EAGLE CONSERVATION PLAN FOR THE GOODNOE HILLS WIND FACILITY KLICKITAT COUNTY, WASHINGTON

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Unit Conversions

Imperial	Metric
1 foot	0.3048 meter
3.28 feet	1 meter
1 mile	1.61 kilometer
0.621 mile	1 kilometer
1 acre	0.40 hectare
2.47 acre	1 hectare

Common Conversions*

Imperial	Metric
0.5 miles	800 meters
0.12 miles	200 meters
0.5 miles	0.8 kilometers
10 miles	16.1 kilometers

* Metric is used as the default unit of measurement in this Eagle Conservation Plan unless noted.

ACRONYMS AND ABBREVIATIONS

APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
CRM	Collision Risk Model
EA	Environmental assessment
Eagle Rule	Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests; Final Rule
ECP	Eagle Conservation Plan
ECP Guidance	Eagle Conservation Plan Guidance
EMU	Eagle Management Unit
ETP	Eagle Incidental Take Permit
FR	Federal Register
ft	feet or foot
GIS	Geographic Information System
GPS	Global Positioning System
Guidelines	Land-based Wind Energy Guidelines
hrs	hours
Imrie	Imrie Wind Resource Area
km	Kilometers
kph	Kilometers per hour
kV	Kilovolt
LAP	Local Area Population
m	meters
MBTA	Migratory Bird Treaty Act
Mi	miles
Mph	Miles per hour
MW	Megawatt
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
OLE	Office of Law Enforcement
Project	Goodnoe Hills Wind Facility
REA	Resource Equivalency Analysis
RSA	Rotor-swept area
RSH	Rotor-swept height
SPUT	Special Purpose Utility Permit
TAC	Technical Advisory Committee
URS	URS Corporation
USC	United States Code
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WDFW	Washington Department of Fish and Wildlife
WEST	Western EcoSystems Technology, Inc.
WIRHS	Wildlife Incident Reporting and Handling System

1 INTRODUCTION

PacifiCorp owns and operates the 47 turbine (94 megawatt [MW]) Goodnoe Hills Wind Facility (Project) in Klickitat County, Washington. The Project has been in commercial operations since June 2008. PacifiCorp is currently upgrading the Project turbine nacelles and rotors. The current rotor diameter is 92.5 meters (m; 303.5 feet [ft]). The new turbine blades will have a 110.0 m (360.9 ft) rotor diameter, effectively increasing the nameplate capacity of the Project from 94 to 103 MW. The new, larger rotor diameter may change the risk to bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) of colliding with turbine blades due to this increased size of the rotor-swept area (RSA)/hazard area (Appendix A). Existing ancillary facilities and support structures, such as turbine tower sections, on-site substations, collector lines, and operations and maintenance (O&M) buildings are not anticipated to be upgraded. Access to the turbines is by existing public roads and access roads constructed for the Project, or existing roads improved to accommodate project requirements.

PacifiCorp contracted Western EcoSystems Technology, Inc. (WEST) to develop this eagle conservation plan (ECP) as part of an Eagle Incidental Take Permit (ETP) pursuant to 50 Code of Federal Regulations (CFR) § 22.26 (2009) and to proactively address potential impacts on bald and golden eagles resulting from operation of the Project. This ECP 1) summarizes the environmental conditions at the Project, 2) describes the avian and eagle study methods and results, 3) assesses potential impacts to eagles, 4) identifies avoidance and risk minimization actions that will be implemented during Project operation, and 5) provides a compensatory mitigation plan, if needed, for unavoidable impacts to eagles. PacifiCorp developed this ECP in coordination with the US Fish and Wildlife Service (USFWS) and anticipates there will be modifications and refinements of the ECP with further coordination and discussions with the USFWS.

1.1 Project Background

The Project was constructed on private land in Klickitat County, Washington. The turbines and supporting facilities are primarily located on dryland wheat agricultural fields and grazing land. 21 kilometers (km; 13 miles [mi]) southeast of Goldendale, Washington (Figures 1.1 and 1.2). The Project consists of 47 2.0- MW REpower turbines with a nameplate capacity of 95 MW of energy. The REpower turbines have a rotor diameter of 92.5 m (303.5-ft) and the wind turbines are situated on 126-m (413-ft) tall steel tubular towers secured to concrete foundations.

The Project includes:

- 47 wind turbines, foundations, and pad-mounted transformers
- A buried electrical energy collection system between turbines
- One electrical substation
- Two permanent meteorological towers
- A 230-kilovolt (kV) overhead transmission line

- An on-site operation and maintenance facility
- Access roads and crane pads for construction and maintenance of all wind turbine generators.

The Project was initially considered for development by Kenetech Windpower, Inc. in 1995 (Klickitat County Board of Commissioners 1995). Northwest Regional Power, LLC, and Windtricity Ventures, LLC, later proposed a 100-MW wind facility consisting of 30−120 monopole turbines (Klickitat County Board of Commissioners 2004). The Project area was then targeted for development of the Hoctor Ridge and Imrie wind facilities. Pre-construction wildlife baseline surveys were initiated in April 2006 for the Hoctor Ridge Project and Imrie Wind Resource Area (Imrie; Johnson et al. 2006a, 2006b; Enz and Bay 2010; Enz and Solick 2011). A conditional use permit from the Klickitat County Planning Department (Klickitat County) was issued to Northwest Regional Power, LLC, and Windtricity Ventures, LLC, for development of the Project in February 2004 (Klickitat County Board of Commissioners 2004). A full summary of the conditional use permit application process for the Project can be found in the Bird and Bat Conservation Strategy (BBCS; Appendix B). PacifiCorp acquired the Project in 2007. Construction of the Project began in 2007, and the Project became operational in June 2008.

The latitude/longitude location of each of the turbines being upgraded is in Table 1.1.

Table 1.1. Turbine locations at the Goodnoe Hills Wind Facility, Washington

Turbine Name	Latitude	Longitude	Turbine Name	Latitude	Longitude
29	45.77572	-120.57122	53	45.78121	-120.51168
30	45.77771	-120.57178	54	45.78348	-120.51187
31	45.77955	-120.57223	55	45.78549	-120.51156
32	45.78337	-120.57169	56	45.78695	-120.51149
33	45.78704	-120.57064	57	45.77778	-120.50038
34	45.78915	-120.56978	58	45.77981	-120.50036
35	45.78122	-120.56410	59	45.77268	-120.48914
36	45.78609	-120.56413	60	45.77496	-120.48808
37	45.78855	-120.56344	61	45.77666	-120.48944
38	45.78807	-120.55537	62	45.77925	-120.49001
39	45.78991	-120.55484	63	45.78140	-120.48839
40	45.79155	-120.55540	64	45.78322	-120.48908
41	45.78362	-120.54574	65	45.78176	-120.51748
42	45.78575	-120.54709	66	45.77506	-120.50794
43	45.78784	-120.54681	67	45.77439	-120.47877
44	45.79040	-120.54777	68	45.77720	-120.47847
45	45.78326	-120.53764	69	45.77987	-120.47686
46	45.78567	-120.53697	70	45.78252	-120.47601
47	45.78807	-120.53659	71	45.78449	-120.47503
48	45.79022	-120.53661	72	45.77328	-120.49664
49	45.78210	-120.52409	73	45.77334	-120.47055
50	45.77837	-120.52121	74	45.77542	-120.47280
51	45.77661	-120.51341	75	45.77721	-120.46987
52	45.77852	-120.51371			

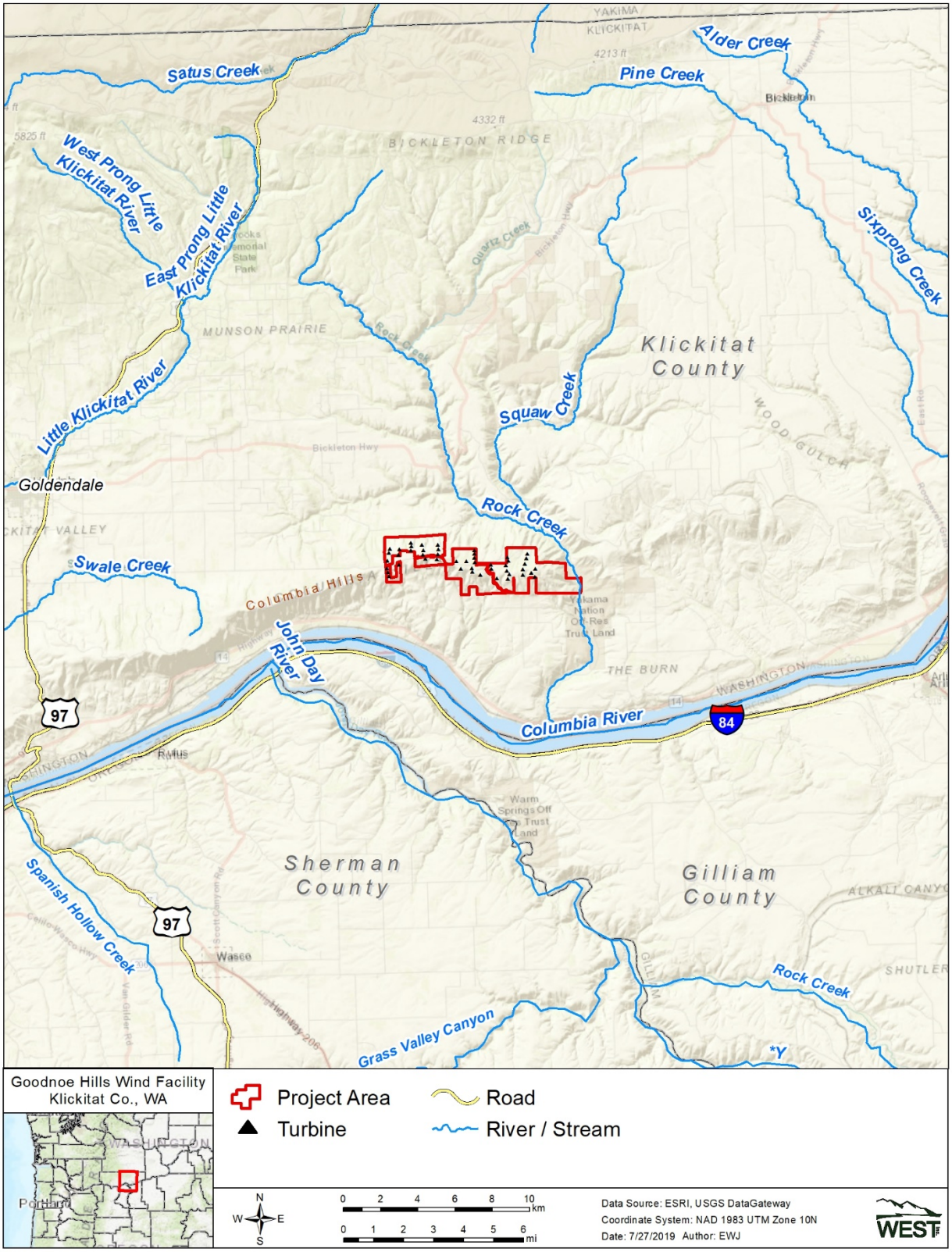

Figure 1.1 Location of the Goodnoe Hills Wind Facility, Klickitat County, Washington.

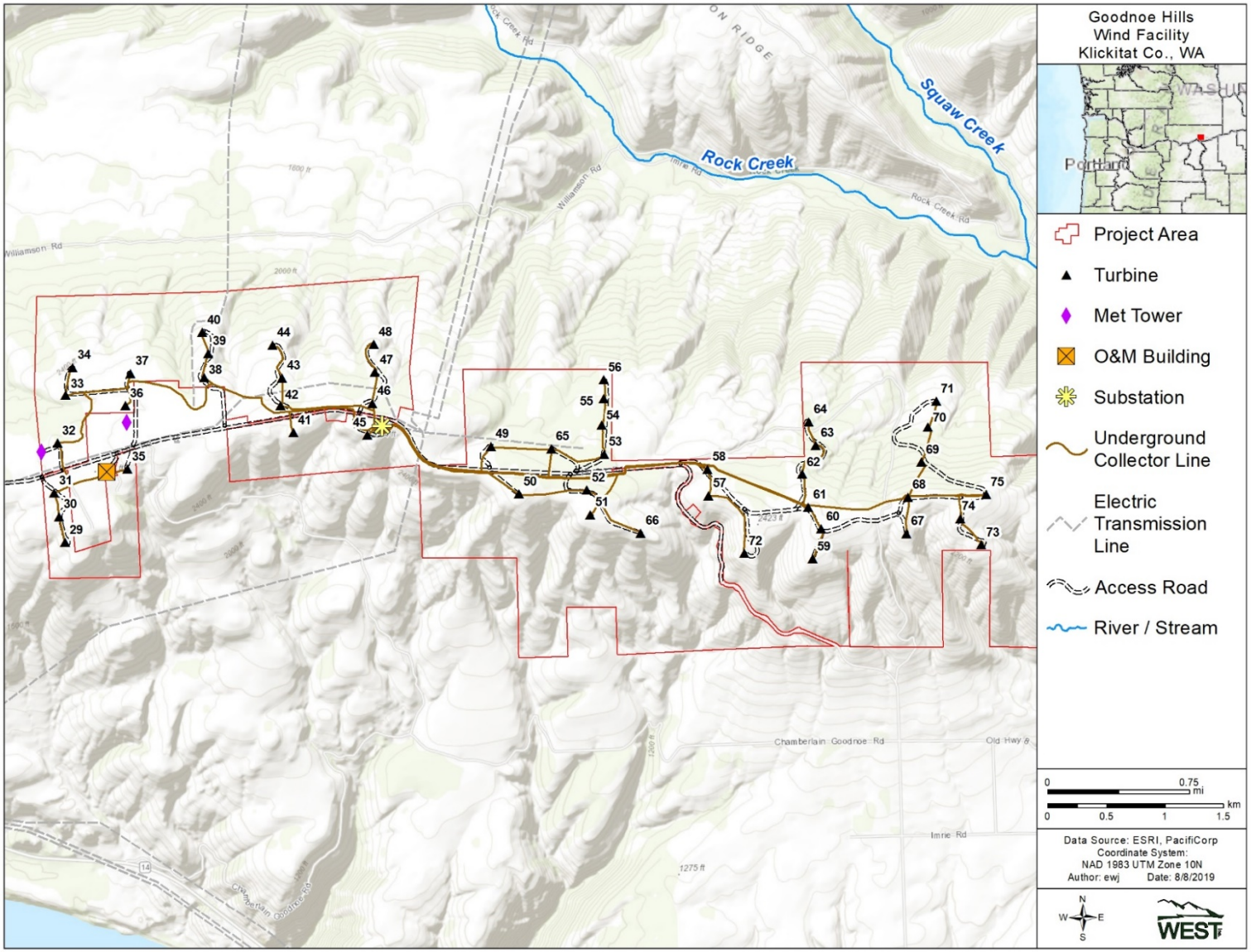

Figure 1.2 Goodnoe Hills Wind Facility, Klickitat County, Washington – Infrastructure Layout.

PacifiCorp submitted a letter to Klickitat County (November 7, 2017, letter from Travis Brown, PacifiCorp, to Mo-chi Lindblad, Director Klickitat County Planning Department) providing written notification of the planned increase to the length of the turbine rotor blades and overall hub heights for all 47 turbines at the Project. Klickitat County has approved PacifiCorp's planned turbine upgrades (December 20, 2017, letter from Mo-chi Lindblad, Director Klickitat County Planning Department, to Travis Brown, PacifiCorp).

The Project was already completed when the (USFWS) published its *Land-based Wind Energy Guidelines* on March 23, 2012 (Guidelines; USFWS 2012), and its *Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy, Version 2* in April 2013 (ECP Guidance; USFWS 2013). PacifiCorp has familiarized itself with the Guidelines and ECP Guidance to work with the USFWS regarding how to apply the tiered approach recommended, and to implement those portions of the Guidelines and ECP Guidance relevant to the continuing phases of the Project. The Guidelines and ECP Guidance acknowledge that for projects already in the development or operational phase, implementation of all tiers or stages of the recommended approach may not be applicable or possible. The ECP Guidance advises project proponents with operating or soon-to-be operating facilities to consider where the project is in the planning process relative to the appropriate tier and inform the USFWS what actions they will take to apply the ECP Guidance. PacifiCorp has coordinated with the USFWS throughout the Project planning and operation phases and been receptive to the USFWS's recommendations on how the Project can be consistent with the ECP Guidance and Guidelines.

1.2 Corporate Policy

Responsible environmental management is good business. It benefits PacifiCorp's customers and improves the quality of the environment in which we live. This belief is the basis for the environmental RESPECT policy that guides our corporate commitment to the environment.

Responsibility

All levels of management are responsible for integrating environmental management programs into business processes in order to measure and improve environmental performance.

All employees are responsible and accountable for understanding and incorporating environmental compliance requirements into their daily work activities with the obligation to bring issues and concerns forward for resolutions.

Efficiency

We will responsibly use natural resources and pursue increased efficiencies that reduce waste and emissions at their source.

We will develop sustainable operations and implement environmental projects designed to leave a clean, healthy environment for our children and future generations.

Stewardship

We will respect our natural resources and take care in balancing the needs of customers with our obligation to future generations.

We will seek opportunities to preserve, restore, protect and improve our natural surroundings.

Performance

We will set challenging goals and assess our ability to continually improve our environmental performance. Through the strategic management of our assets, we will improve the environment and contribute to our business success.

Evaluation

We will perform audits to evaluate our environmental compliance and use the results to improve our operations and their impact on the environment.

Communication

We will foster open dialogue and informed decision making through communication of environmental information with management, employees and the public.

We will work with governments and others in creating responsible environmental laws and regulations reflective of sound public policy.

Training

We will provide the training necessary for our employees to perform their environmental responsibilities.

1.1 Regulatory Framework

The regulatory framework for protecting eagles includes the Bald and Golden Eagle Protection Act (BGEPA; 16 United States Code [USC] 668-668d and 50 CFR 22.26) and the Migratory Bird Treaty Act (MBTA; 16 USC 703, 50 CFR 21, 50 CFR 10). The BGEPA provides that "unless permitted to do so as provided in the Act," it is unlawful to "take, possess, sell…any bald eagle…or any golden eagle, or any part, nest, or egg thereof…." The BGPA defines "take" to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The MBTA applies to migratory birds, which include bald and golden eagles, and provides that "[u]nless and except as permitted by regulations…, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill…any migratory bird, any part, nest, or egg of any such bird…." The USFWS has not promulgated regulations under the MBTA providing permits for non-purposeful take.

In 2009, the USFWS promulgated a final rule on two new permit regulations that, for the first time, specifically authorize the non-purposeful (i.e. incidental) take of eagles and eagle nests to protect

interests in particular localities under BGEPA (50 CFR 22.26 & 22.27). The new regulation authorized programmatic (i.e., ongoing) take, but required any authorized programmatic take is unavoidable after implementing advanced conservation practices. The new regulation provides a mechanism whereby the USFWS may legally authorize the non-purposeful take of eagles if the "take is compatible with the preservation of each species."

In April 2013, the USFWS released its ECP Guidance, which explains its approach to issuing programmatic eagle take permits. It provides guidance to applicants and biologists for conservation practices and adaptive management necessary to meet standards required for issuance of these permits and to comply with the BGEPA.

On December 9, 2013, the USFWS issued a final rule in the *Federal Register* (78 FR 73704) extending the maximum term for programmatic permits to 30 years and maintaining discretion to issue permits of shorter duration, as appropriate. The final rule went into effect on January 8, 2014, but was subsequently vacated by a federal district court (*Shearwater v. Ashe*, No. 14-CV-02830-LHK [N.D. Cal. 2015]; 81 FR 8001, Feb. 17, 2016).

On December 16, 2016, the USFWS promulgated a final rule in the *FR* (81 FR 91494, *Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests; Final Rule* [Eagle Rule]) revising the regulations for permits for incidental take of eagles and take of eagle nests. The USFWS analyzed various alternative management options and rule revisions, including the final rule revisions, in a programmatic environmental impact statement and record of decision published in December 2016 (USFWS 2016b). Revisions include changes to permit issuance criteria and duration, definitions, compensatory mitigation standards, criteria for eagle nest removal permits, permit application requirements, and fees.

The National Environmental Policy Act (NEPA; 42 USC § 4321 et seq.) applies to issuance of eagle take permits because issuing such a permit is a federal action (USFWS 2016b). Where no federal nexus exists other than an eagle take permit, the USFWS must complete a NEPA analysis before it can issue an eagle take permit. Eagle take permits may be issued only in compliance with the conservation standards of BGEPA. This means the take must be "compatible with the goal of stable or increasing breeding populations." To ensure any authorized take of eagles does not exceed this standard, the USFWS has set regional take thresholds for each species, using methodology contained in the *Programmatic Environmental Impact Statement for the Eagle Rule Revision* (USFWS 2016c) developed for the new eagle permit rules. The USFWS analyzed regional populations of eagles and set take thresholds for each species (upper limits on the number of eagle mortalities that can be allowed under permit each year in these regional management areas; USFWS 2016a).

