------------------|-----------------|
| American kestrel | | 13 |
| golden eagle | | 3 |
| greater sage-grouse | | 45 |
| northern harrier | | 5 |
| red-tailed hawk | | 10 |
| sharp-shinned hawk | | 1 |
| turkey vulture | | 17 |
| white-faced ibis | X | 1 |
| Total | | 95 |

Table 4. Mean use¹, percent composition², and percent frequency of occurrence³ for avian groups observed during West Ridge Wind Power Project period between July 18, 2008 and October 20, 2008.

| Species | Mean Use | % Comp | % Freq |
|-------------------------|--------------|--------------|--------------|
| Raptors | 1.240 | 9.831 | 50.67 |
| <i>northern harrier</i> | 0.093 | 0.740 | 8.00 |
| <i>accipiter</i> | 0.027 | 0.211 | 2.67 |
| Cooper's hawk | 0.027 | 0.211 | 2.67 |
| <i>Buteos</i> | 0.400 | 3.171 | 29.33 |
| rough-legged hawk | 0.013 | 0.106 | 1.33 |
| red-tailed hawk | 0.387 | 3.066 | 28.00 |
| <i>Falcons</i> | 0.427 | 3.383 | 25.33 |
| American kestrel | 0.427 | 3.383 | 25.33 |
| <i>Eagles</i> | 0.013 | 0.106 | 1.33 |
| golden eagle | 0.013 | 0.106 | 1.33 |
| <i>Vultures</i> | 0.280 | 2.220 | 16.00 |
| turkey vulture | 0.280 | 2.220 | 16.00 |
| Game birds | 0.053 | 0.423 | 2.67 |
| greater sage-grouse | 0.053 | 0.423 | 2.67 |

| Species | Mean Use | % Comp | % Freq |
|------------------------|---------------|---------------|--------------|
| Doves | 0.280 | 2.220 | 12.00 |
| mourning dove | 0.280 | 2.220 | 12.00 |
| Hummingbird | 0.013 | 0.106 | 1.33 |
| rufous hummingbird | 0.013 | 0.106 | 1.33 |
| Goatsucker | 0.347 | 2.748 | 6.67 |
| common nighthawk | 0.347 | 2.748 | 6.67 |
| Passerines | 10.053 | 79.704 | 84.00 |
| <i>Songbirds</i> | <i>9.893</i> | <i>78.436</i> | <i>82.67</i> |
| American goldfinch | 0.067 | 0.529 | 1.33 |
| American robin | 0.600 | 4.757 | 18.67 |
| Brewer's blackbird | 0.187 | 1.480 | 2.67 |
| Brewer's sparrow | 1.960 | 15.539 | 38.67 |
| Bullock's oriole | 0.013 | 0.106 | 1.33 |
| chipping sparrow | 0.013 | 0.106 | 1.33 |
| dark-eyed junco | 0.080 | 0.634 | 4.00 |
| dusky flycatcher | 0.013 | 0.106 | 1.33 |
| green-tailed towhee | 0.067 | 0.529 | 5.33 |
| horned lark | 0.400 | 3.171 | 13.33 |
| house finch | 0.333 | 2.643 | 6.67 |
| house wren | 0.013 | 0.106 | 1.33 |
| lesser goldfinch | 0.107 | 0.846 | 1.33 |
| mountain bluebird | 2.053 | 16.279 | 25.33 |
| red-breasted nuthatch | 0.013 | 0.106 | 1.33 |
| rock wren | 0.080 | 0.634 | 5.33 |
| sage thrasher | 0.053 | 0.423 | 4.00 |
| savannah sparrow | 0.013 | 0.106 | 1.33 |
| Townsend's solitaire | 0.427 | 3.383 | 12.00 |
| tree swallow | 0.213 | 1.691 | 2.67 |
| unidentified blackbird | 2.000 | 15.856 | 1.33 |
| unidentified finch | 0.160 | 1.268 | 1.33 |
| unidentified passerine | 0.067 | 0.529 | 6.67 |
| unidentified swallow | 0.133 | 1.057 | 4.00 |
| vesper sparrow | 0.227 | 1.797 | 12.00 |
| violet-green swallow | 0.200 | 1.586 | 9.33 |
| western meadowlark | 0.120 | 0.951 | 6.67 |
| white-crowned sparrow | 0.173 | 1.374 | 8.00 |
| yellow-rumped warbler | 0.107 | 0.846 | 6.67 |
| <i>Corvids</i> | <i>0.160</i> | <i>1.268</i> | <i>10.67</i> |
| common raven | 0.160 | 1.268 | 10.67 |
| Woodpecker | 0.627 | 4.968 | 37.33 |
| Lewis's woodpecker | 0.013 | 0.106 | 1.33 |
| northern flicker | 0.613 | 4.863 | 36.00 |
| Totals | 12.613 | | 94.67 |