1.3 Project Coordination with Resource Agencies

PacifiCorp met with Matt Stuber, Region 1 USFWS, Eagle Coordinator, on September 11, 2017 to discuss coordination on developing ECPs for PacifiCorp's Leaning Juniper and Marengo wind projects in Oregon and Washington. PacifiCorp discussed utilizing a Habitat Conservation Plan, but Region 1 stated their preferred method was an ETP. To date, only golden eagle fatalities have

been documented at the Goodnoe Hills wind project. PacifiCorp agreed to prepare an ECP for Goodnoe Hills and submit an ETP application for the Project. WEST was contracted by PacifiCorp in October 2017 to prepare the ECP update and NEPA documentation and analysis required for the ETP. PacifiCorp, WEST, and the USFWS will enter into a Memorandum of Understanding for a third party to prepare the necessary NEPA documentation. Following preliminary internal discussions, PacifiCorp elected to collect an additional year of eagle fatality monitoring data to inform eagle take prediction models for the Project (see Section 2.4.2 below).

2 SITE SUITABILITY, PRE- AND POST-CONSTRUCTION SURVEYS

2.1 Environmental Setting

The Project area is located in the Columbia Plateau Level III Ecoregion in Klickitat County, approximately 21 km (13 mi) southeast of Goldendale, Washington (Figures 1.1 and 1.2). The Project area encompasses approximately 1,692 hectares (4,179 acres) of private land situated along the Columbia Hills ridgeline overlooking the Columbia River immediately to the south, Rock Creek canyon directly to the east, and mixed cropland and livestock grazing to the north and west. The Project area is dominated by a mosaic of livestock modified grassland and shrub-steppe habitats with inclusions of ponderosa pine (*Pinus ponderosa*)-Oregon white oak (*Quercus garryana*) woodlands on the ridge's north facing slopes. The dominant land cover within the Project is shrub/scrub (74%; Table 2.1, Figure 2.1); followed by grassland/herbaceous (19%), cultivated crops (3%), developed, open space (2%), deciduous forest (1%), and evergreen forest (1%). The remaining less than 1% is composed of mixed forest, woody wetlands, emergent herbaceous wetlands, and developed, low intensity (Table 2.1, Figure 2.1).

Table 2.1 Land cover types in the Goodnoe Hills Wind Facility, Klickitat County, Washington, according to the National Land Cover Database (Yang et al. 2018, Multi-Resolution Land Characteristics 2019).

Land Cover	Acres	% Composition
Shrub/Scrub	3,087	74.0
Grassland/Herbaceous	781	19.0
Cultivated Crops	115	2.8
Developed, Open Space	85	2.0
Evergreen Forest	54	1.0
Deciduous Forest	42	1.0
Mixed Forest	6	<0.1
Woody Wetlands	6	<0.1
Emergent Herbaceous Wetlands	3	<0.1
Developed, Low Intensity	0.4	<0.1
Total	**4,179**	**100**

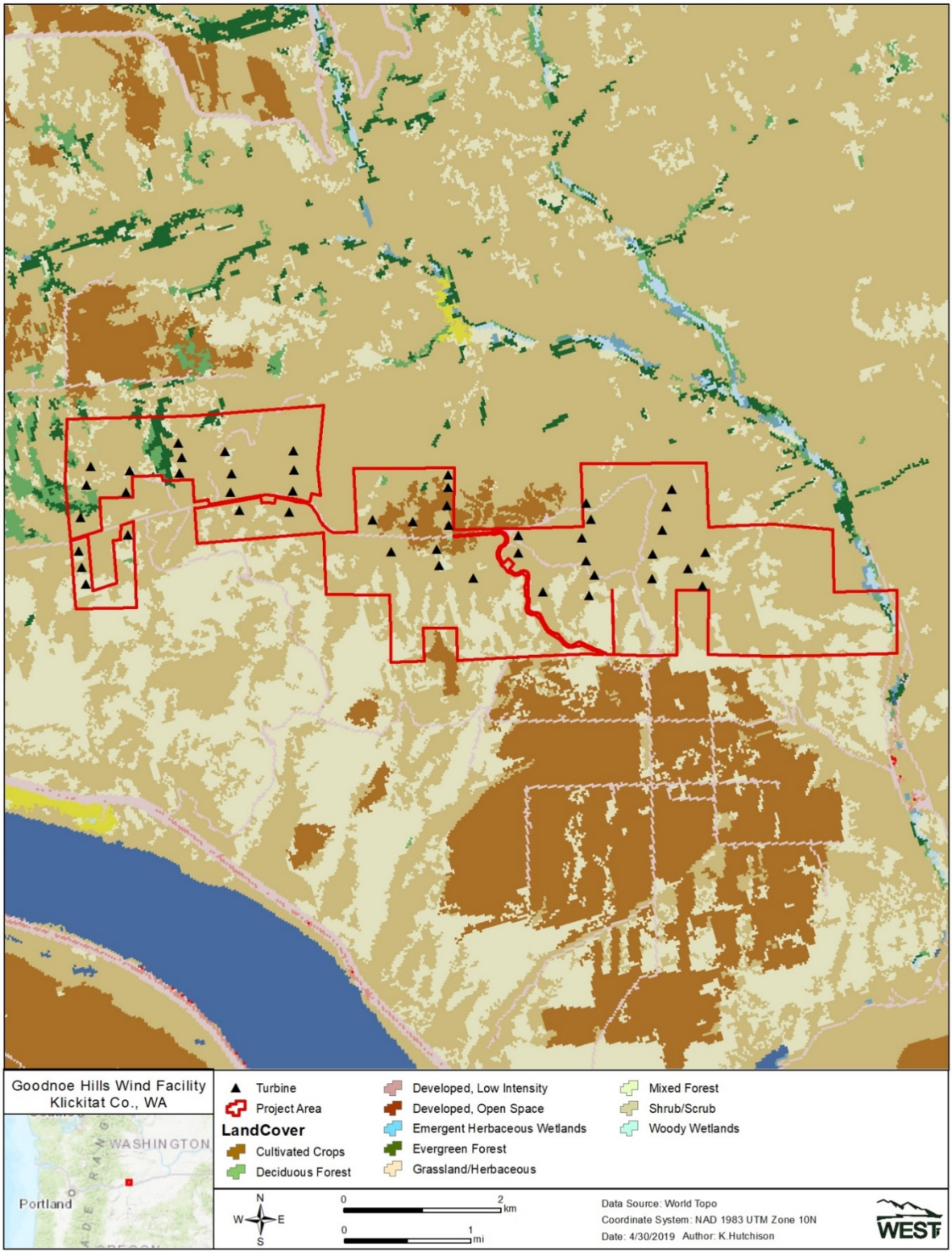

Figure 2.1 Land cover and land use at the Goodnoe Hills Wind Facility, Klickitat County, Washington (Yang et al. 2018, Multi-Resolution Land Characteristics 2019).

2.2 Site Suitability

The Project was developed prior to the release of the ECP Guidance; therefore, PacifiCorp requested WEST conduct a site evaluation analogous to Stage 1 of the ECP Guidance for this ECP. Stage 1 of the ECP Guidance consists of an initial site assessment, during which a wind project developer evaluates broad geographic areas to assess the relative importance to resident breeding and non-breeding eagles, and to migrant and wintering eagles. In 2018, WEST conducted a desktop analysis, which included data from USFWS in Oregon, and the Washington Department of Fish and Wildlife (WDFW) for eagle species observations within the Project area and surrounding 16-km (10-mi) buffer (Figure 2.2). The site was also reviewed for general eagle use by evaluating the general layout of the topography and environmental resources of the Project and surrounding landscape.

Bald eagles typically nest in forested areas that provide nesting and perching habitat adjacent to large bodies of water, often constructing their nests in mature, super-canopy trees (Buehler 2000). While the Project area is located adjacent to the Columbia River, suitable nesting substrate is not available within close proximity based on aerial imagery. Bald eagle nest data has not been collected since 2010, and the closest known bald eagle nest is outside the 16-km Project buffer (USFWS 2018a).

Golden eagles in the western US generally prefer to nest in mountainous canyon and rim-rock terrain of shrub/scrub, deserts, savannahs and grasslands, because these locations provide cover as well as close proximity to open spaces and suitable foraging habitat (Kochert et al. 2002). Suitable nesting habitat is available within and adjacent to the Project area, including ravines, cliffs, and ridges along the Columbia River and surrounding drainages. Suitable foraging habitat for golden eagles, which prefer shrub/scrub and grasslands where small mammalian prey is abundant (Kochert et al. 2002), is plentiful in the landscape surrounding the Project (Figure 1.2).

Golden eagle nest data was obtained from USFWS and WDFW within 16 km of the Project from 1985 to 2017 (Figure 2.2, Table 2.2). We assessed data from the previous 10 years, which indicated six occupied golden eagle territories were located within 10 mi of the Project (Figure 2.2, Table 2.2). Of these, one territory, Rock Creek, was occupied by prairie falcons (*Falco mexicanus*) for several years, and was determined to be unoccupied as of 2017. The nest was repaired in 2004, and an adult golden eagle was observed within the territory in 2014. The Upper Rock Creek and John Day Dam nests were last known to be occupied in 2014, whereas the John Day River Mouth nest was last known to be occupied in 2016. The Harrison Ridge nest is a historical location, and the nest was located on the ground in 2014. The Goodnoe Hills nest was located 0.29 km (0.18 mi) from the nearest Project turbine and an existing radio tower; this nest was not discovered until after Project construction. The Goodnoe Hills nest was last known to be occupied in 2013, and could not be located during an aerial survey of the area in 2017 (WEST, unpublished data). Most golden eagle nests reside along the ridges associated with the Columbia River to the south of the Project, with a few nest territories residing along other ridges associated with Rock Creek to the north of the Project (Figure 2.2).

Table 2.2. Distance of golden eagle nests to the nearest wind turbine at the Goodnoe Hills Wind Facility, Washington.[1]

Nest #	Territory Name	Nearest Turbine ID	Nearest Turbine Distance (km)
1	John Day Dam	29	11.4
2	John Day River Mouth	29	8.2
3	Rock Creek[2]	75	2.9
4	Rock Creek Upper	40	9.8
5	Harrison Ridge[2]	56	3.6
6	Goodnoe Hills[2]	35	0.29

[1] Nests represent the approximate center of the territory in cases of multiple nests within a territory. Nests locations are displayed in Figure 2.2.

[2] These nests are not known to exist currently on the landscape.

ID = Identification; km = kilometers.

2.3 Pre-Construction Surveys

The Project was constructed prior to the release of the 2012 Guidelines and 2013 ECP Guidance; therefore, pre-construction data were not collected specifically for the Project. However, pre-construction monitoring, including avian use surveys, raptor use surveys, and sensitive species surveys, was conducted at two neighboring wind farms: Hoctor Ridge in 2006 (Johnson et al. 2006a) and Imrie during 2006 (Johnson et al. 2006b), 2007, 2008 and 2010 (Enz et al. 2011; Figure 2.3; Table 2.3). Although these pre-construction surveys typically collected data on additional avian and other wildlife species, only survey results related to eagles are included in the following sections.

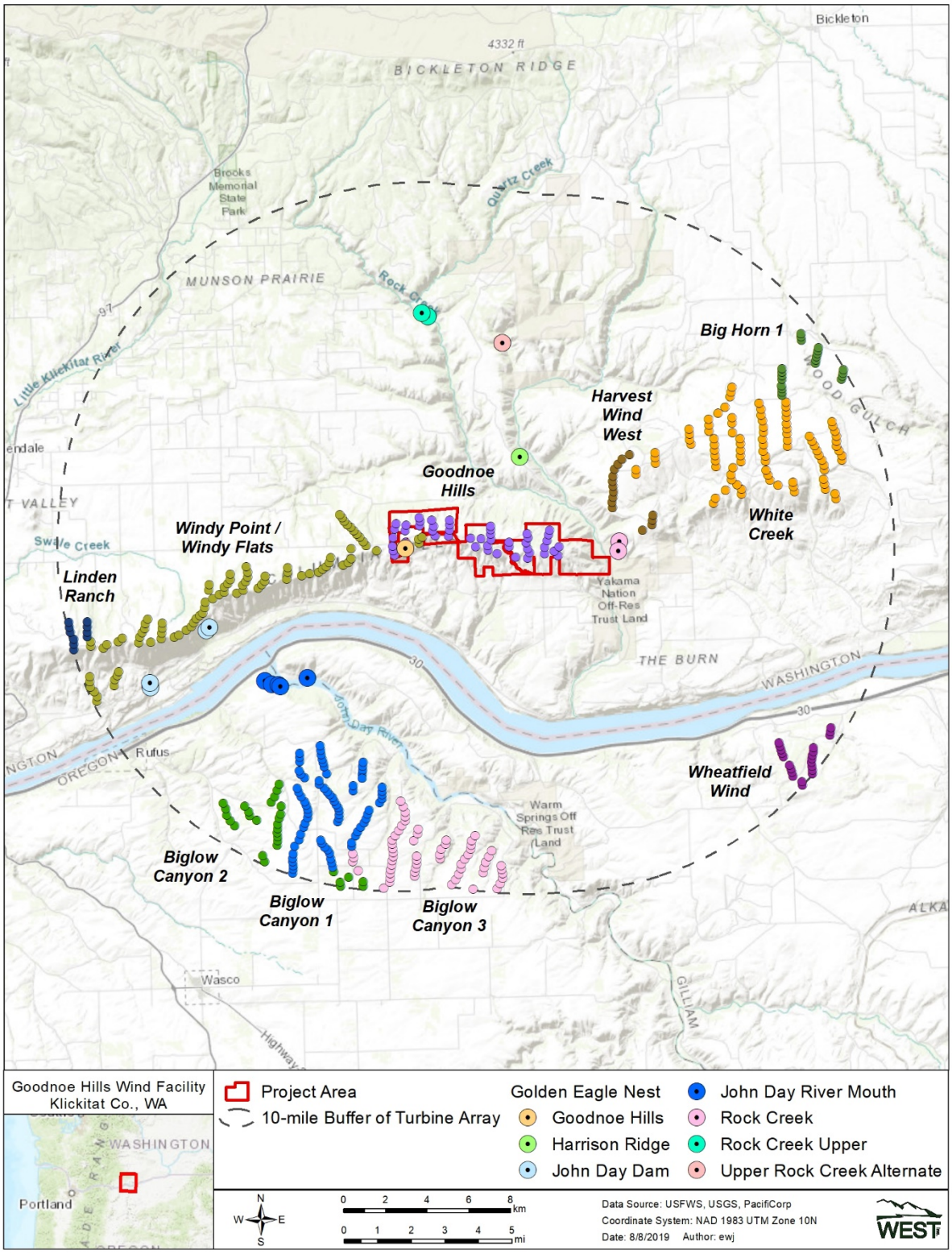

Figure 2.2 Golden eagle nest locations and existing wind energy facilities within 16 kilometers (10 miles) of the Goodnoe Hills Wind Project, Klickitat County, Washington. Historical nest locations are also shown.

Table 2.3. Pre-construction avian studies conducted at sites in the immediate vicinity (i.e., within 1.0 kilometer) of the Goodnoe Wind Energy Project with eagle observations.

Study Type	Study Location	Study Dates	Total # Point Count Stations in Study	Total Eagle Obs.	# of Point Count Stations[a]	Eagle Obs. at Points[a]	Incidental Obs.	Citation
Fixed-point Avian Use	Hoctor Ridge	April – June 2006	4	0	4	0	0	Johnson et al. 2006a
Fixed-point Avian Use	Imrie	April – June 2006	10	0	2	0	0	Johnson et al. 2006b
Fixed-point Avian Use	Imrie	Sept. 2007 – Oct. 2010	13	10 GOEA; 12 BAEA	1	2 GOEA; 2 BAEA	3 GOEA; 8 BAEA	Enz et al. 2011
Raptor Nest	Hoctor Ridge	April – June 2006	n/a	0	n/a	0	0	Johnson et al. 2006a, 2006b
Raptor Nest	Imrie	April – June 2006	n/a	0	n/a	0	0	Johnson et al 2006a, 2006b
Raptor Nest	Imrie	April & May 2010	n/a	0	n/a	0	0	Enz and Bay 2010
Special Status/ Sensitive Species	Hoctor Ridge	April 2006	n/a	0	n/a	0	0	Johnson et al 2006a, 2006b
Special Status/ Sensitive Species	Imrie	April 2006	n/a	0	n/a	0	0	Jonhson et al 20006a, 2006b

[a] Within 1.0 kilometer (km) of Project turbines

Obs = observations; GOEA = golden eagle; BAEA = bald eagle

2.3.1 Fixed-point Avian Use Surveys

The objective of the avian baseline studies were to describe quantitatively temporal and spatial use of the study area by birds using diurnal point count surveys. Data from the six avian use point count stations located within 1.0 km (0.6 mi) of the current Project turbines are reported in this ECP to describe the level of eagle use observed in the Project vicinity during pre-construction avian surveys (Figure 2.3). The six points within one km of Project turbines included four points from Hoctor Ridge in 2006 (Johnson et al. 2006a), and two points from Imrie (two surveyed in 2006 (Johnson et al. 2006b), and one surveyed in three additional years [2007, 2008, and 2010; Enz et al. 2011]). Each survey plot was an approximate 800-m (2,625-ft) radius circle centered on each observation point. Landmarks were located to identify the 800-m boundary of each observation point. Observations of birds beyond the 800-m radius were recorded, but were considered incidental and analyzed separately from data observed within the plot. All sightings of birds in and near plots during the 20-minute plot surveys were recorded. The date, start and end time of observation period, plot number, species, number of individuals, sex and age class, distance from plot center when first observed, closest distance, altitude above ground, activity, and habitat(s) were recorded.

Flight altitude at first observation as well as the lowest and highest flight altitudes observed while the bird was in the plot were recorded to the nearest meter. Flight paths of eagles seen during plot surveys were recorded on the topographic maps and later digitized using the Geographic Information System (GIS).

The number of birds observed and flight heights were used to calculate mean use and an exposure index for eagle observations. Mean use is a measure of the number of birds per survey and exposure index is a relative measure of how often birds flew within the anticipated rotor-swept height (RSH). Mean use was calculated as the number of eagles observed within each 800-m plot for each visit and then averaged by the number of plots surveyed during that visit. A second averaging occurred across the number of visits during the season and entire study period. Exposure index was calculated as a product of the species mean use, the proportion of birds flying, and the proportion of flights within the RSH.

2.3.1.1 Hoctor Ridge 2006

Four Hoctor Ridge avian point count stations were located within one km of Project turbines. Point counts were surveyed once per week during spring migration (April 11 – May 15) and the early summer breeding season (May 16 – June 11). Observation days were divided into two periods, morning (0600−1200 hours [hrs]) and afternoon (1200−1800 hrs), with each station surveyed for 20 minutes per visit. Points were surveyed an equal number of number of times during each period of the day.

Twenty-four point count surveys were conducted over six site visits during the study period. No eagles were observed during any of the avian point count surveys at Hoctor Ridge in 2006 (Johnson et al. 2006a).

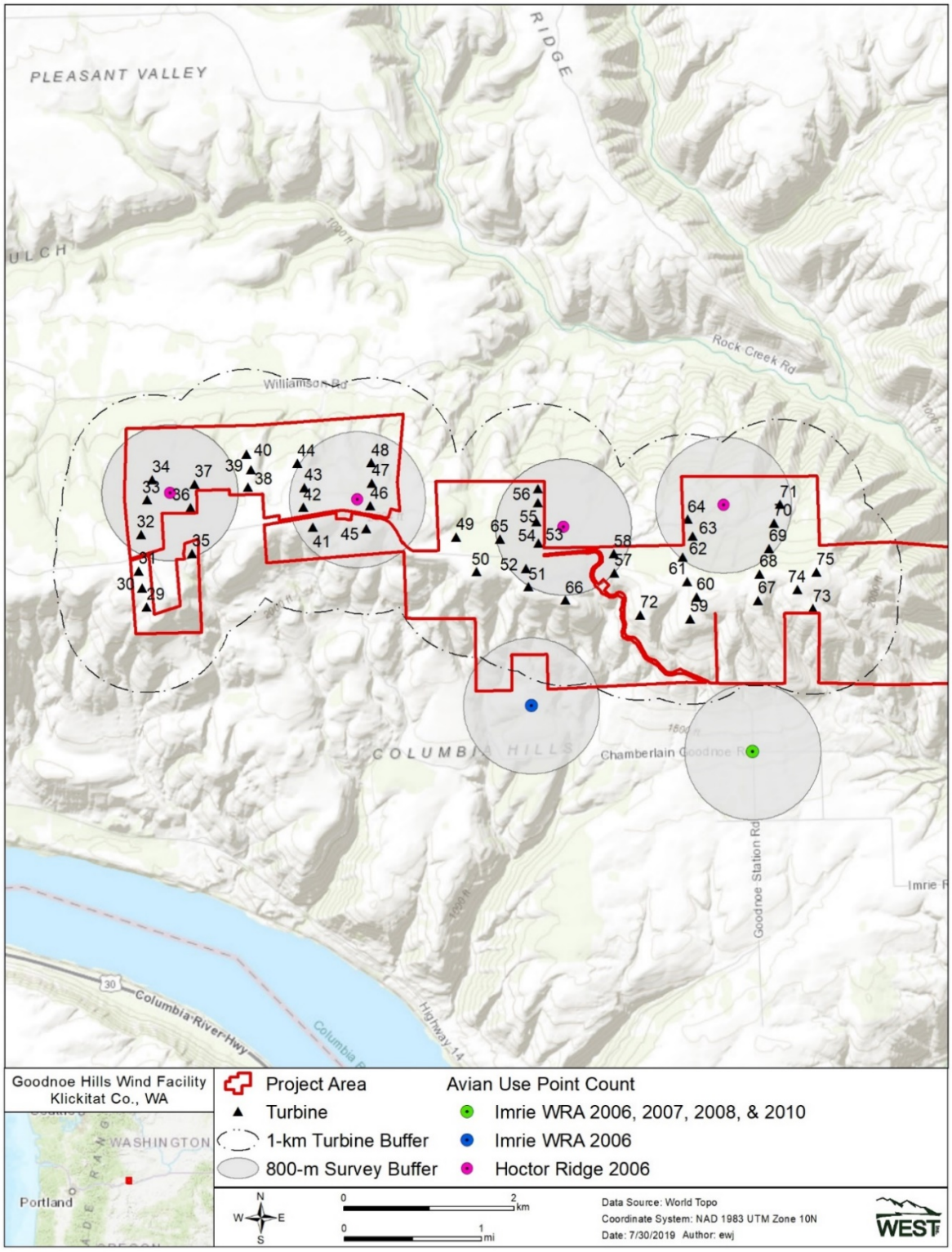

Figure 2.3 Location of avian use point counts conducted within 1.0 kilometers (0.6 miles) of the Goodnoe Hills Wind Facility, Klickitat County, Washington from April 11, 2006 − August 31, 2010.

2.3.1.2 Imrie 2006

Two Imrie avian point count stations were located within one km of Project turbines. Point counts were surveyed once per week during spring migration (April 11 – May 15) and the early summer breeding season (May 16 – June 11). Observation days were divided into two periods, morning (0600−1200 hrs) and afternoon (1200−1800 hrs), with each station surveyed for 20 minutes. Points were surveyed an equal number of times during each period of the day.

Twelve point count surveys were conducted over six site visits during the study period. No eagles were observed at either Imrie avian use point count station in 2006 (Johnson et al. 2006b).

2.3.1.3 Imrie 2007, 2008, and 2010

Due to modifications in Imrie project layout and design, one of the two point count surveys from 2006 was relocated beyond one km from Project turbines; therefore, only data from the remaining point count station within one km was evaluated for the study period from September 14, 2007 − March 13, 2008, and March 3, 2010 − August 31, 2010. Surveys were conducted approximately once per week during the 2007 − 2008 surveys: fall (September 14, 2007 – November 29, 2007), winter (December 6, 2007 − February 28, 2008), and spring (March 1, 2008 − March 13, 2008; March 3, 2010 − May 26, 2010), and twice monthly in the summer (June 3, 2010 − August 31, 2010). Surveys were conducted during daylight hours and survey periods varied to cover approximately all daylight hours during a season. To the extent practical, each point was surveyed approximately the same number of times.

Two golden eagles and two bald eagles were observed at the point count station during the study period (Enz et al. 2011). One of the two golden eagle observations occurred beyond the 800-m survey plot; therefore, this observation was not included in analyses. The combined (i.e., bald and golden eagle) mean eagle use at the point was 0.03 eagles/20-minute survey. Of the 10 total golden eagles observed at all 13 Imrie points surveyed during the study period, 83% were flying within the RSH based on first flight height recorded; and 12 total bald eagles were observed flying with 58% within the RSH based on first flight height recorded (Enz et al. 2011). The resultant overall Imrie exposure indices for golden eagles and bald eagles were relatively low (0.03 and 0.02, respectively) compared to red-tailed hawk (*Buteo jamaicensis*, 0.16), the raptor species with the highest exposure index. An additional eight bald eagles and three golden eagles were observed incidentally during 2007, 2008, and 2010 avian use surveys at Imrie. Overall, eagle use was spread throughout the Imrie survey area (from the southern border of Goodnoe Hills south to the Columbia River) with no apparent concentration areas (Enz et al. 2011).

2.3.2 Raptor Nest Surveys

The objective of raptor nest surveys was to provide information that can be used to predict potential impacts to nesting raptors and to identify methods of avoiding and/or mitigating impacts. Two rounds of raptor nest surveys were conducted at Hoctor Ridge on April 8 – 9 and again from May 1 – June 15, 2006, and Imrie was surveyed on April 6 – 9 and again on June 9 − 10, 2006 (Johnson et al. 2006a, 2006b). The project areas and an approximate 1.6-km (1.0-mi) buffer around the project areas were searched by foot and vehicle for presence of raptor nests. Aerial raptor nest surveys were conducted within 3.2 km (2.0 mi) of Imrie on April 14 and May 19, 2010

(Enz and Bay 2010). Nests were also searched for at other times while conducting other ground-based studies (e.g., point count surveys). All raptor nests were recorded and plotted on US Geological Survey (USGS) 7.5' quad maps of the project area. Data recorded included species occupancy and nest substrate.

No eagle nests or observations of eagles were observed during raptor nest surveys at Hoctor Ridge and Imrie or their survey buffers which overlap the Project (Johnson et al. 2006a, 2006b; Enz and Bay 2010).

2.3.3 Special Status/Sensitive Species Surveys

The objective of special status/sensitive wildlife species surveys was to document the occurrence of species listed as endangered, threatened, sensitive or other special status by WDFW or USFWS at the Project. Two survey rounds were conducted at Hoctor Ridge on April 8 – 9 and May 1 − June 15, 2006 and Imrie on April 6 – 9 and June 9 − 10, 2006 (Johnson 2006a, 2006b). Surveys included searches for raptor nests and special status/sensitive wildlife species by foot and vehicle within the project areas and development corridors along proposed turbine strings. During searches of development corridors, areas within 152 m (500 ft) of the centerline of the proposed turbines were surveyed and consisted of walking transects spaced approximately 50 m (164 ft) apart. Surveys were conducted from dawn to no later than 1300 hrs with wind speed not consistently exceeding 15 mi per hour (mph; 24 km per hour [kph]). All observations were recorded using Global Positioning System (GPS) and/or 1:24,000 scale topographic maps and later mapped using GIS. Observations of eagles and information on concentrated eagle prey (e.g., small mammal colonies) were documented. No eagles or concentrations of eagle prey were observed during special status/sensitive species surveys at Hoctor Ridge or Imrie.

2.4 Post-construction Avian Fatality Monitoring at the Goodnoe Hills Wind Facility

2.4.1 2009 Post-construction monitoring

The objective of the post-construction fatality monitoring study was to estimate the impact of the Project on birds and bats and provide baseline information about fatality rates at the Project. Post-construction monitoring used methodology consistent with other avian mortality monitoring projects in the interior northwest. The study included 1) standardized carcass searches, 2) searcher efficiency trials, and 3) carcass persistence trials.

2.4.1.1 2009 Fatality Monitoring Methods

2.4.1.1.1 Standardized Carcass Searches

Standardized carcass searches were designed to be systematic, consistent, replicable, and representative of conditions in the Project area. Search plots were designed to approximate previously completed studies so Project results could be compared with similar monitoring efforts in the region. Previous studies indicate most turbine-related avian carcasses are found within a distance from the turbine approximately equivalent to the turbine height (Johnson et al. 2003; Young et al. 2005, 2007). Project turbines are approximately 135 m (443 ft) tall at tip height. The 2009 fatality monitoring study used a square grid 180 m (591 ft) on a side. With the turbine at the

center of the grid, plot edges were 90 m (295 ft) and plot corners were 127 m (417 ft) from the turbine bases.

The avian fatality study monitoring year was divided into four periods to accommodate migration periods. The Project's Technical Advisory Committee[1] (TAC) agreed on using March 15 − June 1 for the spring migration and August 1 − October 31 for the autumn migration (URS Corporation [URS] 2010). These dates were used for analysis purposes only and were recognized as not covering all potential migrants or breeding residents in the project area. During the migration periods, carcass searches were completed approximately every 14 days. The non-migration periods included the remainder of the year. The summer period stretched from June 1 − August 1. The winter period started on November 1 and ended on March 14. Carcass searches were conducted approximately every 28 days during the non-migration periods.

The TAC agreed 50% of Project turbines would be monitored during the 1-year survey. Twenty-four of the project's 47 turbines were selected that reflected the variety of potentially important habitat or topographic features, vegetation types, and turbine location.

Upon locating carcasses, feather spots, or body parts, search crew members collected photos, pertinent data, and a GPS location. The condition of each carcass found was recorded. Searchers also tried to estimate the cause of death or in the case of feather spots if a bird had been killed, but removed. As much of the carcass, feathers, and body parts as possible were gathered and bagged for removal from the search plot to eliminate future duplicate records. Any body parts collected received a unique logbook number that was entered into the Project's Wildlife Incident Reporting and Handling System (WIRHS) logbook maintained at the Project office. The bag with carcass, body parts, and logbook identification number were placed in a freezer dedicated to the avian mortality program. Datasheets were kept in the WIRHS logbook.

2.4.1.1.2 Searcher Efficiency Trials

Searcher efficiency trials were conducted randomly and regularly to test the crew members' ability to find and locate bird carcasses within the search plots. Efficiency trials were conducted during actual carcass search events throughout the study period using small numbers of birds to represent more closely the frequency of finding actual carcasses. Trial specimens were composed of a variety of readily available non-native or game birds, roadkill, and previously found carcasses. Large birds consisted of roadkill hawks, juvenile pheasants, partridge, and previously found carcasses. One carcass search crew populated the carcass search plots of a separate search crew by placing trial birds immediately before the commencing carcass searches. Therefore, the person placing the trial birds did not know what other searcher would be conducting

[1] As a part of Conditional Use Permit and Energy Overlay Zone conditions (acquired from the Klickitat County Board of Commissioners in 2004 and 2006, respectively), PacifiCorp was required to consult with a TAC, whose membership included the WDFW, USFWS, Klickitat County, local landowners, the Yakama Nation, and various state, federal, and private wildlife professionals.

a carcass search at any one turbine. The trial carcasses were removed immediately following each trial (URS 2010).

Searcher efficiency was estimated by size of carcass. Placement by habitat type was not calculated because the Project is predominantly shrub-steppe habitat. Efficiency test values were pooled and used to calculate the adjusted total number of project-related avian mortalities.

2.4.1.1.3 Carcass Persistence Trials

Carcass persistence trials were performed to estimate the persistence rates of carcass remains by predators, scavengers, people, or farm equipment to determine the opportunity of a carcass to be found during carcass searches. Carcass persistence trials were completed over four trial periods: spring, mid-summer, late summer/early autumn, and late autumn/winter. About 10 birds were placed during each trial. Juvenile and adult ring-necked pheasant (*Phasianus colchicus*) represented the large birds. Trial placement locations were changed during each trial, but were always located on non-searched turbines to avoid confusing carcass persistence trials carcasses with actual Project-related fatalities. Carcasses were routinely checked over a 30-day trial period, after which any remaining birds and feathers were removed and stored or disposed of appropriately. Calculations of carcass persistence rates were used to adjust the total number of Project-related avian mortalities.

2.4.1.2 2009 Fatality Monitoring Results

2.4.1.2.1 Standardized Carcass Searches

One juvenile golden eagle fatality was found during standardized carcass searches at Turbine 74 on April 27, 2009. The eagle carcass was promptly reported to the USFWS and donated to the National Eagle Repository per USFWS direction. Based on necropsy results and discussion with the TAC, the golden eagle was noted as a 2-year old that was probably a migrant from a Canadian population.

2.4.1.2.2 Searcher Efficiency Trials

Twenty-four large bird carcasses were placed during searcher efficiency trials in 2009. Of these, searchers detected 15 for an overall search efficiency rate of 62%.

2.4.1.2.3 Carcass Persistence Trials

Twenty-two large bird carcasses were placed during carcass persistence trials in 2009. The average persistence time for large birds was 7.41 days. However, carcasses placed during the first trials (spring) had a strong chicken coop odor, and had dramatically shorter persistence times than trials placed during subsequent seasons.

2.4.2 2018 − 2019 Eagle Fatality Monitoring

The objective of the eagle fatality monitoring study was to estimate the impact of the Project on eagles by systematically searching all turbines for eagle carcasses that may be attributed to collision with Project turbines. The number of eagle fatalities attributable to turbine collisions could

be estimated based on the number of eagle fatalities found in the casualty search plots, searcher efficiency rates, and carcass persistence rates.

2.4.2.1 2018 − 2019 Fatality Monitoring Methods

2.4.2.1.1 Standardized Carcass Searches

Standardized carcass searches for eagles were conducted monthly at all 47 Project turbines. Any eagle carcasses located within surveyed areas were recorded and a cause of death determined, if possible, based on inspection of the carcass.

WEST biologists experienced in proper search techniques and carcass detection conducted the searches. All Project turbines were searched. Circular plots with a 100-m (328 ft) radius and centered on the turbine were searched by walking parallel transects. Studies at wind facilities (Hull and Muir 2010, Hallingstad et al. 2018) indicate about 95% of raptor fatalities are found within 100 m of turbines. Transects were initially set approximately 20 m (66 ft) apart, but transect spacing was decreased if searcher efficiency was limited by vegetation density and height. A searcher walked at a rate of approximately 45−60 m (148−197 ft) per minute along each transect searching both sides out to about 10 m (33 ft) for casualties.

Fatality monitoring was completed for one full year. Fatality searches occurred monthly at all Project turbines. Searches began in April 2018. One round of each bias was implemented during each of the four seasons (spring: March 16 – May 15, summer: May 16 − August 15, fall: August 16 − October 31, winter: November 1 − March 15).

2.4.2.1.2 Searcher Efficiency Trials

Searcher efficiency trials were conducted in the same 100-m (328 ft) search plots where the eagle fatality searches occurred. Searcher efficiency trials began concurrent with fatality monitoring and occurred in all seasons. Personnel conducting the scans did not know the location or timing of the detection trials.

To estimate searcher efficiency of large avian carcasses, 20 feathered turkey decoys (Turkey Skinz™ from A-Way Hunting Products, 3230 Calhoun Road, Beaverton, Michigan 48612, www.awayhunting.com) were placed during each season. Unlike large bird carcasses typically used for trials (e.g., hen pheasants or mallards [*Anas platyrhynchos*]), the feathered decoys are not likely to attract scavenging eagles or other raptors. Further, the feathered decoys are more comparable in size and color to eagle carcasses. All decoys were placed within 100 m of turbines prior to searches. Decoys were placed at random locations throughout the search plot. The number and location of the decoys found during the carcass searches were recorded. The number of decoys available for detection during each trial was determined immediately after the search round was completed.

2.4.2.1.3 Carcass Persistence Trials

As with searcher efficiency, carcass persistence is a major component of fatality rate estimations. Traditionally, large bird persistence has been measured by conducting carcass persistence trials using large gamebirds (e.g., mallards, pheasants). However, recent studies are showing

gamebird persistence is likely very conservative when compared with raptor persistence (Urquhart et al. 2015, Hallingstad et al. 2018). In other words, gamebirds persist for fewer days than raptors resulting in eagle fatality estimates biased high if gamebird carcasses are used to estimate persistence. For this reason, only raptors were used when conducting persistence trials to be used for eagle fatality rate adjustments.

A minimum sample of 24, or six carcasses per season, was recommended; however, a permit authorizing shipment and handling of raptor carcasses could not be obtained from the USFWS until halfway through the monitoring year. Personnel conducting carcass searches monitored the trial birds over a 100-day period according to the following schedule as closely as possible: carcasses were checked on day 1, 3, 7, 10, 20, 30, 40, 60, 75, and 90. This schedule occasionally varied depending on weather and coordination with the fatality survey visits.

2.4.2.2 2018 − 2019 Fatality Monitoring Results

2.4.2.2.1 Standardized Carcass Searches

No eagle fatalities, or parts thereof, were found during the monitoring period. All 47 turbines within the Project area were searched monthly from March 19, 2018 − February 20, 2019, totaling 559 plot searches during the monitoring period. Not all turbines were visited during each month due to maintenance, weather, or other reasons.

2.4.2.2.2 Searcher Efficiency Trials

Eighty decoys were place during fall (20), winter (20), spring (20), and summer (20). Logistic regression models were fit using season as a covariate and a model without season (intercept-only). Searchers found 75 out of the 80 trial placements, for an overall estimated detection probability of 0.94.

2.4.2.2.3 Carcass Persistence Trials

Carcass persistence was modeled using six different species of large raptor carcasses placed during fall (eight carcasses) and winter (10 carcasses). Based on the 30-day search interval and modeled carcass persistence time, the average probability of persistence was 0.76.

2.4.3 PacifiCorp Fatality Monitoring

A PacifiCorp biologist has conducted vehicle and walking inspection surveys at the Project once per month since January 2013. The biologist visits all 47 Project turbines each month. Each month approximately half of the turbines are inspected by walking around the base of the turbine and scanning the area with binoculars looking for bird and bat fatalities. The remaining turbines are inspected from the vehicle. Some months not all turbines are visited due to weather or other reasons. The inspections involve the biologist slowly driving the Project access roads and walking around turbine pads looking for avian and bat fatalities. Birds and bats found are reported to USFWS and WDFW. One golden eagle fatality has been documented during these searches: a carcass was found at Turbine 32 on September 10, 2013. This eagle carcass was promptly reported to the USFWS and donated to the National Eagle Repository per USFWS direction.

In addition to a PacifiCorp biologist conducting monthly carcass searches, PacifiCorp personnel have conducted a safety inspection of each turbine every three months since operations began in 2008. Safety personnel conducting the inspections are trained to look for and report bird and bat fatalities along access roads and turbine pads. On-site O&M staff travel throughout the Project areas performing routine maintenance on Project components and have been trained to look for and report any bird and bat fatalities observed.

2.4.4 Summary of Post-Construction Survey Results

Two golden eagle fatalities have been documented at the Project during two years of standardized carcass searches and over six years of operational monitoring (Figure 2.4). Fatalities were found in April (2009) and September (2013). Eagle fatalities were located on opposite sides of the Project.