- ¹ Mean Use: mean number of individuals within 800m plot/20-minute point count for each species or group provides an index of the magnitude of avian use, but it does not describe density.
- ² Percent Composition: mean use for a species/total use across all species, multiplied by 100, providing an estimate of the relative use of any particular species, compared to the use by all other species combined.
- ³ Frequency of Occurrence: percentage of surveys in which a species was observed with the survey plot providing an index of how often a species occurs in the project area.

4.4 Special Status Wildlife Species Surveys

These surveys will be conducted in late spring of 2009.

4.5 Raptor Nest Survey

This survey will be conducted in late spring of 2009.

4.6 Rare Plant Surveys

These surveys will be conducted during early summer of 2009.

4.7 Small-Plot Avian Surveys

These surveys will be conducted during spring and early summer of 2009.

4.8 Big Game

Mule deer were encountered on six occasions during avian use surveys or while in-transit to survey points. These observations consisted of from one to five individuals, and included bucks, does, and young of the year.

Pronghorns were observed twice during avian use surveys and twice more while the surveyor was in-transit to survey points. On three of these occasions, a single individual was encountered; on the fourth, there was a group of four individuals.

5.0 Discussion

5.1 Birds

Raptor Use

Avian use metrics such as mean use and frequency of occurrence provide insight on the relative abundance of birds of concern and their risk of colliding with proposed wind turbines. For raptors, such metrics and subsequent (post-construction) fatality estimates are available for a number of regional wind-generation facilities. At eight newer projects in the regional area, the mean raptor fatality estimate was 0.07/MW/yr (Table 5).

Table 5. Annual fatality estimates on a per turbine and per MW nameplate basis for all birds and for all raptors in the Columbia Basin Ecoregion where fatality monitoring studies have been completed.

| Columbia Basin Ecoregion Wind Project ¹ | All Bird Fatality Rates | | Raptor Fatality Rates ² | |
|---|-------------------------|---------------|------------------------------------|---------------|
| | #/ MW | #/ Turbine | #/ MW | #/ Turbine |
| Listed in order of highest to lowest All Bird Fatality Rate per MW/Year | | | | |
| Klondike II, OR | 3.1 | 4.7 | 0.11 | 0.17 |
| Stateline I and II, WA/OR | 2.9 | 1.9 | 0.09 | 0.06 |
| Nine Canyon I ³ , WA | 2.8 | 3.6 | 0.05 | 0.07 |
| Combine Hills, OR | 2.6 | 2.3 | 0.00 | 0.00 |

| | | | | |
|------------------------------|-------------|-------------|-------------|-------------|
| Big Horn, WA | 2.5 | 3.8 | 0.15 | 0.23 |
| Wild Horse ⁴ , WA | 1.6 | 2.8 | 0.09 | 0.17 |
| Hopkins Ridge, WA | 1.2 | 2.2 | 0.14 | 0.25 |
| Vansycle, OR | 1.0 | 0.6 | 0.00 | 0.00 |
| Klondike I, OR | 0.9 | 1.4 | 0.00 | 0.00 |
| Mean | 2.07 | 2.59 | 0.07 | 0.11 |

¹ Projects are sorted by cumulative bird per MW rates. References for projects: Stateline I and II-partial (Erickson et al., 2004); Vansycle (Erickson et al., 2000); Klondike I (Johnson et al., 2003c); Klondike II (NWC and West, 2007); Combine Hills (Young et al., 2006); Nine Canyon (Erickson et al., 2003a); Hopkins Ridge (Young et al., 2007); Big Horn (Kronner et al., 2008); Wild Horse (Erickson et al., 2008). Only projects with similar study methods included.

² Raptor estimates include diurnal raptors and owls.

³ Nine Canyon II monitored only part-year.

⁴ Wild Horse estimates include only data for the first year of a 2-year study.

Mean use at the West Ridge Wind Energy Project for all raptor species combined was 1.24/20-min survey across the survey period (Table 4). Most of this use (0.99/20-min survey) was accounted for by three species, red-tailed hawks, American kestrels and turkey vultures.