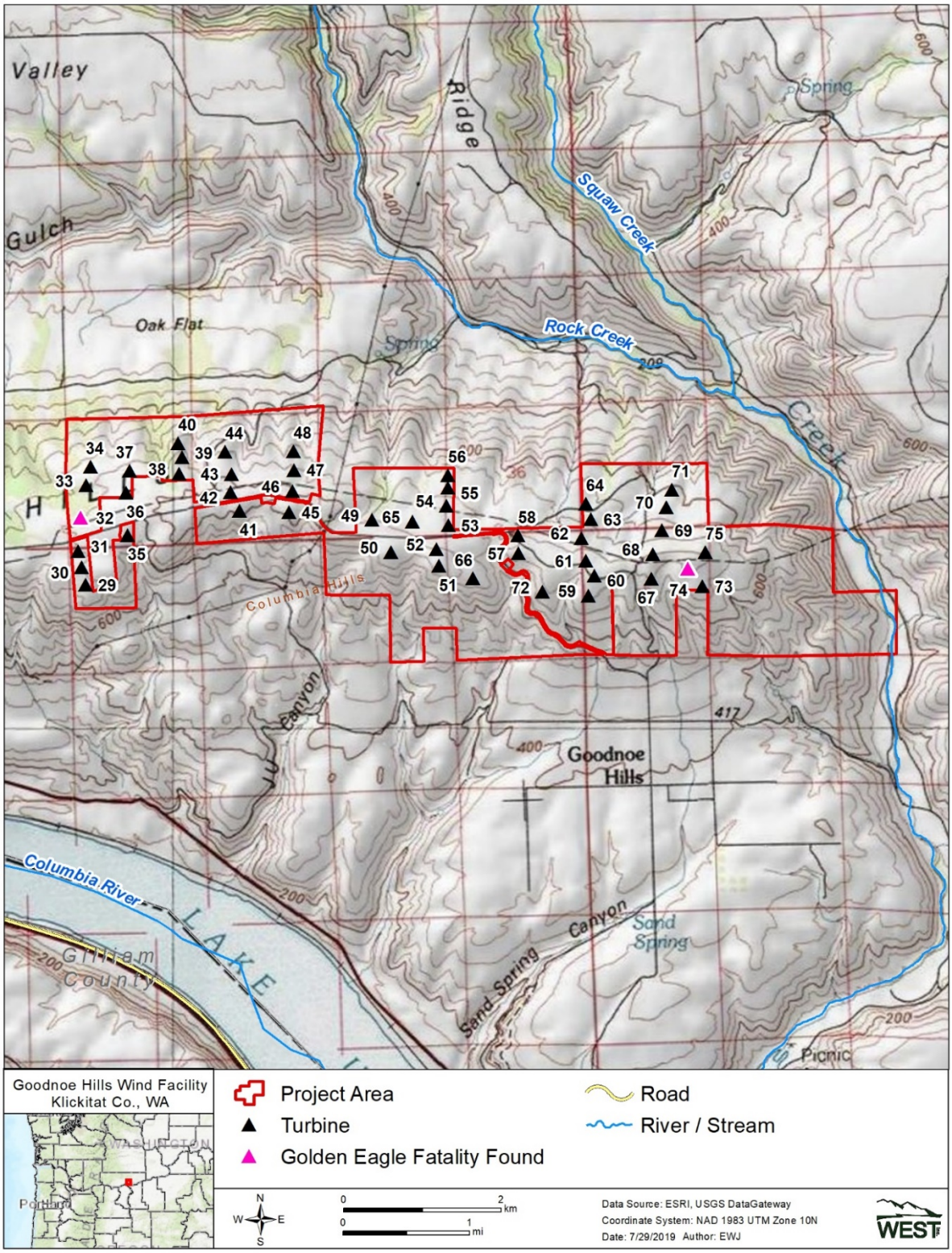

Figure 2.4 Location of golden eagle fatalities documented at the Goodnoe Hills Wind Facility, Klickitat County, Washington.

3 ASSESSING EAGLE RISK AND PREDICTING FATALITIES

Using the data gathered pursuant to various site assessments and field studies as summarized in Section 2, PacifiCorp has analyzed the potential risks of the Project to bald and golden eagles per the USFWS's recommendation under Stage 3 of the ECP Guidance. The analysis presented in the following sections specifically addresses likely impacts of the Project in the context of collision, electrocution, disturbance/displacement, and habitat fragmentation.

3.1 Collision

Because golden eagles were detected during fatality monitoring at the Project, there is a continued risk of collisions with Project turbines. Although bald and golden eagle fatalities have been reduced at wind farms with older-generation turbines (Orloff and Flannery 1992, Kerns and Kerlinger 2004, Kerlinger et al. 2006,), fatalities still occur at wind farms with newer-generation turbines, including Diablo Winds, California (WEST 2008); High Winds, California (Kerlinger et al. 2006); and Elkhorn, Oregon (*Daily Journal of Commerce* 2010).

Only seven bald eagle fatalities have been reported as of 2012 at wind farms in the US (Allison 2012). Preliminary data from a post-construction eagle use survey at a wind facility in Alaska suggest that bald eagles may actively avoid turbines (Sharp et al. 2010). Although there has been a lack of reported bald eagle fatalities at wind energy facilities operating within the species' range, a few features or conditions present at the Project indicate that a risk of collisions for bald eagles could exist.

Another risk factor for eagles colliding with turbines is related to the density and availability of small mammal prey resources, such as colonial burrowing rodents and rabbits, which typically are important prey species for golden eagles. Assemblages of prey resources could attract eagles to the Project to forage and create a potential for the risk of collision. No concentrations of small mammal or other potential eagle prey items were observed during baseline wildlife surveys; therefore, this risk factor may be low.

3.1.1 Eagle Fatality Predictions

The estimated number of eagles predicted to collide with and be killed by the Project's turbines is not a required element of an ECP submitted to the USFWS as part of an application for an ETP. It is understood the USFWS Region 1 will independently complete the bald and golden eagle fatality predictions to determine the appropriate level of take for the Project. The USFWS approach for cases such as the Project will likely be a multi-step process. The first step would be to use the USFWS Collision Risk Model (CRM; USFWS 2018b) and run the CRM with a "priors only" approach. The next step would be to use the data collected through post-construction mortality monitoring for eagles (as collected by PacifiCorp and shared with USFWS) and the Evidence of Absence tool (Dalthorp et al. 2014) to generate a fatality prediction, which would then be used to update the collision prior of the CRM. Furthermore, the increase in eagle take resulting from the larger RSA resulting from Project repowering will need to be estimated. USFWS will conduct these analyses as part of the environmental assessment (EA) completed pursuant to the

NEPA requirements related to the federal action of issuance of an ETP. Hence, this ECP does not include the USFWS's predictions of bald and golden eagle fatalities for the Project.

3.2 Electrocution

Utility lines (transmission and distribution) can potentially result in electrocution of eagles, which have wingspans large enough to simultaneously contact two conductors or a conductor and grounded hardware. Therefore, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. Electrocution risk is higher for golden eagles, which often perch on power poles while foraging.

The risk of electrocution to eagles from the Project is likely to be low because all electrical collection lines for the Project are buried and the aboveground 230-kV power line has been designed following Avian Power Line Interaction Committee (APLIC) Guidelines (APLIC 2006). This low risk has been further reduced through measures taken during the design and construction phases of the Project. These measures are described in Sections 4.1 to 4.5. No additional above ground electrical systems are proposed to repower the Project.

3.3 Disturbance and Displacement

The Project is complete and has been operating since 2008. The Project is largely visible to eagles, except areas low along the Columbia River or within the Rock Creek Canyon. Therefore, construction activities associated with turbine upgrades will also be visible to eagles. Potential impacts to eagles from the turbine upgrade activity include disturbance and displacement; human activities in primary foraging areas and/or near active nests may lead to reduced reproductive success. A small amount of foraging habitat will be removed and temporarily disturbed by excavation at each turbine to install a concrete reinforcement collar. Additional fill material will be placed over the turbine's foundation. The work will be limited to previously disturbed areas and will be reclaimed to the existing turbine pads and surrounding vegetation. Existing ancillary facilities and support structures, such as turbine tower sections, on-site substations, collector lines, and O&M buildings, are not anticipated to be upgraded.

Eagles in the Project area may be temporarily disturbed and displaced by equipment and contractor travel/transport and construction activities required for turbine activities. Due to the lack of quality riparian nesting habitat and limited suitable prey resources within the Project, the risk of disturbance or displacement to bald eagles is considered low.

3.4 Habitat Fragmentation

Habitat fragmentation can exacerbate the problem of habitat loss for eagles by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce eagle productivity through increased nest predation and parasitism and reduced pairing success. The Project did not substantially increase the degree of habitat fragmentation in the area because of existing agriculture and access roads. For example, excluding the 47 wind turbines at the Project, there are approximately 407 wind turbines from nine different utility-scale wind facilities within 16 km of the Goodnoe Hills wind turbines that are similar in nature, size, and use (Figure 2.2; USGS 2019).

Nevertheless, to the extent habitat fragmentation could occur, the likelihood of indirect impacts on eagles has been reduced through measures taken during the design and construction phases of the Project. These measures are described in Sections 4.1 to 4.5 and include removing or eliminating turbines through macro- and micro-siting; burying all the collection lines and designing aboveground transmission line following APLIC guidelines (APLIC 2006, 2012); and minimizing surface disturbance to the maximum extent possible.

3.5 Categorizing Site According to Risk

The ECP Guidance recommends Project developers or operators use a standardized approach to categorize the likelihood a project will meet the standards for issuance of an ETP. Those categories are.

1) Category 1 − High risk to eagles/potential to avoid or mitigate impacts is low.
2) Category 2 − High to moderate risk to eagles/opportunity to mitigate impacts.
3) Category 3 − Minimal risk to eagles.

The ECP Guidance applies primarily to wind energy facilities that have not yet been constructed or are operational. The Project was constructed and operational prior to the publication of the ECP Guidance; the USFWS has determined risk categorization does not apply to operational projects.

3.6 Cumulative Impacts

USFWS Region 1 will use their cumulative effects tool to complete the Local Area Population (LAP) analysis in the EA to decide whether to issue an ETP for the Project and the levels of bald and golden eagle take that could potentially be authorized. The LAP is the population of eagles within a distance from the Project footprint equal to the species' median natal-dispersal distance. The median natal-dispersal distance is known to be 175 km (109 mi) for golden eagles and 138 km (86 mi) for bald eagles (USFWS 2016a). The USFWS has identified take rates of between 1% and 5% of the estimated total eagle population size at the LAP scale as sustainable; with 5% being at the upper end of what might be appropriate under the BGEPA preservation standard, whether offset by compensatory mitigation or not (USFWS 2016a).

The cumulative impact analysis incorporates records of federal ETPs issued (i.e., authorized take) and unpermitted eagle mortality records (i.e., electrocution, collisions, shootings, poisonings) that are available to the USFWS. Information on unpermitted take in the USFWS's databases is generally sensitive information. In addition, the USFWS will communicate with state wildlife agencies within the LAP to incorporate eagle mortality records they possess which may not be included in their database.

3.7 Conclusion

In summary, the documented use of the Project by golden eagles and the two golden eagle fatalities documented to date demonstrate the Project poses risk of direct impacts to this species. For bald eagles, low use and the lack of bald eagle fatalities to date suggest low risk of direct

impacts. Risk of disturbance or displacement from existing habitats due to habitat fragmentation is low. There is also a low potential risk of eagle mortality because of collision with power lines and electrocution by power lines because all electrical collection power lines have been buried, and the aboveground transmission power line has been designed following APLIC guidelines (APLIC 2006, 2012).

As required for an ETP, PacifiCorp has undertaken conservation measures to avoid and minimize the risks to eagles. These measures are discussed in detail in Sections 4.1 to 4.5.

4 AVOIDANCE AND MINIMIZATION OF RISK IN PROJECT DESIGN

This section identifies avoidance and minimization measures PacifiCorp incorporated into the planning and design of the Project to reduce impacts to eagles and their habitat during the construction and operation of the Project. It also provides general measures that will be taken when the Project is decommissioned. These measures are described in detail in Appendix B. PacifiCorp consulted and coordinated with the USFWS, WDFW, and Klickitat County regarding avoidance and minimization measures during planning and design of the Project (Appendix B). The Project will seek to comply with all federal, state, and county environmental laws, orders, and regulations. Avoidance and minimization measures relevant to the Project's potential impacts on bald and golden eagles are listed below.

4.1 Conservation Measures Prior to Construction

During the site selection stage of the Project, pre-construction avian surveys were conducted and determined raptor carcass rates for the Project was expected to be low given relatively few turbines (47) and the low raptor carcass rates observed at other wind energy facilities. Raptor use at the Project appeared moderate relative to other locations studied in Klickitat County. Areas to the west of the Project appear to have higher raptor use, and areas to the east appear to have lower raptor use. Using the low and high range raptor carcass estimates used in a previous study, the developer's wildlife contractor predicted raptor carcass rates would range between 0.02−0.06 raptor carcasses per turbine per year based on the assumption of the operation of 40−55 wind turbines (Erickson et al. 2003).

By utilizing existing roads, siting of Project infrastructure was considered to minimize habitat loss and fragmentation. Although the Guidelines were not available at the time, the Project infrastructure was sited, the Project was generally consistent with these guidelines.

The Project incorporates state-of-the-art turbine technology, including un-guyed, tubular towers and slow-rotating, upwind rotors.

As discussed above, Project siting was developed in coordination with WDFW and USFWS to avoid or minimize impacts to raptors. Specific measures taken include:

- Turbine locations were modified to ensure adherence to disturbance free buffers for raptor nests.
- An avian risk assessment and pre-construction surveys were conducted (Johnson et al. 2006a, 2006b; Enz and Bay 2010; Enz et al. 2011).
- Fragmentation of wildlife habitat has been and will continue to be minimized through the use, where practical, of lands already disturbed, such as utilizing existing roadways and locating the transmission line in close proximity to an existing highway.
- Turbines set back approximately 300 m (984 ft) from any grade breaks, defined as an increase in slope to greater than 20%, of the ridge tops.

- Unavoidable habitat impacts were mitigated by enhancement of suitable "like" off-site habitat (Klickitat County Board of Commissioners 2004).

4.2 Conservation Measures during Construction

Conservation measures implemented during construction of the Project are described below.

- Tree clearing activities were limited to the minimum necessary for construction to avoid potential harm to avian species' nests and eggs.
- No trees containing active bird nests were cleared for construction purposes.
- No construction occurred within 0.8 km (0.5 mi) of any active raptor nests during the 2- to 3-month period when raptors were incubating.
- Construction activities were typically limited to daylight hours and all equipment was equipped with sound-control devices.
- Equipment coming on-site was inspected for signs of noxious weeds.

4.3 Conservation Measures during Operation

In addition to the post-construction fatality monitoring (discussed in Section 3.0), conservation measures implemented during operation of the Project are described below.

4.3.1 General

- The Project will seek to comply with all federal, state, and county environmental laws, orders, and regulations.
- On-site O&M contractors are provided annual training regarding wildlife handling and reporting requirements.
- PacifiCorp will continue to report the presence of bird carcasses at the Project in accordance with the BBCS to verify the effectiveness of the avoidance, minimization, and mitigation strategies incorporated in the Project operation and management (Appendix B). A detailed description of the adaptive management program is described in Section 6. PacifiCorp employees receive annual training in WIRHS protocols to ensure they understand the procedures.

4.3.2 Site Management

- To avoid attracting eagles and other raptors, the availability of carrion is reduced by removing carcasses discovered on-site during regular maintenance and monitoring activities. O&M personnel, or PacifiCorp contractors, will either pick up the carrion and dispose of it at an appropriate off-site facility or immediately call the WDFW to collect the wildlife carcass in an effort to remove potential avian attractants from turbines areas. Appropriate owners are called to remove livestock carcasses.
- The Project is located on private property. Hunting is not allowed near the Project turbines. A benefit of this practice is safety and a reduction in attraction as gut piles and other carcass remnants are reduced.

- Hunting, fishing, or possession of firearms by PacifiCorp employees and designated contractor(s) on the Project areas were and are prohibited during construction, operation, and maintenance.
- Project personnel are advised regarding speed limits on roads (25 mph [40 kph]) and to be alert to wildlife to minimize wildlife mortality due to vehicle collisions.
- Potential increases in poaching are reduced through employee and contractor education regarding wildlife laws. If violations are discovered, the offense will be reported to the WDFW and/or USFWS, depending upon the species.
- Typical travel is restricted to designated roads; and no off-road travel will be allowed except to perform operational activities and in emergencies.
- Turbine strings, access roads, and other disturbed areas are monitored regularly to prevent the spread of noxious weeds.

4.3.3 Collision Risk

- Wind turbines are un-guyed, tubular towers and have slow-rotating, upwind rotors.
- Collection and communication lines were buried thus minimizing and avoiding collision and electrocution risks to eagles and other avian species.

4.4 Conservation Measures during Repowering

In addition to conservation measures being implemented during Project operation, the following conservation measures will be implemented specific to the turbine upgrade process.

4.4.1 Limited Work Areas

All Project upgrade activities will occur in previously disturbed areas to the extent practicable. Construction work will be limited to approved and surveyed areas. Existing access roads will be used to transport equipment and personnel to each turbine. No working or driving cross-country within the Project boundaries as shortcuts will be permitted without prior approval from the appropriate authorities.

4.4.2 Restoration

If impacted, disturbed areas will be replanted after construction. PacifiCorp prepared a revegetation and weed control plan in consultation with the Klickitat County Weed Control Board for the Project. The seed mix(s) included in the plan will be used to reestablish plant communities disturbed during construction.

4.5 Conservation Measures during Decommissioning

PacifiCorp developed a detailed Decommissioning Plan in March 2010 (PacifiCorp 2010). In the event the Project is decommissioned, infrastructure will be removed, and the site will be graded and restored to as near its original condition as reasonably possible. Habitat removed as a result of the Project will be allowed to re-establish through natural succession, thereby restoring habitat over time for avian species.

5 EAGLE FATALITY MONITORING

Monitoring for eagle fatalities at the operating Project is a critical component of this ECP and a requirement for issuing an ETP under the 2016 Eagle Rule. The primary objectives of fatality monitoring are to ensure eagle fatalities are detected and estimate eagle fatality rates for comparison with the model-based predictions.

PacifiCorp has developed USFWS-approved eagle fatality monitoring protocols in coordination with the USFWS. Detailed methods for these eagle fatality monitoring surveys are presented below. PacifiCorp may alter survey methods over time to incorporate new survey techniques and protocols as they become available.

The methods for the eagle monitoring surveys are broken into four primary components:

1) Standardized carcass surveys
2) Searcher efficiency trials
3) Carcass persistence trials
4) Adjusted mortality estimates

5.1 Standardized Carcass Surveys

PacifiCorp will conduct systematic searches every month at all 47 turbines for eagles for two years after issuance of an ETP. For each turbine, a standardized search plot of 200 × 200 m (656 x 656 ft) will be established centered on the wind turbine tower. Within the 200-square m (2,153 square ft) plot, transects will be spaced 20 m apart and observers will look for eagle carcasses within 10 m on each side of each transect. This transect width should be sufficient given (1) an eagle's large size makes it highly conspicuous, (2) short ground cover height makes visibility of eagle carcasses easier in most locations, and (3) high searcher efficiency using 20-m transect spacing during 2019 fatality monitoring at the Project. Per the USFWS's 2016 Eagle Rule, qualified, independent searchers trained in proper search techniques (Strickland et al. 2011) will conduct the systematic searches and report the results directly to the USFWS. All searches will be conducted during daylight hours.

PacifiCorp will obtain/renew the necessary permits or agency authorization for eagle carcass handling and removal. If an eagle carcass is found, the searcher will place a flag near the carcass and continue the search. After searching the entire plot, the searcher will return to each carcass to record information about the carcass condition, distance from turbine, age, sex, GPS location, and cause of death. All carcasses will be handled according to the procedures and protocols described in detail below in Section 5.2.4.

Due to topography and for safety, carcass searches will not be conducted on slopes exceeding 30%. To the extent possible and safe, surveyors will visually inspect the steep portion of the search plot with binoculars from a safe vantage point(s) such as the turbine pad, access road, and toe of steep slope. The location of search areas with over 30% gradient will be mapped using USGS digital elevation model prior to conducting carcass searches. Searches will not be

performed when weather conditions made turbines inaccessible or unsafe to access in a standard road vehicle.

5.2 Bias Corrections Surveys

The number of eagle fatalities detected during the carcass surveys does not equal the actual number of eagle fatalities at a turbine or project. Searcher efficiency and carcass persistence trials are needed to adjust potential downward bias of the annual fatality estimate, so a true total number of turbine-related fatalities that occur each year can be estimated.

5.2.1 Searcher Efficiency Trials

The primary objective of searcher efficiency trials is to estimate the percentage of eagle carcasses searchers can find. Because of their large size, searchers detect eagles more easily than smaller birds. Recent studies suggest searcher efficiency for eagles is approximately 90% when conducting transect-based searches (Smallwood 2013, New et al. 2015, Hallingstad et al. 2018).

Searchers will search for carcasses using the same methods presented in Section 5.1. The trials will be conducted four times per year for two years following ETP issuance. Searcher efficiency trials will be completed during each season to account for different field conditions (e.g., snow, dense spring vegetation, dry summer vegetation) that may affect the ability of the surveyors to locate eagle carcasses. Seasons will be defined as described by Erickson et al. (2003): spring migration (February 15 – April 15), breeding/summer season (April 16 – September 15), fall migration (September 16 – November 15), and winter (November 16 – February 14). Although seasonal trials will not address fluke weather events, they will address field conditions relevant to the overall period.

Feathered turkey decoys will be used for the searcher efficiency trials. This surrogate is proposed because it is approximately the same size as a bald or golden eagle, and has been used during similar studies at wind facilities (including 2018 − 2019 eagle fatality monitoring at the Project, see Section 2.4.2); however, we will examine using other representative carcass surrogate during the study.

Twenty carcass surrogates per season (80 total per year) will be distributed throughout survey plots in locations unknown to the searchers. Prior to initiating the searcher efficiency study, carcass surrogate locations will be randomly generated. A qualified, USFWS-approved biologist who is not participating in the searcher efficiency trials will plant carcass surrogates at the predetermined survey plots. Carcass surrogates will be dropped from waist height, so they land in a random position and location. The position and location will be recorded for later comparison with actual fatalities. The biologist will record the location (taken of each carcass surrogate with a GPS unit), ground cover type, vegetation, turbine number, date, and time.

When searchers locate a placed carcass surrogate, they will record the location using a handheld GPS unit, which will be compared to the locations recorded during placement. The percentage of planted carcass surrogates located by searchers will be used to generate a correction factor (by

turbine as appropriate) to estimate the actual number of eagles killed, based on the number of observed fatalities.

5.2.2 Carcass Persistence Trials

The objectives of the carcass persistence trials are to document the length of time carcasses remain in the surveyed area and are available to be found by searchers and to determine the appropriate frequency of carcass searches for turbine-associated fatalities within the search plots. Recent studies suggest large raptors persist at least 30 days (Northwest Wildlife Consultants and WEST 2007, Gritski et al. 2010, Hallingstad et al. 2018). Some projects reported mean carcass persistence as high as 128 days (Smallwood 2013, New et al. 2015, Hallingstad et al. 2018). Carcass persistence trials will be completed seasonally and concurrently with the searcher efficiency trials described above, but will only occur in the first year of post-permit monitoring due to concerns over suitable carcass availability. Different seasonal rates for carcass persistence are necessary to address changes in scavenging throughout the season, as well as over time, because scavengers adapt to novel food sources.

Carcasses of species that approximate the size of eagles, such as turkey vultures (*Cathartes aura*), red-tailed hawk, great horned owl (*Bubo virginianus*), and other large birds, will be used for carcass persistence trials if readily available; we will examine using other representative carcasses during the trials, if needed. Carcasses will be placed within the Project area in locations representative of the habitat, topography, and visibility characteristics within search plots. However, carcass persistence trials will be placed a minimum of 200 m from turbine bases to reduce collision risk to avian scavengers attracted to the trial carcasses. Carcasses will be checked on days 1, 3, 5, 7, 10, 14, 21, 28, 35, and 42 following placements, or until they are all removed. All birds used in the carcass persistence trials will be handled with disposable nitrile gloves or an inverted plastic bag to avoid leaving a scent on the carcasses and interfering with the trials.

The mean carcass persistence rate will be derived from the carcass persistence trials and will be used to adjust the search interval. The appropriate frequency of searches will be investigated after the end of the first year of trials. Estimates of the probability a carcass was not removed in the time between surveys, and therefore was available to be found by searchers, will be used to adjust carcass counts for persistence bias (Dalthorp et al. 2014, Huso et al. 2015).

5.2.3 Adjusted Fatality Estimates

Unadjusted (observed) fatalities (i.e., raw carcass counts) and adjusted fatality estimates (raw carcass count data adjusted for imperfect detectability) will be presented in annual reports submitted to the USFWS during the first quarter in each of the two years following ETP issuance, as discussed in greater detail in Section 5.3. Adjusted fatality estimates are based on observed carcasses found during formal carcass searches, the probability a searcher will miss a carcass (searcher efficiency correction factor), the probability a carcass will be removed before a searcher can locate it (carcass persistence correction factor), and the proportion of turbines searched to the total number of turbines at the facility.

Adjusted eagle fatality estimates will be calculated using an industry-accepted statistical estimator; searcher efficiency and carcass persistence results may inform the specific estimator used. The Evidence of Absence statistical estimator (Dalthorp et al. 2014, Huso et al. 2015) is currently thought to be reliable for producing accurate fatality estimates when few (or no) carcasses are found. The estimator also can account for unsearched areas within the search plot. Adjusted eagle fatality estimates will be presented per year for the total area of the Project, per turbine per year, and per MW per year. If an eagle fatality is found, raw carcass data will be presented by eagle species.

5.2.4 Detection Procedures and Protocols

PacifiCorp applied for and received a Special Purpose Utility Permit (SPUT) renewal from the USFWS for the Project on August 31, 2018 (MB93024C-0). This permit is valid through March 31, 2021. The SPUT authorizes PacifiCorp to collect, transport, and temporarily possess migratory birds found dead or injured at the Project. Sub-permittees and employees directly reporting to the sub-permittees are also authorized under the permit. PacifiCorp will apply for a permit renewal as necessary throughout the duration of the Project. Under the conditions of this SPUT, PacifiCorp will report to USFWS all birds found dead or injured at the Project.

The USFWS's Oregon Field Office and Office of Law Enforcement (OLE) will be notified within 24 hrs if any federally listed species or eagle is detected during fatality surveys, whether recorded during eagle fatality monitoring or by PacifiCorp personnel during routine O&M. The USFWS Region 1 Migratory Bird Permit Office will also be notified no later than seven days from the date of discovery of the remains. Any state-listed species fatality will be reported to WDFW within 48 hrs. The SPUT does not allow eagles and federally listed threatened and endangered species to be collected. OLE preference regarding eagle carcass handling and disposition will be determined prior to conducting eagle fatality searches. A freezer will be available at the Project's O&M building for storage as needed.

When a dead eagle is found, the following information will be recorded on a fatality data sheet: date; species; age and sex (if possible); band number and notation if wearing a radio-transmitter or auxiliary marker; observer name; turbine or pole number or other identifying characteristic; distance of the carcass from the turbine or pole; azimuth of the carcass from the turbine or pole; decimal-degree latitude and longitude or Universal Transverse Mercator coordinates of the turbine or pole and carcass; habitat surrounding the carcass; condition of the carcass (entire, partial, scavenged); description of the carcass (e.g., intact, wing sheared, in multiple pieces); a rough estimate of the time since death (e.g., less than one day, more than one week) and how estimated; a digital photograph of the carcass; and information on carcass disposition.

5.3 Annual Reports

PacifiCorp will submit written reports to the USFWS during the first quarter in each of the two years following ETP issuance. A summary of the key contents of each annual report is provided below.

- Actual and estimated eagle takes and the level of uncertainty of the estimates (e.g., confidence intervals), as described in the ECP.
- Disposition (alive/dead), location, and dates of dead eagle species recorded during the monitoring program, as described in the ECP.
- One or more maps or graphical representations illustrating the geographic distribution and location of all eagle fatalities (relative to turbine locations).
- A description of the mitigation activities, adaptive management actions, carcass persistence trials, and enforcement activities conducted and their outcomes.
- Analysis of the data to be used as part of adaptive management.

PacifiCorp has also implemented a WIRHS for the life of the Project (Appendix C). The purpose of the WIRHS procedure is to standardize and describe the actions taken by Project personnel in response to wildlife incidents found at the Project. PacifiCorp has been provided a guidance document, which provides directions for Project personnel who encounter a wildlife incident, and to fulfill PacifiCorp's commitment to reporting wildlife incidents. The Project will record all dead or injured birds and bats, including eagles, found incidentally in the Project area over the entire life of the Project.

5.4 Operations and Maintenance Monitoring

Following the completion of the two years of eagle fatality monitoring, PacifiCorp will implement an internal monitoring program, which will be used by PacifiCorp's wildlife biologist and on-site personnel to record all avian and bat fatalities over the long-term duration of operation. The intent of this monitoring program will be to ensure the turbines at the sites are frequently inspected for possible avian or bat impacts and if impacts are identified, they are recorded, agencies are notified, and mitigation measures are identified and implemented, if necessary. The monitoring program will be conducted for the life of the Project beginning after the two years of eagle fatality monitoring studies.

PacifiCorp's wildlife biologist will visit the Project once per month. All 47 turbines and access roads will be searched by vehicle and pedestrian surveys over a 2-month period (i.e., half of Project turbines are searched during each visit). Pedestrian surveys to search for carcasses will cover the area immediately surrounding the turbine (concentric circles out to 10 m). Access roads will be searched by driving slowly (10 mph [16 kph] or less) throughout the Project.

All avian and bat fatalities discovered will be recorded. If the fatality of a species listed under the Endangered Species Act or an eagle is recorded, the finding will be reported to the USFWS and OLE within 24 hrs of species confirmation, if not sooner. If other migratory bird species fatalities are observed, they will be reported. Birds and bats will not be moved or removed by any individual who does not have the appropriate permits. The location will be recorded using a GPS unit. An avian and wildlife reporting form will be filled out, and photos will be taken. This information will be turned in to the manager and provided to the USFWS. The manager will coordinate with the USFWS to arrange transportation and treatment of an injured threatened or endangered species or eagle. At PacifiCorp's cost, birds approved for removal/relocation will be taken to a local USFWS-approved rehabilitation center or disposed of as recommended by the USFWS. Non-eagle carcasses and parts will be legally distributed via licensed repositories.

6 COMPENSATORY MITIGATION AND ADAPTIVE MANAGEMENT

For projects in operation after issuance of the Eagle Permit Rule in 2009 (USFWS 2009, 50 CFR 22.26 [2009]), the USFWS recommends offsetting compensatory mitigation to offset all predicted golden eagle take. Conversely, the Project was in operation prior to 2009, and eagle take resulting from Project operation is considered part of the historic baseline take level. Therefore, impacts to eagles resulting from Project operation would not be considered in the realm of no-net-loss relative to impacts on golden eagle populations. As such, compensatory mitigation for eagle take resulting from current Project operation is not needed. However, any increase in golden eagle take rates resulting from post-2009 turbine upgrades would have to be offset. Offsetting compensatory mitigation for bald eagles is only required if 1) annual take exceeds the threshold for the eagle management unit (EMU; Pacific flyway in this case) or 2) annual take (together with cumulative effects) is greater than 5% of the local-area (138-km radius) population (USFWS 2013, 2016a). This section identifies compensatory mitigation and adaptive management techniques to offset eagle mortality associated with operation of the Project.

6.1 Compensatory Mitigation through Power Pole Retrofitting

Compensatory mitigation required for golden eagle take will be achieved through retrofitting power poles in the same EMU as the Project[2]. Power pole electrocution has been shown to cause a significant number of eagle fatalities. Therefore, retrofitting electric poles is an effective way to minimize fatalities in the population, generally (USFWS 2013). Retrofits are also an effective and quantifiable compensatory mitigation measure that may be used to offset any eagle fatalities that may occur because of operation of the Project.

The USFWS has resource equivalency analysis (REA) models for calculating appropriate golden eagle and bald eagle compensatory mitigation values for power pole retrofits (USFWS 2013). The REAs for power pole retrofits use currently available information on golden and bald eagle life history inputs, effectiveness of retrofitting lethal electric poles, and an estimated annual take to develop a framework for power pole retrofits as compensatory mitigation for golden and bald eagle fatalities. The number of utility pole retrofits per eagle carcass discovery will be based on a REA analysis conducted by the USFWS (2013).

6.1.1 Methods for Identifying Power Poles to Retrofit

PacifiCorp will identify power poles to retrofit through field surveys that identify non-APLIC compliant poles and poles posing a risk due to local factors. Such local factors may include proximity of the power pole to a known eagle nest, prey density near the area, known eagle habitat, proximity of the pole to key foraging spots, and proximity to known migration corridors. Analysis of these factors will consist of scoring candidate power poles, setting a minimum score for poles to qualify for retrofitting. Additional detail on pole selection methodology can be found in

[2] Retrofits will be prioritized to be undertaken within the same LAP.

PacifiCorp's *Renewable Resources Retrofit Plan for Washington and Oregon Wind Energy Projects* (Appendix D).

6.1.2 Tracking Retrofit Work during the Permit Term

As part of its annual eagle report, PacifiCorp will provide accounting summary of the power poles retrofitted in the previous year.

6.1.3 Post-Installation of Retrofit Monitoring

Retrofitted power poles will be monitored for one year after installation to assess their effectiveness. Trained biologists will complete monthly surveys for approximately 25% of all retrofitted power poles to look for mortalities as well as eagle use. Consistent with the ECP Guidance regarding adaptive management as a component of compensatory mitigation, any failures at retrofitted power poles will be analyzed to determine what additional measures can be employed. Monitoring staff will report any eagle mortalities to the USFWS using the protocols defined in Section 5.3.

6.2 Tiered Mitigation Approach with Adaptive Management

Adaptive management is integral to any ECP as an iterative process that will improve decisions for avoiding, minimizing, and/or mitigating effects to eagles throughout all phases of the Project. As part of the adaptive management strategy, PacifiCorp agrees to make management adjustments and/or implement mitigation measures if eagle conservation goals are not achieved. Assessing various management options determined to be most appropriate to achieve conservation goals, as well as designing, implementing, and monitoring each option will be completed as part of the adaptive management plan.

Adaptive management is based on learning and adapting, allowing for flexibility in decision-making as new data are gathered. Understanding uncertainties exist, adaptive management provides resource managers the latitude to change monitoring protocols, avoidance and minimization measures, or mitigation methods to achieve desired goals. The findings of monitoring could indicate the need for modification of operations and management strategies. PacifiCorp intends to work cooperatively with the USFWS to develop appropriate actions or mitigation measures to address issues or concerns identified during eagle fatality monitoring studies at the Project.

Depending on the results of eagle fatality monitoring studies, no further action may be needed if Project-caused eagle fatalities are determined to be less than permitted. The priority will be to determine if documented eagle fatalities were indeed caused by turbine collisions at the Project. If Project-caused eagle fatalities are determined to be higher than anticipated, an assessment of why impacts are occurring will be conducted to aid in developing appropriate corrective actions. Further monitoring efforts may be implemented to help understand impacts if causes of mortality are unknown. Once voluntary avoidance and minimization measures are put into place, additional monitoring to determine the effectiveness of the voluntary measures will be conducted. Voluntary avoidance and minimization measures may be operational or non-operational as shown in Table 6.1, and would be implemented in a tiered fashion. Each subsequent step or tier will trigger

more robust corrective actions to reduce the rate of eagle take. This table will be updated once additional discussions with the USFWS have occurred and/or after the USFWS has conducted their analysis in the EA to decide whether to issue an ETP.

Table 6.1. Anticipated Conservation Measures using Adaptive Management

Step	Anticipated Conservation Measure	Threshold or Trigger
I	Assess eagle fatality to determine and/or understand potential cause. Conduct detailed analysis of all existing data and information surrounding the known fatality and relate it to existing meteorological and wind turbine operational data. Consult with US Fish and Wildlife Service (USFWS) to review appropriate measures to minimize likelihood of future take. Evaluate take levels relative to permitted value.	One golden or bald eagle carcass found in any permit year.
II	Evaluate the need to conduct additional studies to inform take occurrences. Identify actions that can be taken to avoid or minimize future take. This may include operation Best Management Practices, habitat management, Advanced Conservation Practices, or other activities deemed appropriate. Consult with USFWS to determine potential course of action.	At any time take is projected to exceed the permitted level.
III	PacifiCorp will consult with the USFWS to review and discuss information known about previous takes, in an attempt to identify factors that might be targeted. PacifiCorp's overall mitigation program for the subsequent 5-year permit period would be re-evaluated, based on actual results as compared with permitted levels of take, and this stepwise approach will start over with Step I. Examples of measures that may be implemented include: • Employ onsite biological monitor(s) during daylight hours at locations and/or times of suspected risk, to refine further the understanding of risk factors. • Implement habitat management or modification plan to minimize attraction to the Project, limit perching within the Project, and generally minimize risky behaviors. • Implement a limited curtailment program specific to the area(s) and/or period(s) of highest collision risk. • Develop and evaluate detection and deterrent system for eagles approaching area(s) of risk. • Other measures agreed upon in consultation with USFWS.	If before or by the end of the 4th year the Projects have taken one less than the permitted take level for bald or golden eagles.

7 LITERATURE CITED

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Appendix A. Analysis of the Repowering of the Goodnoe Hills Wind Facility

TECHNICAL MEMORANDUM

Date: November 2, 2017

To: Travis Brown, Pacific Power

From: Kristen Nasman and Luke Martinson, WEST, Inc.

Subject: Analysis of the Repowering of the Goodnoe Hills Wind Facility

INTRODUCTION

Pacific Power owns and operates the 47 turbine (94 megawatt [MW]) Goodnoe Hills Wind Facility (Project) in Klickitat County, Washington. The Project has been in commercial operations since June 2008. Pacific Power is considering updates to the Project that would replace the current turbine blades with new, larger blades. The new turbine blades may have an up to 116 meter (m) rotor diameter, while the current rotor diameter is 92.5 m and therefore, the potential for a change in risk to avian and bat species may occur. To evaluate the potential change in risk, Pacific Power contracted Western EcoSystems Technology Inc. to analyze the potential impacts to avian and bat species assuming a larger rotor diameter turbine blade.

POST-CONSTRUCTION MONITORING

A post-construction fatality monitoring study was conducted at the Project from February 2009 to January 2010 by URS Corporation (URS Corporation 2010a). The objective of the study was to evaluate avian mortality related to the regular operation of the 47 wind turbines at the Project. During the study, 24 wind turbines were surveyed approximately 19 times, and 25 bird and eight bat fatalities were found on the survey plots.

The adjusted all bird fatality estimate was 2.80 birds/turbine/year (131 birds total per year) and the adjusted bat fatality estimate was 0.68 bats/turbine/year (32 bats total per year). Approximately 73% of the all bird fatalities were small birds.

To calculate the potential risk from the larger turbine blades, the proportion increase in rotor swept area was calculated. That proportion increase was then directly applied to the reported fatality rates. The proportion increase was calculated at 57%. Under this proportional increase, the predicted fatality rate for the new turbine blades is 4.40 birds/turbine/year (207 birds total per year) and 1.07 bats/turbine/year (51 bats total per year). These predicted rates assume that the risk for birds and bats increase proportionally with an increase in turbine blade diameter and does not assume any level of turbine avoidance or habituation from current turbine operations.

COMPARISON TO OTHER WIND PROJECTS

The fatality rates observed at the Project from 2009 to 2010 and the predicted fatality rates given the new turbine blades were compared to other facilities that have conducted post-construction fatality monitoring studies and are publicly available in Oregon and Washington and in North America.

The fatality rates per MW were used to compare projects with different turbine sizes. The estimated fatality rate for birds during the 2009 through 2010 monitoring was 1.40 birds/MW/year and the estimated fatality rate for bats was 0.34 bats/MW/year. The predicted fatality rate for birds for the new turbine blades was 2.20 birds/MW/year and the predicted fatality rate for bats was 0.54 bats/MW/year.

The estimated impacts from the 2009 and 2010 study along with the predicted fatality rates at the Project fall within the range of fatalities rates that are publicly available from 35 other wind energy facilities in Washington and Oregon for both birds and bats (Figures 1 and 2). Fatality rates for birds in Washington and Oregon ranged from 0.16 to 8.45 birds/MW/year while fatality rates for bats ranged from 0.12 to 4.23 bats/MW year.

In addition, the estimated impacts from the 2009 and 2010 study along with the predicted fatality rates at the Project fall within the range of fatalities rates that are publicly available other wind energy facilities in North America for both birds and bats (Tables A1 and A2). Fatality rates for birds in North America ranged from 0.08 to 17.44 birds/MW/year while fatality rates for bats ranged from 0 to 40.20 bats/MW year.

DISCUSSION

The estimated impacts to avian and bat species from the 2009 and 2010 study along with the predicted fatality rates for the new turbine blade at the Project fall within the range of fatalities rates that are publicly available from other wind energy facilities in Washington and Oregon. Prior to construction of the facility, it was predicted that the bird fatality rates at the Project would range from 0.63 to 2.80 birds/turbine/year or 30 to 132 bird fatalities per year at the 47 turbine facility based on publicly available data at the time (Johnson and Erickson 2006). In addition, it was predicted that the bat fatality rates at the Project would range from 0.70 to 0.90 bats/turbine/year or 33 to 42 bats at the Project per year. The observed fatalities estimated from the post-construction monitoring study were in line with the predicted impacts, it was estimated that 132 bird fatalities and 32 bat fatalities occurred at the Project during the study.

This exercise assumed the risk to birds and bats is proportional to the rotor swept area; however, this is likely a conservative assumption for bird fatality rates as birds have been known to practice avoidance of wind turbines and the proportion of flights that the bird fails to avoid collision with

the turbine contributes to risk (Busse 2013). To date, only limited studies have been conducted to evaluate the change in risk to birds and bats when upgrading to larger turbines. These studies have demonstrated a reduction in relative risk due to slower moving blade; however, most of these studies evaluated modern and pre-modern turbines (Smallwood and Karas 2009, Hotker 2006). We predicted that 207 bird fatalities and 51 bat fatalities will occur at the Project per year. These predictions are within the range with fatality rates for birds and bats within Oregon and Washington. PacifiCorp has engaged the US Fish and Wildlife Service (USFWS) regarding the proposed turbine upgrades and PacifiCorp will perform intensive post-construction mortality monitoring for up to two years after blade upgrades have been performed. The data will be used to determine if mortalities rates increased due to larger rotor diameters and assist with PacifiCorp's efforts to obtain an eagle take permit for the Project from the Region 1 USFWS office. PacifiCorp will provide Klickitat County with the results of the report upon completion of the final document if requested.