It is inappropriate to compare this mean raptor use with raptor use recorded at other wind projects in the region, since surveys have not yet been conducted at West Ridge Wind Energy Project during other seasons. It is likely that the overall mean use at West Ridge will be lower than it is for this survey period, since surveys began when local breeding raptors (and their fledglings) were still present on the Project, and continued through the period of fall migration. Numbers of raptors detected decreased considerably toward the end of the survey season, and it is likely that the number of raptors wintering on the Project area could be lower.

For the sake of interest, mean use ranges (among most seasons combined) from other Northwest wind energy projects include: Rattlesnake Road Wind Power Facility, Oregon (0.43-0.81/30-min; Kronner et al. 2007a), Klondike Wind Project, Oregon (0.49–0.73; Johnson et al. 2002), White Creek Wind I (0.38–0.56/20 min.; Kronner et al. 2005), Leaning Juniper, Oregon (0.24–1.07/20 min; Kronner et al. 2005), Big Horn Wind Project, Washington (0.40–1.5/20 min; Johnson and Erickson 2004; Kronner et al. 2006a and 2006b).

If late summer/fall season is one the higher use periods of raptor use for West Ridge it is expected that the mean use of raptors at this site will fall within the ranges of the above mentioned projects.

Raptor Nests

This survey is planned for late spring of 2009.

5.2 Greater Sage-Grouse

Greater sage-grouse were observed both during avian use surveys and (more frequently) in-transit to survey points. Grouse were detected 12 different times, with numbers observed ranging from two to nine individuals; in all, 51 greater sage-grouse detections were made. Some of these detections could have been of the same bird or birds more than once. Use of the area by this species was also documented by the presence of pellets and the remains of two carcasses (eaten by predators and/or scavengers). Portions of the Project area provide suitable habitat for foraging and likely for nesting by this species. It is expected that the special status wildlife surveys planned for 2009 will provide better information about the spatial use of the Project area by sage-grouse.

5.3 Rare Plants

Rare plant surveys will be conducted in early summer of 2009.

5.4 Big Game

No site-specific surveys were conducted for big game, since wind power generation is generally deemed to be compatible with deer, elk, and pronghorn. The Project area does, however, provide habitat for big game, and presence of deer and pronghorn was confirmed during the studies reported herein.

Some disturbance of normal behavior of deer and pronghorn is to be expected during the construction phase of this Project because of the influx of humans and heavy construction equipment and associated disturbance. Following completion of the wind project, the disturbance levels from construction equipment and humans will diminish and the primary disturbances will be associated with operations and maintenance personnel, occasional vehicular traffic, and the presence of turbines and other facilities. Disturbance to deer and pronghorn associated with maintenance once the Project is operational would be expected to be low. At the Big Horn Wind Project in Washington, very young, live mule deer fawns (only a few days to a week old) were observed on eight occasions in May and June during post-construction wildlife fatality monitoring conducted on turbine search plots indicating that mule deer birthing activities occurred near turbines (NWC, 2007). At the Foote Creek Rim Wind Project in Wyoming, pronghorn antelope use within 800 meters site did not change significantly after construction (Johnson et al., 2000).

The Project's footprint (turbine platforms and the roads between) is likely to involve a loss of some medium- to high-quality forage for deer. Such loss is expected to be quite small, however, relative to the amount of this same habitat that will remain.

6.0 Mitigation and Monitoring

The following measures have been implemented, or are proposed by West Ridge Wind to avoid, minimize or mitigate for anticipated impacts.

Planning Phase Avoidance and Minimization of Impacts

- Habitat mapping and extensive pre-construction biological surveys will be conducted on-site to document rare plant populations, seasonal pools, unique habitats, and wildlife use. Wildlife surveys will be conducted by experienced biologists to understand how both sensitive and common wildlife species use the Project site.
- Choice of turbines with low RPM and use of tubular towers to minimize risk of bird collision with turbine blades and towers.
- Choice of turbine lights that are accepted by the wind power industry, and accepted by the FAA for safety, as being least impacting to night migrating birds.
- Spacing of all overhead power line conductors to minimize potential for raptor electrocution.
- Use of anti-perching devices on overhead transmission line poles and other utility poles and near turbines. Distance to be determined on a site-by-site basis.