It was estimated that the population level impact for passerine species due to collisions from wind turbines ranged from 0.014 to 0.043% depending on the species (Erickson et al. 2014). At the Project, 73% of the fatalities were small birds and therefore, the population level impact to avian species at the project is minimal. In addition, based on a relatively small prediction of 51 bat fatalities at the Project, it is unlikely that operations of this facility with larger turbine blades will result in any significant impacts to bat populations. As noted previously, post-construction monitoring will be conducted after the new blades are installed to confirm the conclusion that population level impacts to bird and bat as a result of operations from the facility are unlikely, as well as provide insight into comparing before/after impacts from increasing rotor diameters on existing wind turbine infrastructure.

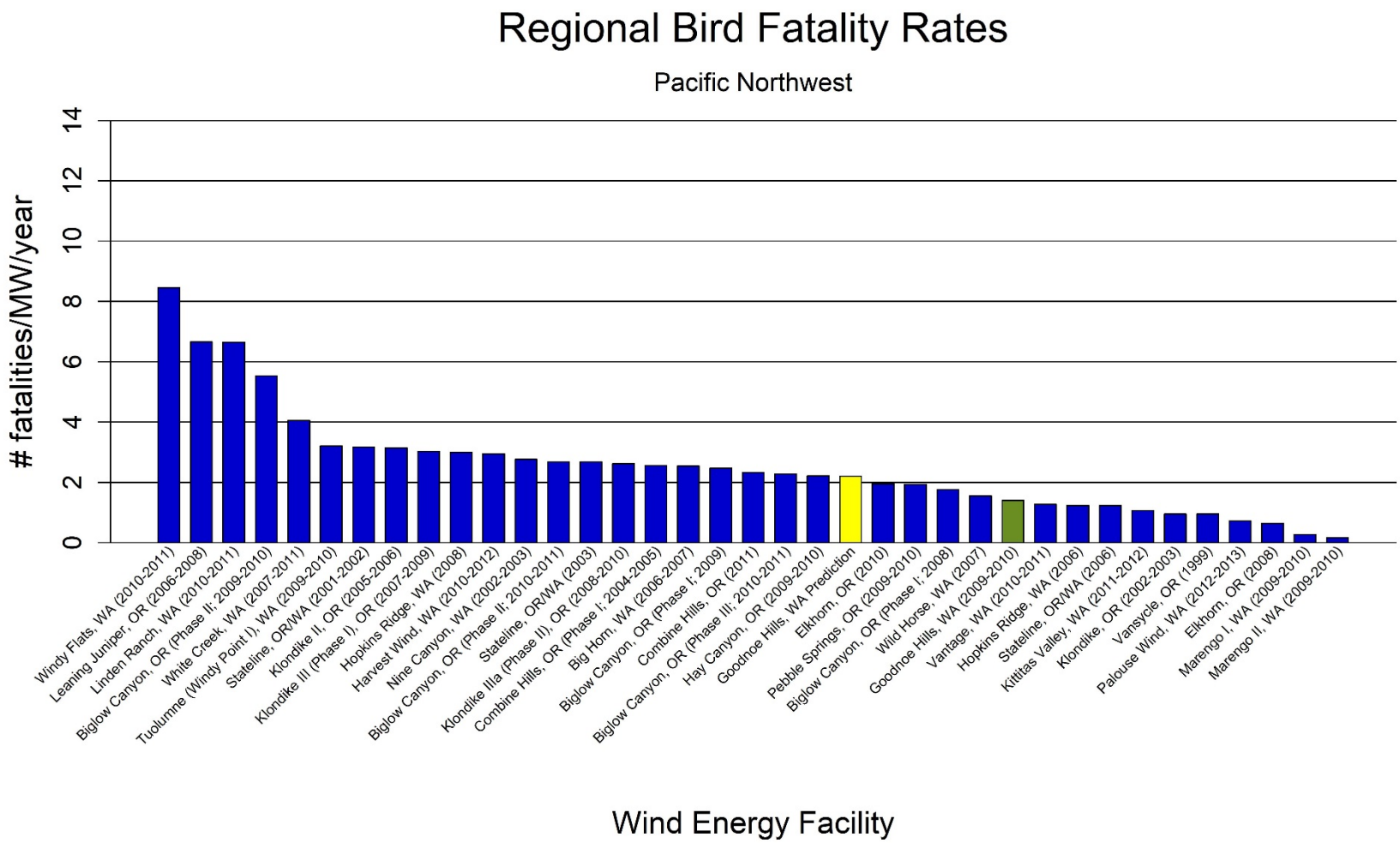

Figure 1. Fatality rates for all birds (number of birds per MW per year) from publicly-available wind energy facilities in Oregon and Washington.

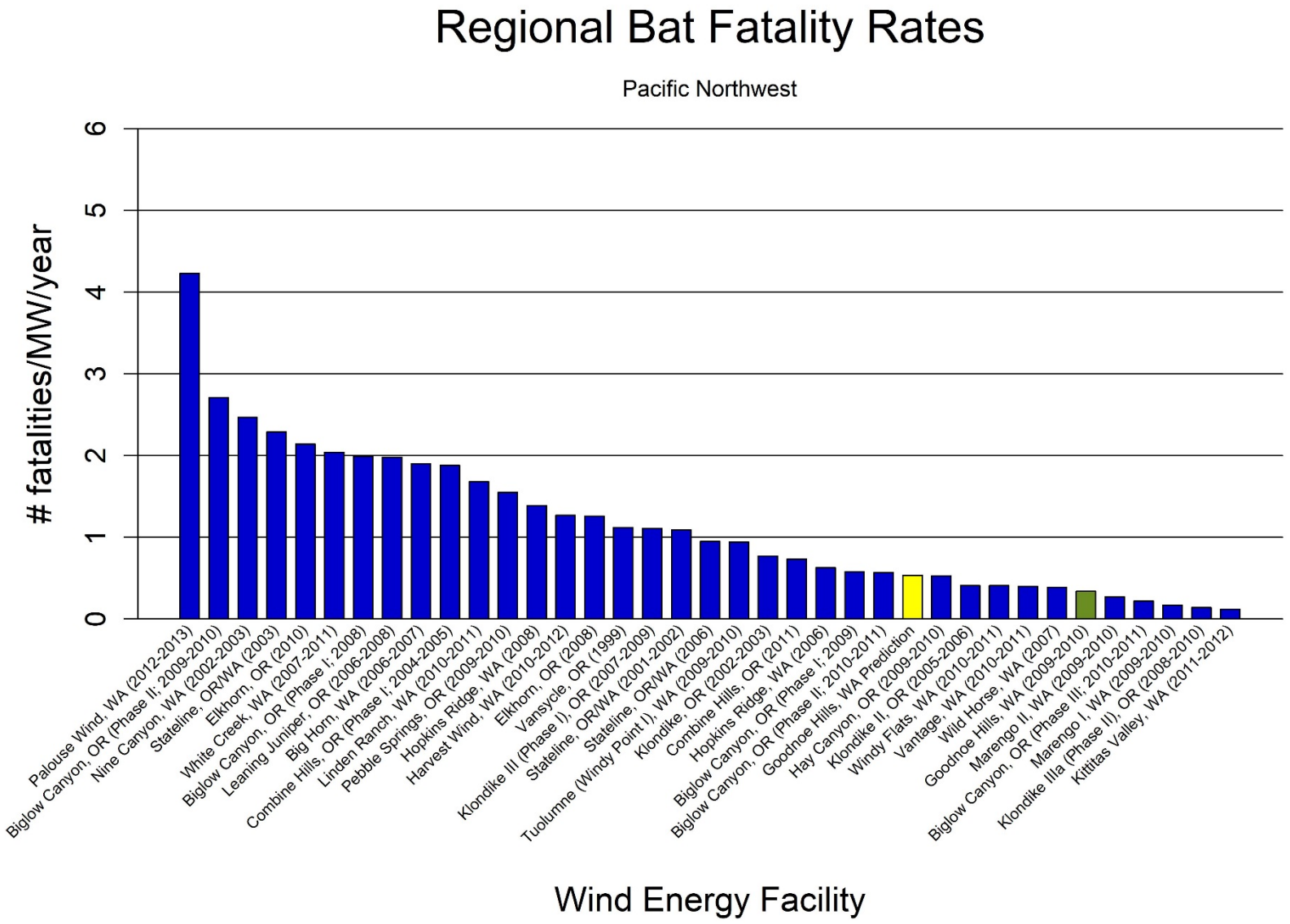

Figure 2. Fatality rates for bats (number of bats per MW per year) from publicly-available wind energy facilities in Oregon and Washington.

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Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Reference
Alite, CA (2009-2010)	0.55	California	Chatfield et al. 2010
Alta I, CA (2011-2012)	7.07	California	Chatfield et al. 2012
Alta I-V, CA (2013-2014)	7.8	California	Chatfield et al. 2014
Alta II-V, CA (2011-2012)	1.66	California	Chatfield et al. 2012
Alta VIII, CA (2012-2013)	0.66	California	Chatfield and Bay 2014
Barton I & II, IA (2010-2011)	5.5	Midwest	Derby et al. 2011b
Barton Chapel, TX (2009-2010)	1.15	Southern Plains	WEST 2011
Beech Ridge, WV (2012)	1.19	Northeastern	Tidhar et al. 2013a
Beech Ridge, WV (2013)	1.48	Northeastern	Young et al. 2014a
Big Blue, MN (2013)	0.6	Midwest	Fagen Engineering 2014
Big Blue, MN (2014)	0.37	Midwest	Fagen Engineering 2015
Big Horn, WA (2006-2007)	2.54	Pacific Northwest	Kronner et al. 2008
Big Smile, OK (2012-2013)	0.09	Southern Plains	Derby et al. 2013b
Biglow Canyon, OR (Phase I; 2008)	1.76	Pacific Northwest	Jeffrey et al. 2009b
Biglow Canyon, OR (Phase I; 2009)	2.47	Pacific Northwest	Enk et al. 2010
Biglow Canyon, OR (Phase II; 2009-2010)	5.53	Pacific Northwest	Enk et al. 2011b
Biglow Canyon, OR (Phase II; 2010-2011)	2.68	Pacific Northwest	Enk et al. 2012b
Biglow Canyon, OR (Phase III; 2010-2011)	2.28	Pacific Northwest	Enk et al. 2012a
Blue Sky Green Field, WI (2008; 2009)	7.17	Midwest	Gruver et al. 2009
Buffalo Gap I, TX (2006)	1.32	Southern Plains	Tierney 2007
Buffalo Gap II, TX (2007-2008)	0.15	Southern Plains	Tierney 2009
Buffalo Mountain, TN (2000-2003)	11.02	Southeastern	Nicholson et al. 2005
Buffalo Mountain, TN (2005)	1.1	Southeastern	Fiedler et al. 2007
Buffalo Ridge, MN (Phase I; 1996)	4.14	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase I; 1997)	2.51	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase I; 1998)	3.14	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase I; 1999)	1.43	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase II; 1998)	2.47	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase II; 1999)	3.57	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase III; 1999)	5.93	Midwest	Johnson et al. 2000
Buffalo Ridge I, SD (2009-2010)	5.06	Midwest	Derby et al. 2010d
Buffalo Ridge II, SD (2011-2012)	1.99	Midwest	Derby et al. 2012a
Casselman, PA (2008)	1.51	Northeastern	Arnett et al. 2009b
Casselman, PA (2009)	2.88	Northeastern	Arnett et al. 2010
Cedar Ridge, WI (2009)	6.55	Midwest	BHE Environmental 2010
Cedar Ridge, WI (2010)	3.72	Midwest	BHE Environmental 2011
Cohocton/Dutch Hill, NY (2009)	1.39	Northeastern	Stantec 2010
Cohocton/Dutch Hills, NY (2010)	1.32	Northeastern	Stantec 2011a
Combine Hills, OR (Phase I; 2004-2005)	2.56	Pacific Northwest	Young et al. 2006
Combine Hills, OR (2011)	2.33	Pacific Northwest	Enz et al. 2012
Criterion, MD (2011)	6.4	Northeastern	Young et al. 2012b
Criterion, MD (2012)	2.14	Northeastern	Young et al. 2013
Criterion, MD (2013)	3.49	Northeastern	Young et al. 2014b

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Reference
Diablo Winds, CA (2005-2007)	4.29	California	WEST 2006, 2008
Dillon, CA (2008-2009)	4.71	California	Chatfield et al. 2009
Dry Lake I, AZ (2009-2010)	2.02	Southwestern	Thompson et al. 2011
Dry Lake II, AZ (2011-2012)	1.57	Southwestern	Thompson and Bay 2012
Elkhorn, OR (2008)	0.64	Pacific Northwest	Jeffrey et al. 2009a
Elkhorn, OR (2010)	1.95	Pacific Northwest	Enk et al. 2011a
Elm Creek, MN (2009-2010)	1.55	Midwest	Derby et al. 2010e
Elm Creek II, MN (2011-2012)	3.64	Midwest	Derby et al. 2012b
Foote Creek Rim, WY (Phase I; 1999)	3.4	Rocky Mountains	Young et al. 2003
Foote Creek Rim, WY (Phase I; 2000)	2.42	Rocky Mountains	Young et al. 2003
Foote Creek Rim, WY (Phase I; 2001-2002)	1.93	Rocky Mountains	Young et al. 2003
Fowler I, IN (2009)	2.83	Midwest	Johnson et al. 2010a
Goodnoe, WA (2009-2010)	1.4	Pacific Northwest	URS Corporation 2010a
Grand Ridge I, IL (2009-2010)	0.48	Midwest	Derby et al. 2010a
Harvest Wind, WA (2010-2012)	2.94	Pacific Northwest	Downes and Gritski 2012a
Hay Canyon, OR (2009-2010)	2.21	Pacific Northwest	Gritski and Kronner 2010a
Heritage Garden I, MI (2012-2014)	1.3	Midwest	Kerlinger et al. 2014
High Sheldon, NY (2010)	1.76	Northeastern	Tidhar et al. 2012a
High Sheldon, NY (2011)	1.57	Northeastern	Tidhar et al. 2012b
High Winds, CA (2003-2004)	1.62	California	Kerlinger et al. 2006
High Winds, CA (2004-2005)	1.1	California	Kerlinger et al. 2006
Hopkins Ridge, WA (2006)	1.23	Pacific Northwest	Young et al. 2007
Hopkins Ridge, WA (2008)	2.99	Pacific Northwest	Young et al. 2009b
Kewaunee County, WI (1999-2001)	1.95	Midwest	Howe et al. 2002
Kittitas Valley, WA (2011-2012)	1.06	Pacific Northwest	Stantec 2012
Klondike, OR (2002-2003)	0.95	Pacific Northwest	Johnson et al. 2003
Klondike II, OR (2005-2006)	3.14	Pacific Northwest	NWC and WEST 2007
Klondike III (Phase I), OR (2007-2009)	3.02	Pacific Northwest	Gritski et al. 2010
Klondike IIIa (Phase II), OR (2008-2010)	2.61	Pacific Northwest	Gritski et al. 2011
Leaning Juniper, OR (2006-2008)	6.66	Pacific Northwest	Gritski et al. 2008
Lempster, NH (2009)	3.38	Northeastern	Tidhar et al. 2010
Lempster, NH (2010)	2.64	Northeastern	Tidhar et al. 2011
Linden Ranch, WA (2010-2011)	6.65	Pacific Northwest	Enz and Bay 2011
Locust Ridge, PA (Phase II; 2009)	0.84	Northeastern	Arnett et al. 2011
Locust Ridge, PA (Phase II; 2010)	0.76	Northeastern	Arnett et al. 2011
Maple Ridge, NY (2007)	2.34	Northeastern	Jain et al. 2009a
Maple Ridge, NY (2007-2008)	2.07	Northeastern	Jain et al. 2009b
Marengo I, WA (2009-2010)	0.27	Pacific Northwest	URS Corporation 2010b
Marengo II, WA (2009-2010)	0.16	Pacific Northwest	URS Corporation 2010c
Mars Hill, ME (2007)	1.67	Northeastern	Stantec 2008
Mars Hill, ME (2008)	1.76	Northeastern	Stantec 2009a
Milford I, UT (2010-2011)	0.56	Rocky Mountains	Stantec 2011b
Milford I & II, UT (2011-2012)	0.73	Rocky Mountains	Stantec 2012b
Montezuma I, CA (2011)	5.19	California	ICF International 2012
Montezuma I, CA (2012)	8.91	California	ICF International 2013

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Reference
Montezuma II, CA (2012-2013)	1.08	California	Harvey & Associates 2013
Moraine II, MN (2009)	5.59	Midwest	Derby et al. 2010f
Mount Storm, WV (2009)	3.85	Northeastern	Young et al. 2009a, 2010b
Mount Storm, WV (2010)	2.6	Northeastern	Young et al. 2010a, 2011b
Mount Storm, WV (2011)	4.24	Northeastern	Young et al. 2011a, 2012a
Mountaineer, WV (2003)	2.69	Northeastern	Kerns and Kerlinger 2004
Munnsville, NY (2008)	1.48	Northeastern	Stantec 2009b
Mustang Hills, CA (2012-2013)	1.66	California	Chatfield and Bay 2014
Nine Canyon, WA (2002-2003)	2.76	Pacific Northwest	Erickson et al. 2003
Noble Altona, NY (2010)	1.84	Northeastern	Jain et al. 2011a
Noble Bliss, NY (2008)	1.3	Northeastern	Jain et al. 2009c
Noble Bliss, NY (2009)	2.28	Northeastern	Jain et al. 2010c
Noble Chateaugay, NY (2010)	1.66	Northeastern	Jain et al. 2011b
Noble Clinton, NY (2008)	1.59	Northeastern	Jain et al. 2009d
Noble Clinton, NY (2009)	1.11	Northeastern	Jain et al. 2010a
Noble Ellenburg, NY (2008)	0.83	Northeastern	Jain et al. 2009e
Noble Ellenburg, NY (2009)	2.66	Northeastern	Jain et al. 2010b
Noble Wethersfield, NY (2010)	1.7	Northeastern	Jain et al. 2011c
NPPD Ainsworth, NE (2006)	1.63	Midwest	Derby et al. 2007
Palouse Wind, WA (2012-2013)	0.72	Pacific Northwest	Stantec 2013a
Pebble Springs, OR (2009-2010)	1.93	Pacific Northwest	Gritski and Kronner 2010b
Pine Tree, CA (2009-2010, 2011)	17.44	California	BioResource Consultants 2012
Pinnacle, WV (2012)	3.99	Northeastern	Hein et al. 2013
Pinyon Pines I & II, CA (2013-2014)	1.18	California	Chatfield and Russo 2014
Pioneer Prairie II, IA (2011-2012)	0.27	Midwest	Chodachek et al. 2012
PrairieWinds ND1 (Minot), ND (2010)	1.48	Midwest	Derby et al. 2011d
PrairieWinds ND1 (Minot), ND (2011)	1.56	Midwest	Derby et al. 2012d
PrairieWinds SD1, SD (2011-2012)	1.41	Midwest	Derby et al. 2012c
PrairieWinds SD1, SD (2012-2013)	2.01	Midwest	Derby et al. 2013a
PrairieWinds SD1, SD (2013-2014)	1.66	Midwest	Derby et al. 2014
Rail Splitter, IL (2012-2013)	0.84	Midwest	Good et al. 2013b
Record Hill, ME (2012)	3.7	Northeastern	Stantec 2013b
Record Hill, ME (2014)	1.84	Northeastern	Stantec 2015
Red Hills, OK (2012-2013)	0.08	Southern Plains	Derby et al. 2013c
Ripley, Ont (2008)	3.09	Midwest	Jacques Whitford 2009
Rollins, ME (2012)	2.9	Northeastern	Stantec 2013c
Rugby, ND (2010-2011)	3.82	Midwest	Derby et al. 2011c
Shiloh I, CA (2006-2009)	6.96	California	Kerlinger et al. 2009
Shiloh II, CA (2009-2010)	1.9	California	Kerlinger et al. 2010, 2013a
Shiloh II, CA (2010-2011)	2.8	California	Kerlinger et al. 2013a
Shiloh II, CA (2011-2012)	2.8	California	Kerlinger et al. 2013a
Shiloh III, CA (2012-2013)	3.3	California	Kerlinger et al. 2013b
Solano III, CA (2012-2013)	1.6	California	AECOM 2013
Stateline, OR/WA (2001-2002)	3.17	Pacific Northwest	Erickson et al. 2004
Stateline, OR/WA (2003)	2.68	Pacific Northwest	Erickson et al. 2004
Stateline, OR/WA (2006)	1.23	Pacific Northwest	Erickson et al. 2007
Stetson Mountain I, ME (2009)	2.68	Northeastern	Stantec 2009c

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Reference
Stetson Mountain I, ME (2011)	1.18	Northeastern	Normandeau Associates 2011
Stetson Mountain I, ME (2013)	6.95	Northeastern	Stantec 2014
Stetson Mountain II, ME (2010)	1.42	Northeastern	Normandeau Associates 2010
Stetson Mountain II, ME (2012)	3.37	Northeastern	Stantec 2013d
Summerview, Alb (2005-2006)	1.06	Rocky Mountains	Brown and Hamilton 2006
Top Crop I & II (2012-2013)	1.35	Midwest	Good et al. 2013c
Top of Iowa, IA (2003)	0.42	Midwest	Jain 2005
Top of Iowa, IA (2004)	0.81	Midwest	Jain 2005
Tuolumne (Windy Point I), WA (2009-2010)	3.2	Pacific Northwest	Enz and Bay 2010
Vansycle, OR (1999)	0.95	Pacific Northwest	Erickson et al. 2000
Vantage, WA (2010-2011)	1.27	Pacific Northwest	Ventus 2012
Wessington Springs, SD (2009)	8.25	Midwest	Derby et al. 2010c
Wessington Springs, SD (2010)	0.89	Midwest	Derby et al. 2011a
White Creek, WA (2007-2011)	4.05	Pacific Northwest	Downes and Gritski 2012b
Wild Horse, WA (2007)	1.55	Pacific Northwest	Erickson et al. 2008
Windy Flats, WA (2010-2011)	8.45	Pacific Northwest	Enz et al. 2011
Winnebago, IA (2009-2010)	3.88	Midwest	Derby et al. 2010g

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Fatality Reference
Alite, CA (2009-2010)	0.24	California	Chatfield et al. 2010
Alta I, CA (2011-2012)	1.28	California	Chatfield et al. 2012
Alta I-V, CA (2013-2014)	0.2	California	Chatfield et al. 2014
Alta II-V, CA (2011-2012)	0.08	California	Chatfield et al. 2012
Alta VIII, CA (2012-2013)	0	California	Chatfield and Bay 2014
Barton I & II, IA (2010-2011)	1.85	Midwest	Derby et al. 2011b
Barton Chapel, TX (2009-2010)	3.06	Southern Plains	WEST 2011
Beech Ridge, WV (2012)	2.03	Northeastern	Tidhar et al. 2013a
Beech Ridge, WV (2013)	0.58	Northeastern	Young et al. 2014a
Big Blue, MN (2013)	2.04	Midwest	Fagen Engineering 2014
Big Blue, MN (2014)	1.43	Midwest	Fagen Engineering 2015
Big Horn, WA (2006-2007)	1.9	Pacific Northwest	Kronner et al. 2008
Big Smile, OK (2012-2013)	2.9	Southern Plains	Derby et al. 2013b
Biglow Canyon, OR (Phase I; 2008)	1.99	Pacific Northwest	Jeffrey et al. 2009b
Biglow Canyon, OR (Phase I; 2009)	0.58	Pacific Northwest	Enk et al. 2010
Biglow Canyon, OR (Phase II; 2009-2010)	2.71	Pacific Northwest	Enk et al. 2011b
Biglow Canyon, OR (Phase II; 2010-2011)	0.57	Pacific Northwest	Enk et al. 2012b
Biglow Canyon, OR (Phase III; 2010-2011)	0.22	Pacific Northwest	Enk et al. 2012a
Blue Sky Green Field, WI (2008; 2009)	24.57	Midwest	Gruver et al. 2009
Buffalo Gap I, TX (2006)	0.1	Southern Plains	Tierney 2007
Buffalo Gap II, TX (2007-2008)	0.14	Southern Plains	Tierney 2009
Buffalo Mountain, TN (2000-2003)	31.54	Southeastern	Nicholson et al. 2005
Buffalo Mountain, TN (2005)	39.7	Southeastern	Fiedler et al. 2007
Buffalo Ridge, MN (Phase I; 1999)	0.74	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase II; 1998)	2.16	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase II; 1999)	2.59	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase II; 2001/Lake Benton I)	4.35	Midwest	Johnson et al. 2004
Buffalo Ridge, MN (Phase II; 2002/Lake Benton I)	1.64	Midwest	Johnson et al. 2004
Buffalo Ridge, MN (Phase III; 1999)	2.72	Midwest	Johnson et al. 2000
Buffalo Ridge, MN (Phase III; 2001/Lake Benton II)	3.71	Midwest	Johnson et al. 2004
Buffalo Ridge, MN (Phase III; 2002/Lake Benton II)	1.81	Midwest	Johnson et al. 2004
Buffalo Ridge I, SD (2009-2010)	0.16	Midwest	Derby et al. 2010d
Buffalo Ridge II, SD (2011-2012)	2.81	Midwest	Derby et al. 2012a
Casselman, PA (2008)	12.61	Northeastern	Arnett et al. 2009b
Casselman, PA (2009)	8.6	Northeastern	Arnett et al. 2010
Casselman Curtailment, PA (2008)	4.4	Northeastern	Arnett et al. 2009a
Cedar Ridge, WI (2009)	30.61	Midwest	BHE Environmental 2010
Cedar Ridge, WI (2010)	24.12	Midwest	BHE Environmental 2011
Cohocton/Dutch Hill, NY (2009)	8.62	Northeastern	Stantec 2010
Cohocton/Dutch Hills, NY (2010)	10.32	Northeastern	Stantec 2011a
Combine Hills, OR (Phase I; 2004-2005)	1.88	Pacific Northwest	Young et al. 2006
Combine Hills, OR (2011)	0.73	Pacific Northwest	Enz et al. 2012

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Fatality Reference
Crescent Ridge, IL (2005-2006)	3.27	Midwest	Kerlinger et al. 2007
Criterion, MD (2011)	15.61	Northeastern	Young et al. 2012b
Criterion, MD (2012)	7.62	Northeastern	Young et al. 2013
Criterion, MD (2013)	5.32	Northeastern	Young et al. 2014b
Crystal Lake II, IA (2009)	7.42	Midwest	Derby et al. 2010b
Diablo Winds, CA (2005-2007)	0.82	California	WEST 2006, 2008
Dillon, CA (2008-2009)	2.17	California	Chatfield et al. 2009
Dry Lake I, AZ (2009-2010)	3.43	Southwestern	Thompson et al. 2011
Dry Lake II, AZ (2011-2012)	1.66	Southwestern	Thompson and Bay 2012
Elkhorn, OR (2008)	1.26	Pacific Northwest	Jeffrey et a. 2009a
Elkhorn, OR (2010)	2.14	Pacific Northwest	Enk et al. 2011a
Elm Creek, MN (2009-2010)	1.49	Midwest	Derby et al. 2010e
Elm Creek II, MN (2011-2012)	2.81	Midwest	Derby et al. 2012b
Foote Creek Rim, WY (Phase I; 1999)	3.97	Rocky Mountains	Young et al. 2003
Foote Creek Rim, WY (Phase I; 2000)	1.05	Rocky Mountains	Young et al. 2003
Foote Creek Rim, WY (Phase I; 2001-2002)	1.57	Rocky Mountains	Young et al. 2003
Forward Energy Center, WI (2008-2010)	18.17	Midwest	Grodsky and Drake 2011
Fowler I, IN (2009)	8.09	Midwest	Johnson et al. 2010a
Fowler I, II, III, IN (2010)	18.96	Midwest	Johnson et al. 2010b
Fowler I, II, III, IN (2011)	20.19	Midwest	Good et al. 2011
Fowler I, II, III, IN (2012)	2.96	Midwest	Good et al. 2012
Fowler III, IN (2009)	1.84	Midwest	Good et al. 2013a
Goodnoe, WA (2009-2010)	0.34	Pacific Northwest	URS Corporation 2010a
Grand Ridge I, IL (2009-2010)	2.1	Midwest	Derby et al. 2010a
Harrow, Ont (2010)	11.13	Midwest	Natural Resources Solutions Inc. (NRSI) 2011
Harvest Wind, WA (2010-2012)	1.27	Pacific Northwest	Downes and Gritski 2012a
Hay Canyon, OR (2009-2010)	0.53	Pacific Northwest	Gritski and Kronner 2010a
Heritage Garden I, MI (2012-2014)	5.9	Midwest	Kerlinger et al. 2014
High Sheldon, NY (2010)	2.33	Northeastern	Tidhar et al. 2012a
High Sheldon, NY (2011)	1.78	Northeastern	Tidhar et al. 2012b
High Winds, CA (2003-2004)	2.51	California	Kerlinger et al. 2006
High Winds, CA (2004-2005)	1.52	California	Kerlinger et al. 2006
Hopkins Ridge, WA (2006)	0.63	Pacific Northwest	Young et al. 2007
Hopkins Ridge, WA (2008)	1.39	Pacific Northwest	Young et al. 2009b
Judith Gap, MT (2006-2007)	8.93	Rocky Mountains	TRC 2008
Judith Gap, MT (2009)	3.2	Rocky Mountains	Poulton and Erickson 2010
Kewaunee County, WI (1999-2001)	6.45	Midwest	Howe et al. 2002
Kibby, ME (2011)	0.12	Northeastern	Stantec 2012a
Kittitas Valley, WA (2011-2012)	0.12	Pacific Northwest	Stantec Consulting Services 2012
Klondike, OR (2002-2003)	0.77	Pacific Northwest	Johnson et al. 2003
Klondike II, OR (2005-2006)	0.41	Pacific Northwest	NWC and WEST 2007
Klondike III (Phase I), OR (2007-2009)	1.11	Pacific Northwest	Gritski et al. 2010

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Fatality Reference
Klondike IIIa (Phase II), OR (2008-2010)	0.14	Pacific Northwest	Gritski et al. 2011
Leaning Juniper, OR (2006-2008)	1.98	Pacific Northwest	Gritski et al. 2008
Lempster, NH (2009)	3.11	Northeastern	Tidhar et al. 2010
Lempster, NH (2010)	3.57	Northeastern	Tidhar et al. 2011
Linden Ranch, WA (2010-2011)	1.68	Pacific Northwest	Enz and Bay 2011
Locust Ridge, PA (Phase II; 2009)	14.11	Northeastern	Arnett et al. 2011
Locust Ridge, PA (Phase II; 2010)	14.38	Northeastern	Arnett et al. 2011
Maple Ridge, NY (2006)	11.21	Northeastern	Jain et al. 2007
Maple Ridge, NY (2007)	6.49	Northeastern	Jain et al. 2009a
Maple Ridge, NY (2007-2008)	4.96	Northeastern	Jain et al. 2009b
Maple Ridge, NY (2012)	7.3	Northeastern	Tidhar et al. 2013b
Marengo I, WA (2009-2010)	0.17	Pacific Northwest	URS Corporation 2010b
Marengo II, WA (2009-2010)	0.27	Pacific Northwest	URS Corporation 2010c
Mars Hill, ME (2007)	2.91	Northeastern	Stantec 2008
Mars Hill, ME (2008)	0.45	Northeastern	Stantec 2009a
Milford I, UT (2010-2011)	2.05	Rocky Mountains	Stantec 2011b
Milford I & II, UT (2011-2012)	1.67	Rocky Mountains	Stantec 2012b
Montezuma I, CA (2011)	1.9	California	ICF International 2012
Montezuma I, CA (2012)	0.84	California	ICF International 2013
Montezuma II, CA (2012-2013)	0.91	California	Harvey & Associates 2013
Moraine II, MN (2009)	2.42	Midwest	Derby et al. 2010f
Mount Storm, WV (Fall 2008)	6.62	Northeastern	Young et al. 2009c
Mount Storm, WV (2009)	17.53	Northeastern	Young et al. 2009a, 2010b
Mount Storm, WV (2010)	15.18	Northeastern	Young et al. 2010a, 2011b
Mount Storm, WV (2011)	7.43	Northeastern	Young et al. 2011a, 2012a
Mountaineer, WV (2003)	31.69	Northeastern	Kerns and Kerlinger 2004
Munnsville, NY (2008)	1.93	Northeastern	Stantec 2009b
Mustang Hills, CA (2012-2013)	0.1	California	Chatfield and Bay 2014
Nine Canyon, WA (2002-2003)	2.47	Pacific Northwest	Erickson et al. 2003
Noble Altona, NY (2010)	4.34	Northeastern	Jain et al. 2011a
Noble Bliss, NY (2008)	7.8	Northeastern	Jain et al.2009c
Noble Bliss, NY (2009)	3.85	Northeastern	Jain et al. 2010c
Noble Chateaugay, NY (2010)	2.44	Northeastern	Jain et al. 2011b
Noble Clinton, NY (2008)	3.14	Northeastern	Jain et al. 2009d
Noble Clinton, NY (2009)	4.5	Northeastern	Jain et al. 2010a
Noble Ellenburg, NY (2008)	3.46	Northeastern	Jain et al. 2009e
Noble Ellenburg, NY (2009)	3.91	Northeastern	Jain et al. 2010b
Noble Wethersfield, NY (2010)	16.3	Northeastern	Jain et al. 2011c
NPPD Ainsworth, NE (2006)	1.16	Midwest	Derby et al. 2007
Palouse Wind, WA (2012-2013)	4.23	Pacific Northwest	Stantec 2013a
Pebble Springs, OR (2009-2010)	1.55	Pacific Northwest	Gritski and Kronner 2010b
Pinnacle, WV (2012)	40.2	Northeastern	Hein et al. 2013
Pinyon Pines I & II, CA (2013-2014)	0.04	California	Chatfield and Russo 2014
Pioneer Prairie II, IA (2011-2012)	4.43	Midwest	Chodachek et al. 2012
Pioneer Prairie II, IA (2013)	3.83	Midwest	Chodachek et al. 2014
PrairieWinds ND1 (Minot), ND (2010)	2.13	Midwest	Derby et al. 2011d
PrairieWinds ND1 (Minot), ND (2011)	1.39	Midwest	Derby et al. 2012d
PrairieWinds SD1, SD (2011-2012)	1.23	Midwest	Derby et al. 2012c

Appendix A1. Wind energy facilities in North America with fatality data for all bird species. Fatality estimate presented as number of bird fatalities per megawatt (MW) per year.

Project Name	Fatality/ MW/Year	Geographic Region	Fatality Reference
PrairieWinds SD1, SD (2012-2013)	1.05	Midwest	Derby et al. 2013a
PrairieWinds SD1, SD (2013-2014)	0.52	Midwest	Derby et al. 2014
Rail Splitter, IL (2012-2013)	11.21	Midwest	Good et al. 2013b
Record Hill, ME (2012)	2.96	Northeastern	Stantec 2013b
Record Hill, ME (2014)	0.55	Northeastern	Stantec 2015
Red Hills, OK (2012-2013)	0.11	Southern Plains	Derby et al. 2013c
Ripley, Ont (2008)	4.67	Midwest	Jacques Whitford 2009
Rollins, ME (2012)	0.18	Northeastern	Stantec 2013c
Rugby, ND (2010-2011)	1.6	Midwest	Derby et al. 2011c
Shiloh I, CA (2006-2009)	3.92	California	Kerlinger et al. 2009
Shiloh II, CA (2009-2010)	2.6	California	Kerlinger et al. 2010, 2013a
Shiloh II, CA (2010-2011)	3.8	California	Kerlinger et al. 2013a
Shiloh II, CA (2011-2012)	3.4	California	Kerlinger et al. 2013a
Shiloh III, CA (2012-2013)	0.4	California	Kerlinger et al. 2013b
Solano III, CA (2012-2013)	0.31	California	AECOM 2013
Stateline, OR/WA (2001-2002)	1.09	Pacific Northwest	Erickson et al. 2004
Stateline, OR/WA (2003)	2.29	Pacific Northwest	Erickson et al. 2004
Stateline, OR/WA (2006)	0.95	Pacific Northwest	Erickson et al. 2007
Stetson Mountain I, ME (2009)	1.4	Northeastern	Stantec 2009c
Stetson Mountain I, ME (2011)	0.28	Northeastern	Normandeau Associates 2011
Stetson Mountain I, ME (2013)	0.18	Northeastern	Stantec 2014
Stetson Mountain II, ME (2010)	1.65	Northeastern	Normandeau Associates 2010
Stetson Mountain II, ME (2012)	2.27	Northeastern	Stantec 2013d
Summerview, Alb (2005-2006)	10.27	Rocky Mountains	Brown and Hamilton 2006
Summerview, Alb (2006; 2007)	11.42	Rocky Mountains	Baerwald 2008
Top Crop I & II, IL (2012-2013)	12.55	Midwest	Good et al. 2013c
Top of Iowa, IA (2003)	7.16	Midwest	Jain 2005
Top of Iowa, IA (2004)	10.27	Midwest	Jain 2005
Tuolumne (Windy Point I), WA (2009-2010)	0.94	Pacific Northwest	Enz and Bay 2010
Vansycle, OR (1999)	1.12	Pacific Northwest	Erickson et al. 2000
Vantage, WA (2010-2011)	0.4	Pacific Northwest	Ventus Environmental Solutions 2012
Wessington Springs, SD (2009)	1.48	Midwest	Derby et al. 2010c
Wessington Springs, SD (2010)	0.41	Midwest	Derby et al. 2011a
White Creek, WA (2007-2011)	2.04	Pacific Northwest	Downes and Gritski 2012b
Wild Horse, WA (2007)	0.39	Pacific Northwest	Erickson et al. 2008
Windy Flats, WA (2010-2011)	0.41	Pacific Northwest	Enz et al. 2011
Winnebago, IA (2009-2010)	4.54	Midwest	Derby et al. 2010g
Wolfe Island, Ont (July-December 2009)	6.42	Northeastern	Stantec Ltd. 2010
Wolfe Island, Ont (July-December 2010)	9.5	Northeastern	Stantec Ltd. 2011
Wolfe Island, Ont (July-December 2011)	2.49	Northeastern	Stantec Ltd. 2012

Appendix B Goodnoe Bird and Bat Conservation Strategy

Confidential Business Information

Goodnoe Hills Wind Project
Bird and Bat Conservation Strategy

Pacific Power

Version 1.0

September 1, 2015

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1.0 INTRODUCTION

PacifiCorp (dba Pacific Power) applies the principles in its RESPECT policy to guide the company's corporate commitment to the environment (Appendix A). That commitment is reflected in this Bird and Bat Conservation plan ("BBCS") for Goodnoe Hills Wind Project (the "Project" or "Site") located in Klickitat County, Washington. The primary purpose of the BBCS is to identify and describe conservation measures and actions that will be implemented in order to avoid and minimize current and future impacts to migratory birds at the Project. The measures described in this BBCS are consistent with U.S. Fish and Wildlife Service (USFWS) policies and guidelines: the Land-Based Wind Energy Guidelines (USFWS 2012d), and the USFWS Eagle Conservation Plan Guidance (USFWS 2013). In accordance with those policies and guidelines, this BBCS includes bird and bat-use surveys, risk monitoring, impact assessments, an adaptive management process, post-construction monitoring, and/or conservation measures to avoid and minimize risk to bats and/or birds including eagles.

1.1 Purpose of the BBCS

Wind energy is one of the fastest growing sources of renewable energy in the United States, and is generally viewed as an environmentally friendly alternative to nuclear and fossil fuel power plants (American Wind Energy Association [AWEA] 2008, National Research Council [NRC] 2007). Development of wind energy is strongly endorsed by the Secretary of the Interior (USFWS 2003). Energy from wind-powered generation resources serves an important role in meeting PacifiCorp's loads, including Washington consumers. In addition, wind energy enables PacifiCorp to meet renewable portfolio standards, and applicable federal Green House Gas goals and objectives. However, wind energy projects have the potential to impact bird populations through habitat loss and fragmentation, displacement, and mortality due to collision with turbine blades (National Wind Coordinating Collaborative [NWCC] 2010). PacifiCorp continues to develop and refine this BBCS for the Project to avoid and minimize impacts to birds as warranted

This BBCS documents PacifiCorp's voluntary measures to avoid and minimize impacts to birds during Site selection, Project design and construction, and outlines post-construction monitoring efforts and adaptive management strategies. This BBCS describes the following:

- regulatory background for avian protection;
- Project and consultation history;
- Project description and environmental context;
- pre-construction baseline avian studies and associated risk assessments to identify if/when additional conservation measures or mitigation may be warranted under the adaptive management process for avian and bat species;
- actions taken to avoid and minimize impacts during, operation, maintenance, and decommissioning of the Project;
- Tier 4 assessments and actions -
    - post-construction carcass monitoring procedures to assess risk and impacts to avian and bat species;
    - comparison of post-construction avian carcass discovery at the Project relative to pre-construction risk assessments and national and regional mortality rates;
    - commitments to undertake avoidance, minimization, and mitigation actions;

1.2 BBCS Term

This BBCS is in effect and will continue through the operation, maintenance, and decommissioning of the Project. This term will cover the remaining functional life of turbines, as well as potential extended operations and/or decommissioning of the Project. PacifiCorp has and will continue to update this BBCS through adaptive management (*see* Section 6.0). Should operation continue beyond the initially expected life of the Project, this BBCS will be reviewed, updated, and remain in effect until Project decommission.