Construction Phase Avoidance and Minimization of Impacts and Monitoring

- Restrict maintenance vehicles and general access onto West Ridge near the lek area until after 11:00 am during lekking season (March 1 –June 30), each year.
- Establishment and enforcement of reasonable driving speed limits during construction to minimize potential for striking wildlife.
- Flagging of any sensitive habitat areas (e.g. raptor nests, wetlands, etc.) near proposed areas of construction activity and designation of such areas as “off limits” to all construction personnel.
- Minimizing of construction in sensitive areas such as documented rare plant populations, seasonal pools and wetlands. These sites will be delineated within construction zones, where necessary.
- Training - Prior to issuance of the building permit and groundbreaking, training will be provided to construction staff explaining restrictions that protect wildlife, habitat, and critical area features in or near the construction zones.
- Enforce designated construction zones. Construction personnel will avoid driving over or otherwise disturbing areas outside the designated construction areas.

- Designation of an environmental monitor during construction to train construction personnel on avoidance of sensitive areas and to monitor construction activities to ensure compliance with mitigation measures/Permit Conditions.
- Sensitive raptor nest trees will be flagged. The environmental monitor will work with the construction contractor to minimize construction work in these areas to the extent feasible during periods when the nests are active
- Development and implementation of a fire control plan, *in coordination* with local fire districts, to minimize risk of accidental fire during construction and operations, and respond effectively to any fire that does occur.

Post-Construction (Operations Phase) Measures and Mitigation

- Development of a revegetation and weed control plan. All temporarily disturbed areas will be restored with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to prevent spread of noxious weeds. The Applicant will consult with Oregon Department of Agriculture and the Local Weed Master regarding the appropriate seed mixes for the Project area.
- Restrict maintenance vehicles and general access onto West Ridge near the lek site until after 11:00 am during lekking season, each year.
- Establish a Juniper Tree Management Program for the Project area. Work with ODF&W on Program specifics which may include restoration of certain areas.
- Identification and removal of all carcasses of livestock, big game, etc. from within the Project site or off site but near turbines that may attract foraging eagles or other raptors.
- Environmental sensitivity training will be given to all personnel on site whether employees of the operating company or its contractors. Training will include a response system if injured wildlife are discovered or if bird and bat carcasses are discovered.

Post-Construction Wildlife Monitoring and Mitigation

- Reporting of bird and bat fatalities and injured birds and bats discovered on-site for the life of the Project in a timely manner (monthly) to ODFW and USFWS.
- An avian and bat monitoring plan will be prepared. The goal will be to monitor for avian/bat fatalities in a portion of the Project for a two year time period. A different portion will be sampled each year (50% each year for two years). Consideration will be given to conducting an intensive, focused bat fatality search during late summer/fall bat migration period. The operational monitoring protocol will be designed for the Project by the wildlife consultant with input from the ODFW.
- Raptor nests will be monitored for use and productivity to determine potential indirect impacts to raptors. The objectives behind raptor nest surveys are to estimate the size of the local breeding populations of raptor species in the vicinity of the Project and to determine whether a reduction of nesting activity

or nesting success in the local populations of raptor species exists. Raptor nests will be monitored during the first and fourth years after construction. 2009 baseline data will be used as “pre-construction” use data

- A habitat mitigation plan will be designed to ensure no net loss of habitat from temporary and permanent disturbed areas in quantity or quality and to provide a net benefit of habitat quantity or quality for high value habitats.
- Sage Grouse Lek Monitoring Study will be partially funded for the first two years of the project in an amount not to exceed \$50,000 per year.

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8.0 Acknowledgments

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Miko Ruhlen – Report Editor

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Appendix 1. Special status wildlife species of known or potential occurrence in the East Ridge Wind Energy Project area.

| Common Name and Scientific Name | Federal Status | ODFW Status | Potential for Occurrence Within or Near the East Ridge Project (some surveys not yet conducted) |
|---|-----------------------|--------------------|--|
| Mammals | | | |
| pygmy rabbit <i>Brachylagus idahoensis</i> | SoC | SV | Unlikely due to lack of suitable big sage habitat, which is generally associated with deep, loose soils. |
| Preble's shrew <i>Sorex preblei</i> | SoC | - | Rare species, likely present on or near Project area where sagebrush is present. |
| white-tailed antelope squirrel <i>Ammospermophilus leucurus</i> | - | SU | Unlikely; associated with more xeric habitats at lower elevations. |
| white-tailed jackrabbit <i>Lepus townsendii</i> | - | SU | Unknown. |
| California wolverine <i>Gulo gulo luteus</i> | SoC | LT | Possible; habitat is open forests at high elevation and in alpine areas. May travel through lower elevations due to wide home ranges. Avoids young, regenerating forests and dense brushy areas. |
| kit fox <i>Vulpes macrotis</i> | - | LT | Unlikely; no recent documentation in Oregon. |
| California myotis* <i>Myotis californicus</i> | - | - | Likely; occupies various habitats, including shrub-steppe and juniper woodlands. |
| fringed myotis <i>Myotis thysanodes</i> | SoC | SV | Unlikely; dwells in caves, buildings, and mine adits. |
| hoary bat * <i>Lasiurus cinereus</i> | - | - | Possible; primary habitat is boreal montane forests, but also uses shrub-steppe; may also occur on Project during migration. |
| long-eared myotis <i>Myotis evotis</i> | SoC | SU | Possible, but not expected to be common; needs buildings, caves, or mine adits for maternity colonies and for night roosting. |
| long-legged myotis <i>Myotis volans</i> | SoC | SU | Possible; associated with montane coniferous forests but also occur in some desert and riparian habitats. |
| pallid bat <i>Antrozous pallidus</i> | SoC | SV | Possible, but needs rock crevices, tree hollows, mines, caves, buildings. |
| silver-haired bat <i>Lasionycteris noctivagans</i> | SoC | SU | Possible; found in forest and grassland habitats. |
| spotted bat <i>Euderma maculatum</i> | SoC | - | Possible as migrant or during long-distance foraging flights.. |
| Townsend's big-eared bat <i>Corynorhinus townsendii</i> | SoC | SC | Likelihood unknown; uses caves, old mines, and buildings as summer day and night roosts. Does not roost in crevices (Verts and Carraway 1998) but hangs from structures. Uncommon anywhere. |
| western small-footed myotis <i>Myotis ciliolabrum</i> | SoC | SU | Possible; uses xeric habitats near cliffs and rock outcrops. |
| Yuma myotis <i>Myotis yumanensis</i> | SoC | - | Unlikely, but habitats include arid grasslands. |

| Common Name and Scientific Name | Federal Status | ODFW Status | Potential for Occurrence Within or Near the East Ridge Project (some surveys not yet conducted) |
|---|----------------|-------------|--|
| Birds | | | |
| horned grebe <i>Podiceps auritus</i> | - | SP | Unlikely, except as transient. |
| red-necked grebe <i>Podiceps grisegena</i> | - | SC | Unlikely, except as transient. |
| American white pelican <i>Pelecanus erythrorhynchos</i> | - | SV | Unlikely, except as transient. |
| snowy egret <i>Egretta thula</i> | - | SV | Unlikely, except as transient. |
| western least bittern <i>Ixobrychus exilis hesperis</i> | SoC | SP | Unlikely, except as transient. |
| white-faced ibis <i>Plegadis chihi</i> | SoC | - | Documented while in-transit to surveys. |
| sandhill crane <i>Grus canadensis</i> | - | SV | Likely as transient across Project area. |
| snowy plover <i>Charadrius alexandrinus</i> | PS:LT BoCC | LT | Unlikely, except as transient. |
| Franklin's gull <i>Larus pipixcan</i> | - | SP | Unlikely, except as transient. |
| black tern <i>Chlidonias niger</i> | SoC | - | Unlikely, except as transient. |
| bald eagle <i>Haliaeetus leucocephalus</i> | NW EPA | LT | Possible transient or during migration. |
| Swainson's hawk <i>Buteo swainsoni</i> | BoCC | SV | Possible during late summer and fall migration. |
| ferruginous hawk <i>Buteo regalis</i> | SoC BoCC | SC | Likely as visitor or migrant. |
| northern goshawk <i>Accipiter gentilis</i> | SoC | SC | Likely migrant or transient. |
| peregrine falcon <i>Falco peregrinus</i> | NW BoCC | Delisted | Likely (at least as passing migrant). |
| greater sage-grouse <i>Centrocercus urophasianus</i> | SoC BoCC | SV | Documented by presence of old pellets. |
| Lewis's woodpecker <i>Melanerpes lewis</i> | SoC BoCC | SC | Documented during avian use surveys. |
| willow flycatcher <i>Empidonax traillii</i> | SoC | SU | Unknown. Willow/shrub habitats not present near proposed turbines. |
| black swift <i>Cypseloides niger</i> | BoCC | SP | Unlikely, except as transient. Breeds and roosts behind waterfalls. |
| black-throated sparrow <i>Amphispiza bilineata</i> | - | SP | Possible disperser. |

| Common Name and Scientific Name | Federal Status | ODFW Status | Potential for Occurrence Within or Near the East Ridge Project (some surveys not yet conducted) |
|--|----------------|-------------|--|
| black rosy-finch <i>Leucosticte atrata</i> | - | SP | Known from higher elevations to south of Project, within approximately 5 miles. |
| Reptiles and Amphibians | | | |
| ground snake <i>Sonora semiannulata</i> | - | SP | Unlikely, secretive, nocturnal; known from Owyhee Mountains to northeast. |
| Columbia spotted frog <i>Rana luteiventris</i> | C | SU | Unknown. |
| western toad <i>Bufo boreas</i> | - | SV | Unknown. |

Status Key

* Indicates a species that does not have Federal or State Status, but is tracked by Oregon Natural Heritage Program (ORNHIC). For ORNHIC ranking, see ORNHIC, 2007.

Federal:

| | | | |
|------|--|-----|--------------------------------------|
| T | Threatened | SoC | Species of Concern |
| E | Endangered | NW | Not Warranted; delisted |
| C | Candidate | EPA | Bald and Golden Eagle Protection Act |
| PS | Partial Status. Taxa for which some but not all infraspecific taxa have status | | |
| BoCC | USFWS Birds of Conservation Concern (BCR 9, Great Basin) | | |
| - | No special status | | |

Note: All native migratory birds are protected by the federal Migratory Bird Treat Act (MBTA).

Oregon:

| | |
|----|---|
| T | Threatened |
| E | Endangered |
| SC | "Critical" sensitive species are those for which listing as threatened or endangered would be appropriate if immediate conservation actions were not taken. Some peripheral species which are at risk throughout their range and some disjunct populations (those that are geographically isolated from other populations) area also considered "Critical." |
| SV | "Vulnerable" sensitive species are not in imminent danger of being listed as threatened or endangered, but could become sensitive-critical, threatened, or endangered with changes in populations, habitats or threats. |
| SP | "Peripheral" species are on the edge of their range. "Naturally Rare" species are those with historically low population numbers in Oregon due to naturally limiting factors. The management objective is to maintain existing populations within their current range. |
| SU | "Undetermined" species are those for which status is unclear. They may be susceptible to population declines that may result in listing as endangered, threatened, critical or vulnerable in the future, but additional research is needed before a decision can be made regarding their status. |

Appendix 2. Special Status Plant Species with Potential for Occurrence within the East Ridge Wind Energy Project Area

| Name | Status | Typical Habitat | Likelihood of Occurrence | Identification Period |
|---|--------------------------------|---|---------------------------------|------------------------------|
| alpine fescue <i>Festuca brachyphylla</i> | ONHP Status L3 BLM Status T | Moist rocky slopes, meadows and crevices above 7900 ft | Low | June - August |
| alpine lily <i>Lloydia serotina</i> | ONHP Status L3 BLM Status T | Gravelly ridges and in rock crevices high in the mountains | Low | June - July |
| Bellardi bog sedge <i>Kobresia bellardii</i> | ONHP Status L2 BLM Status A | In Steens, known only from high elevation cirque meadow | Low | July - August |
| capitate sedge <i>Carex capitata</i> | ONHP Status L2 BLM Status T | In Steens, uncommon on shaded rock ledges and moist, gravelly slopes above 7900 ft | Medium | July - August |
| cloud sedge <i>Carex haydeniana</i> | ONHP Status L4 BLM Status T | In moist to moderately dry places at high elevations, usually above timberline | Low | June - August |
| common moonwort <i>Botrychium lunaria</i> | ONHP Status L2 BLM Status A | Along perennial streams, in open, moist rocky meadows. Not known from Steens. Elevation: 2300 to 7400 ft. | Low | July - September |
| Cusick's draba <i>Draba cusickii</i> | ONHP Status L4 BLM Status T | Common in rock outcrops above 6900 ft | High | Late June - July |
| Cusick's giant hyssop <i>Agastache cusickii</i> | ONHP Status L2 BLM Status A | On alpine rock outcrops or gravelly soils | Low | July - August |
| dark alpine sedge <i>Carex subnigricans</i> | ONHP Status L2 BLM Status T | On moist, rocky slopes and in meadows at high elevations in the mountains | Medium | June - August |
| Davidsons penstemon <i>Penstemon davidsonii</i> var. <i>praeteritus</i> | ONHP Status L4 BLM Status T | Alpine rock outcrops or gravelly soils | Moderate | June - August |
| Drummond's willow <i>Salix drummondiana</i> | ONHP Status L4 BLM Status T | In Steens, occasional near streams, seeps and ponds between 5575 and 8200 ft | Medium | May - June |
| duskyseed sedge <i>Carex pelocarpa</i> | ONHP Status L2 BLM Status A | Common in meadows and on moist, open slopes and stream banks at high elevations in the mountains, often above timberline. Not known from Steens | Low | June - August |

| Name | Status | Typical Habitat | Likelihood of Occurrence | Identification Period |
|--|---|---|--------------------------|--------------------------|
| early sedge <i>Carex praeceptorum</i> | ONHP Status L4 BLM Status T | In Steens, uncommon in inundated seeps and boggy stream and lake margins above 7500 ft | Medium | July - August |
| foetid sedge <i>Carex vernacula</i> | ONHP Status L2 BLM Status A | In moist or wet places at high elevations especially at the edges of melting snowfields and in meltwater streams. | Low | June - August |
| grimy mousetail <i>Ivesia rhypara</i> var. <i>rhypara</i> | OR RANK: Endangered OR STATUS: S1, List 1 FED STATUS: SOC | Mostly on dry, relatively barren, yellowish or light-colored outcrops or badlands. Elevation ~5000 to 6500 ft | Low | May - August (?) |
| Herman's dwarf rush <i>Juncus hemiendytus</i> var. <i>abjectus</i> | ONHP Status L3 BLM Status T | Seasonally wet depressions and gravels in sagebrush. In Steens, between 5250 and 7540 ft | Moderate | July - August |
| Kruckeberg's hollyfern <i>Polystichum kruckebergii</i> | ONHP Status L4 BLM Status T | In Steens, extremely rare in moist, shady rock crevices above 8850 ft | Low | June – September? |
| lanceleaf moonwort <i>Botrychium lanceolatum</i> | ONHP Status L4 BLM Status A | In Steens, known only from high elevation site at S. Fork Willow cirque. | Low | July - August |
| Mingan moonwort <i>Botrychium minganense</i> | ONHP Status L4 BLM Status A | Rare in Little Blitzen and S. Fork Willow cirques above 8500 ft | Low | July - September |
| moss rush <i>Juncus bryoides</i> | ONHP Status L3 BLM Status T | Moist shallow depressions in sagebrush. In Steens, known only east of Fish Lake | Moderate | July - August |
| narrowleaf cottonwood <i>Populus angustifolia</i> | OR RANK: S4 OR STATUS: Watch | Stream banks; foothills and high plains. | Medium - High | May - September |
| northern moonwort <i>Botrychium pinnatum</i> | ONHP Status L4 BLM Status A | Extremely rare in S. Fork Willow and possibly other cirques above 8200 ft | Low | July - August |
| orpine stonecrop <i>Sedum debile</i> | ONHP Status L4 BLM Status T | In Steens, uncommon in rocky outcrops above 7200 ft | Medium | Late June – Early August |
| pygmy gentian <i>Gentiana prostrata</i> | ONHP Status L2 BLM Status A | Cirque meadows above 8200 ft | Low | July - August |
| rock milicgrass <i>Melica stricta</i> | ONHP Status L2 BLM Status T | Moist rocky crevices above 8200 ft | Low | July - August |

| Name | Status | Typical Habitat | Likelihood of Occurrence | Identification Period |
|--|--------------------------------|--|--------------------------|--------------------------|
| shortfruit willow <i>Salix brachycarpa</i> var. <i>brachycarpa</i> | ONHP Status L4 BLM Status T | Known to occur at high elevations in the Steens (~8500 ft), often in wet meadows | Low | April - May |
| shortlobe penstemon <i>Penstemon seorsus</i> | ONHP Status L4 BLM Status T | Dry rocky places in the plains and foothills, often with sagebrush, from 4920 to 5575 ft in elevation | Low | May – July |
| Sierra springbeauty <i>Claytonia nevadensis</i> | ONHP Status L4 BLM Status T | Occasional in alpine streams | Low | April - Late July |
| slender gentian <i>Gentianella tenella</i> | ONHP Status L2 BLM Status A | In WA, appears to favor disturbed sites in subalpine to alpine meadows from 6800 to 7600 ft | Medium | July - August |
| small saxifrage <i>Saxifraga adscendens</i> var. <i>oregonensis</i> | ONHP Status L2 BLM Status A | In Steens, very rare in wet, north-facing cliffs at the heads of Little Blitzen, Kiger and Big Indian gorges | Low | July - August |
| snowline springparsley <i>Cymopterus nivalis</i> | ONHP Status L2 BLM Status A | In Steens, restricted to rock crevices on ridges near highest summits | Low | July - August |
| sticky polemonium <i>Polemonium viscosum</i> | ONHP Status L4 BLM Status T | In Steens, extremely rare on east rim of Kiger gorge | Low - Medium | July - August |
| western white-flower penstemon <i>Penstemon pratensis</i> | ONHP Status L3 BLM Status T | Meadows and stream bank in high sagebrush valleys and aspen woods | Moderate | July - August |
| whitestem goldenbush <i>Ericameria discoidea</i> var. <i>discoidea</i> | ONHP Status L4 BLM Status T | Dry, rocky outcrops above 8200 ft | Low | August - Early September |

Status Key

ORNHP (Oregon Natural Heritage Program) Status (ONHIC, 2007):

- List 1 – Taxa which are threatened with extinction throughout their entire range
- List 2 – Taxa which are threatened with extirpation in Oregon State
- List 3 – Taxa for which more information is needed but that may be threatened
- List 4 – Taxa off conservation concern but not currently threatened or endangered

BLM/USFS (Bureau of Land Management/U. S. Forest Service) Status:

- S – Sensitive taxa under the Interagency Special Status/Sensitive Species Program (ISSSSP, 2008)

Appendix 3. Comprehensive species list for all vertebrate wildlife detected during avian use surveys and while in-transit at West Ridge Wind Energy Project.

| Common Name | Scientific Name |
|--------------------------------------|----------------------------------|
| Birds | |
| American goldfinch | <i>Carduelis tristis</i> |
| American kestrel | <i>Falco sparverius</i> |
| American robin | <i>Turdus migratorius</i> |
| Brewer's blackbird | <i>Euphagus cyanocephalus</i> |
| Brewer's sparrow | <i>Spizella breweri</i> |
| Bullock's Oriole | <i>Icterus bullockii</i> |
| chipping sparrow | <i>Spizella passerina</i> |
| common nighthawk | <i>Chordeiles minor</i> |
| common raven | <i>Corvus corax</i> |
| Cooper's hawk | <i>Accipiter cooperii</i> |
| dark-eyed junco | <i>Junco hyemalis</i> |
| dusky flycatcher | <i>Empidonax oberholseri</i> |
| golden eagle | <i>Aquila chrysaetos</i> |
| greater sage-grouse | <i>Centrocercus urophasianus</i> |
| green-tailed towhee | <i>Pipilo chloruru</i> |
| horned lark | <i>Eremophila alpestris</i> |
| house finch | <i>Carpodacus mexicanus</i> |
| house wren | <i>Troglodytes aedon</i> |
| lesser goldfinch | <i>Carduelis psaltria</i> |
| Lewis's woodpecker | <i>Melanerpes lewis</i> |
| mountain bluebird | <i>Sialia currucoides</i> |
| mourning dove | <i>Zenaida macroura</i> |
| northern flicker | <i>Colaptes auratus</i> |
| northern harrier | <i>Circus cyaneus</i> |
| red-breasted nuthatch | <i>Sitta canadensis</i> |
| red-tailed hawk | <i>Buteo jamaicensis</i> |
| rock wren | <i>Salpinctes obsoletus</i> |
| rough-legged hawk | <i>Buteo lagopus</i> |
| sage thrasher | <i>Oreoscoptes montanus</i> |
| savannah sparrow | <i>Passerculus sandwichensis</i> |
| Townsend's solitaire | <i>Myadestes townsendi</i> |
| tree swallow | <i>Tachycineta bicolor</i> |
| turkey vulture | <i>Cathartes aura</i> |
| unidentified blackbird | <i>Icteridae</i> |
| unidentified finch | |
| unidentified passerine | |
| unidentified swallow | <i>Hirundidae</i> |
| vesper sparrow | <i>Pooecetes gramineus</i> |
| violet-green swallow | <i>Tachycineta thalassina</i> |
| western meadowlark | <i>Sturnella neglecta</i> |
| white-crowned sparrow | <i>Zonotrichia leucophrys</i> |
| white-faced ibis | <i>Plegadis chihi</i> |
| yellow-rumped warbler | <i>Dendroica coronata</i> |
| Mammals, Reptiles, Amphibians | |
| Belding's ground squirrel | <i>Spermophilus beldingi</i> |
| coyote | <i>Canis latrans</i> |
| least chipmunk | <i>Tamias minimus</i> |
| Merriam's ground squirrel | <i>Spermophilus canus</i> |
| mountain cottontail | <i>Sylvilagus nuttallii</i> |
| mule deer | <i>Odocoileus hemionus</i> |
| pronghorn | <i>Antilocapra americana</i> |