1.3 Regulatory Framework

This section describes the regulations and guidelines relevant to this BBCS.

1.3.1 Endangered Species Act

The Endangered Species Act (ESA) of 1973 provides a program for the preservation of endangered and threatened species and the protection of the habitats upon which those species depend for their survival. Section 9 of the ESA prohibits the "take" of any endangered or threatened species of fish or wildlife listed under the ESA. Under the ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened, or to attempt to engage in any such conduct. Under Section 10 of the ESA, the USFWS may authorize, under certain terms and conditions, taking otherwise prohibited by Section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, an otherwise lawful activity. Section 10 take authorization is known as an Incidental Take Permit (ITP). To qualify for an ITP, a non-federal landowner or land manager must develop, fund, and implement a USFWS-approved Habitat Conservation Plan (HCP). No ESA-listed species or critical habitat occurs in the vicinity of the project; therefore, PacifiCorp is not pursuing an ESA Section 10 permit.

1.3.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. Through this BBCS, PacifiCorp is voluntarily committing to measures to avoid, minimize, and mitigate impacts on species protected under the MBTA.

1.3.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668d) prohibits the take of bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), unless authorized by federal regulation. The BGEPA defines “take” of an eagle to include a broad range of actions, including to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The term “disturb” in regulations found at 50 CFR § 22.3 means “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

1.3.4 Land Based Wind Energy Guidelines

In February 2011 the USFWS issued "Draft Land-Based Wind Energy Guidelines: Recommendations on Measures to Avoid, Minimize, and Compensate for Effects to Fish, Wildlife, and Their Habitats" (2011 Guidelines) (USFWS 2011b). And after five years of review and in response to over 30,000 comments on the draft guidelines, USFWS issued the final Land-Based Wind Energy Guidelines (2012 Guidelines) on March 26, 2012 (USFWS 2012d).[3]

The 2012 Guidelines revise and replace interim guidelines that the USFWS published in 2003. The 2012 Guidelines are intended to help shape the smart siting, design and operation of the nation's rapidly expanding wind energy operations. Specifically, the 2012 Guidelines set out a voluntary and collaborative approach to implement a structured, scientific process for addressing wildlife conservation concerns at all stages of land-based wind energy development. One of the core objectives of the 2012 Guidelines is to aid wind developers to implement a strategy to avoid, minimize, and mitigate for potential adverse effects on species of concern and their habitats.

The 2012 Guidelines set out a "tiered approach" to assess the "potential adverse effects to species of concern and their habitats." For projects operating at the time the 2012 Guidelines were issued, developers or operators "should confer with the [USFWS] regarding the appropriate period of carcass monitoring consistent with Tier 4, communicate and share information with the [USFWS] on monitoring results, and consider Tier 5 studies and mitigation options where appropriate."

Under Tier 4, developers and operators are advised to:

- discuss extent and design of post-construction studies with the USFWS;
- conduct post-construction studies to assess fatalities and habitat-related impacts;
- communicate results of all studies to USFWS field office in a timely manner;
- if necessary, discuss potential mitigation strategies with USFWS; and
- maintain appropriate records of data collected from studies.

To avoid, minimize, and mitigate impacts to species of concern under the MBTA and BGEPA, PacifiCorp is implementing measures (*see* Sections 1.12 and 4.7) in this BBCS that have previously been accepted by the USFWS in BBCSs for other wind projects. In addition to measures recommended under the 2012 Guidelines, this BBCS also incorporates measures based on the 2003 Guidelines, the 2004 Instructions, the 2011 Guidelines, and the 2013 ECPG. The specific measures adopted from these documents to avoid and minimize impacts to protected birds are presented in this BBCS and discussed in greater detail in Section 1.12; 4.7; and an adaptive management program is discussed in Section 6.0.

1.3.5 Washington State Environmental Policy Act

The Washington State Environmental Policy Act (SEPA; Revised Code of Washington 43.21C et. seq.), enacted in 1971, provides a means to identify and assess the possible environmental impacts that may occur from state and local government decisions. For all projects except those deemed "categorically

exempt" by the lead agency, the project proponent will fill out an "environmental checklist", which provides the lead agency with information regarding the proposal and its potential environmental impacts. A determination of non-significance (DNS) is issued if the lead agency determines the project unlikely to have a significant adverse impact. An Environmental Impact Statement (EIS) is required when a proposal is likely to have a significant adverse impact. A public comment period is incorporated into the SEPA process.

1.4 Project History

The Project was constructed on primarily agricultural lands near Goldendale, Washington. The Project was acquired from Northwest Wind Partners, LLC (developer) in 2007. The Project was previously known as the Hoctor Ridge, Imrie North, and/or Goodnoe East Wind Project.

The permitting process for a potential wind energy facility in the Project vicinity began in 1995 (Table 1). Pre-construction wildlife surveys began in 1993 and continued sporadically to 2006 for various wind energy projects in the area. A Conditional Use Permit (CUP) and Energy Overlay Zone (EOZ) permit for construction and operation of the Project were acquired from the Klickitat County Board of Commissioners in 2004 and 2006, respectively. Construction of the Project began in 2007 and was completed in May 2008 (Erickson et al. 2003a, Johnson and Erickson 2006).

All Project turbines were commissioned by June, 2008, and the Project is currently in operation.

Table 1. Summary of conditional use permit application process for the Goodnoe Hills Project, Klickitat County, Washington.

Date	What	Parties	Regarding	general topics
7/13/1995	Conditional Use Permit (CUP) Application	Kenetech to Klickitat County Board of Adjustment	Columbia Hills CUP	
6/6/2003	letter	from Windtricity to Klickitat Planning Department	SEPA & CUP submittal	Includes the environmental checklist used by Government agencies to determine whether an EIS is needed.
6/19/2003	memorandum	from Klickitat Planning Department to various county and state agencies and other interested parties	SEPA Threshold Determination and CUP Application	Mitigated Determination of Non-significance (MDNS) and Conditional Use Applications for Project; Notification of 15-day Comment Period ending 7/3/2003.
7/3/2003	court document	Confederated Tribe and Bands of the Yakama Nation	appeal of the MDNS	Appeal of the threshold determination issued by the SEPA responsible official (Klickitat County Planning Director).
7/3/2003	letter	from Windtricity to Klickitat Planning Department	SEPA & Washington Department of Fish & Wildlife	Discusses meeting below; includes revised mitigation plan based on WDFW comments.
7/3/2003	meeting	Windtricity, WDFW	review comments on the SEPA/CUP submittal	Addressed WDFW comments on mitigation plan; Windtricity voluntarily complied with requests; WDFW satisfied with revised approach.
12/9/2003	public hearing	Klickitat County board of commissioners	deliberation and decision regarding the request for CUP	Conditional CUP approved.
1/20/2004	public hearing	Klickitat County board of commissioners	continuation of 12/9/2003 public hearing	
1/20/2004	public hearing	Klickitat County board of commissioners	Confederated Tribe and Bands of the Yakama Nation	7/3/2003 SEPA Appeal denied; Conditional CUP approved.
2/12/2004	Findings of Fact and Conclusion	Klickitat County board of commissioners		Notice of land use decision issued and signed by the board of commissioners.
3/8/2004		Confederated Tribe and Bands of the Yakama Nation		Appealed notice of land use decision under the Land Use Petition Act.

Table 1. Summary of conditional use permit application process for the Goodnoe Hills Project, Klickitat County, Washington.

Date	What	Parties	Regarding	general topics
9/14/2004	court hearing	Confederated Tribe and Bands of the Yakama Nation	Confederated Tribe and Bands of the Yakama Nation vs. Klickitat County and Windtricity	MDNS procedure was adequate and no EIS should be required; there was sufficient evidence to justify the board's decision to grant the CUP.
10/14/2004	Order issued	Superior Court		Affirmed board of commissioners decisions.
11/15/2004	appeal filed	Confederated Tribe and Bands of the Yakama Nation	appeal of the 10/14/2004 order	
2/8/2005	Settlement Agreement	Confederated Tribe and Bands of the Yakama Nation	settlement	Appeal settled - final signature. 2/5/2005 - the Nation agreed to withdraw its appeal.
2/25/2005	court document	Confederated Tribe and Bands of the Yakama Nation	motion for voluntary withdraw appeal	Received by court.
1/12/2006	letter	Windtricity	requested extension of CUP	
1/18/2006		Klickitat County Planning Department	CUP extension request granted	Permit extended to 2/5/2007.

1.5 Consultation History

The Project developers collaborated with the Washington Department of Fish and Wildlife (WDFW) on Project-specific mitigation plans that included a conservation easement near the Project to compensate for habitat loss. As part of the agreement the developer agreed to protect eighty acres of land from cattle grazing and development along Rock Creek east of the Project area. PacifiCorp maintains fencing around the parcel to prohibit cattle grazing and unauthorized access to the conservation area.

Additionally, as a part of CUP and EOZ conditions, PacifiCorp was required to consult with a Technical Advisory Committee (TAC), whose membership included the WDFW, USFWS, Klickitat County, local landowners, the Yakama Nation, and various state, federal, and private wildlife professionals. Permit conditions required PacifiCorp to consult with the TAC for a minimum of one year of post-construction avian and bat carcass monitoring. Post-construction studies were implemented to quantify annual carcass rates for avian and bat species from wind energy. PacifiCorp consulted with the TAC in compliance with the CUP and EOZ permit conditions until the TAC was disbanded in March, 2010, and avian and bat carcass monitoring ended (Table 1.5-1 2).

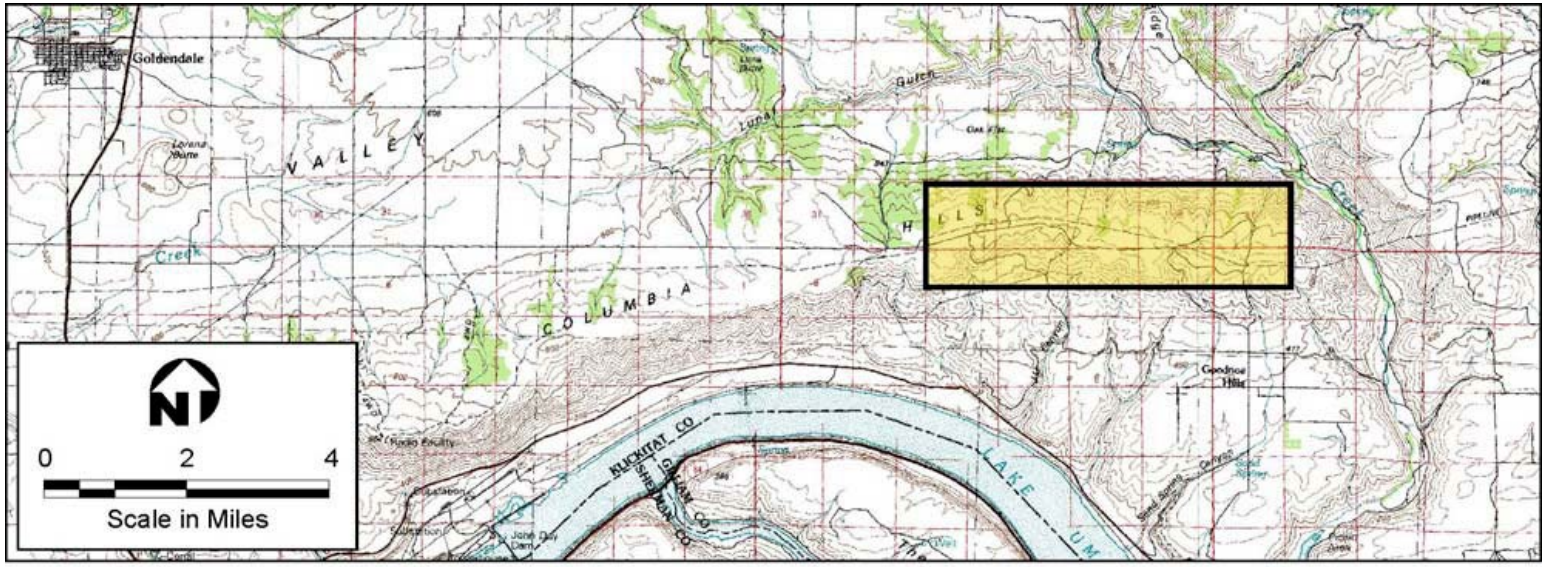
Table 1.5-12. Summary of TAC meeting correspondence regarding the Goodnoe Hills Project, Klickitat County, Washington.

Date	Event	Groups represented	Items Addressed
2/19/2009	meeting	PacifiCorp, URS, RePower USA; Imrie Ranch, Klickitat County, enXco, Yakama Nation	
5/26/2009	letter	from WDFW	Recommended TAC reconvene in light of golden eagle carcass discovery.
7/8/2009	meeting	PacifiCorp; URS; enXco; Central Klickitat Conservation District; REPower; USFWS OLE; USFWS; Klickitat County representatives	Determine a consensus recommendation to the regulatory authority that would be considered mitigation for this golden eagle carcass.
3/11/2010	TAC meeting	PacifiCorp, REPower, enXco, land owners, local professional falconer, Yakima nation, URS, WDFW, USFWS, Klickitat County representatives	Discuss the finalizing of the Year 1 monitoring report; WDFW requested that the discussion regarding the GOEA carcass, which had been put on hold until the full year's study was completed, be resumed. WDFW recommended PacifiCorp fund a study of the interaction of GOEA with turbines, but ultimately, it was decided that a separate discussion between PacifiCorp, WDFW, and the County be set up to discuss the specific mitigation for the GOEA carcass. Permits did not require further systematic monitoring, but at the TAC request, it was agreed that a summary of the ongoing incidental carcass discoveries recorded be included in the final report.

1.6 General Study Area

The Project site is located in Klickitat County, approximately 13 miles southeast of Goldendale, Washington (see Figure 1). The Project is located on privately held leased lands. The site encompasses approximately 1,800 acres of private land on primarily agriculture and upland areas. The Project consists of 47 wind turbines with a capacity of 94 MW. The turbines have a rotor diameter of approximately 300 feet and the wind turbines are situated on 262-foot tall steel tubular towers secured to concrete foundations.

The Project resides in agricultural fields (wheat and pasture), grassland, and lithosol (exposed shallow, rocky soils) areas. Local habitats consist of upland habitat, and no wetland or riparian habitats occur within the Project area; however, some native oak habitat is present on the north side of drainages. Additionally, cattle ranching activities occur seasonally on or near the Project.



SOURCE: USGS 1:100,000 scale topographic quadrangle, Goldendale, Washington-Oregon, 1980

Figure 1. Location of the Goodnoe Hills Wind Energy Facility, Klickitat County, Washington (URS Corporation 2009).

1.7 Communications and Collection System

Generated electricity moves through an underground collection system to the Project collector substation. Both power and communication cables were buried in trenches a minimum of 36 inches deep. By burying the collection system, this Project component is not involved in collision-related avian impacts. Habitat loss/fragmentation was minimized by clearing and disturbing the minimum amount possible to install the lines and by allowing disturbed areas to re-vegetate to similarly adjoining conditions following construction.

1.8 Substations and O&M Facility

The Imrie collector substation is owned by PacifiCorp and operated in accordance with prudent industry practices. The substation is similar to those used on transmission systems in the region. The Project Operations and Maintenance (O&M) facility, which contains all necessary plumbing and electrical connections needed for typical operation of offices and a maintenance shop, is located separately from the Project substation. Utilities such as electric service, water service, telephone service, as well as access to a septic system, are required at the site. To minimize attracting night-migrating birds, security lighting at the O&M facility is kept to the minimum required, the lights have motion sensors so they operate only when needed, and the lights are down-shielded to minimize light emission into the sky.

1.9 Transmission Line

With the exception of a short overhead section of transmission line connecting Imrie substation to the Bonneville Power Administration, there are no overhead electric lines included in the Project.

1.10 Post-Construction Grading, Erosion Control, and Project Clean-up

Once construction of the Project was completed, disturbed areas were graded to the approximate original contour, and areas disturbed during construction were stabilized and reclaimed using appropriate erosion control measures, including site-specific contouring, reseeding, or other measures outlined in the Conditional Use Permit conditions. The measures were implemented in compliance with the Project's Storm Water Pollution Prevention Plans (SWPPP). Areas that were disturbed around each turbine during construction were reverted to the original land use after construction.

1.11 Operations, Maintenance, Decommissioning, and Restoration

PacifiCorp will perform Project O&M for the life of the Project, which is anticipated to be a 30 years from the commission date. PacifiCorp and an O&M contractor will control, monitor, operate, and maintain the Project by means of the Supervisory Control and Data Acquisitions (SCADA) system, and regularly scheduled on-site inspections will be conducted.

Maintenance activities typically occur within areas previously disturbed by construction. Abnormal activities may include the need to disturb areas to facilitate crane access. Turbine maintenance is typically performed up-tower, and O&M personnel perform maintenance within the tower or nacelle and access the towers using pick-up trucks.

Each turbine has an associated maintenance pad for general access and crane activity. In general, no significant construction is required to utilize cranes and disturbance is kept to a minimum during maintenance activities. Disturbed areas are typically reclaimed once crane work is complete.

PacifiCorp will meet or exceed current APLIC standards in the event that any utility poles or power lines are built or retrofitted at the Site.

Large scale noxious weed management is performed by a licensed herbicide and pesticide applicator on all turbine pads, roads, substations, and O&M facility infrastructure during the spring and fall, or on an as needed basis.

At the end of the Project' economic life, PacifiCorp expects to explore alternatives for decommissioning the Project. If required, PacifiCorp would reapply for new or amended permits to retrofit the turbines and power system with upgrades based on new technology.

If the Project terminates operations in the future, PacifiCorp would obtain the necessary authorization from the appropriate regulatory agencies to decommission the facilities. Generally, wind energy projects that are decommissioned contain a high "scrap value" due to the materials and equipment contained in the infrastructure (steel infrastructure, electric generators, and copper).

In general, the decommissioning of the Project may result in burial of foundations below an allowed depth, and any unsalvageable material would be disposed of at authorized sites. The soil surface would be restored as close as reasonably possible to its original contour. The Project substations may remain in place post-decommissioning, if required to be utilized for other purposes. If the buried/overhead power lines could not be used by PacifiCorp for other utility purposes, all structures, conductors, and cables would be removed unless otherwise allowed to remain in place.

Demolition or removal of equipment and facilities will meet applicable environmental and health regulations. Additionally, PacifiCorp may salvage economically recoverable materials or recycle Project materials for future uses.

1.12 Conservation Measures

Throughout Project development, conservation measures were evaluated and adopted to aid in the protection of wildlife and avian species (i.e., eagles, other raptors, and migratory birds). These conservation measures have been incorporated into the infrastructure layout and design, construction/clean-up, operations, and decommissioning/restoration plans for the Project. PacifiCorp has consulted and coordinated with the WFGD and USFWS regarding proposed conservation measures. This section provides a summary of the conservation measures developed during each stage of Project development, followed by a comprehensive list of measures that may avoid/reduce impacts to avian species.

1.12.1 Site Selection and Project Design

During the site selection stage of the Project, pre-construction avian surveys were conducted and determined that raptor carcass rates for the Project was expected to be low given the relatively few turbines (47 turbines), and the low raptor carcass rates observed at other wind energy facilities. Raptor use at the Project appeared moderate relative to other locations studied in Klickitat County. Areas to the west of the Project appear to have higher raptor use, and areas to the east appear to have lower raptor use. Using the low and high range raptor carcass estimates used in a previous study, the developer's wildlife contractor predicted raptor carcass rates would range between 0.02 to 0.06 raptor carcasses per turbine per year based on the assumption of the operation of 40 to 55 wind turbines (Erickson et al. 2003a).

By utilizing existing roads, siting of project infrastructure within the project was considered to minimize habitat loss and fragmentation. Although the 2012 Guidelines were not available at the time the Project infrastructure was sited, the Project was generally consistent with these guidelines.

The Project incorporates state-of-the-art turbine technology, including unguyed, tubular towers and slow-rotating, upwind rotors.

1.12.2 Construction

To avoid potential harm to avian species nests and eggs, PacifiCorp limited all tree clearing activities to the minimum necessary for project construction. No trees containing active nests were cleared for construction purposes.

Roads, portions of roads, crane paths, and staging areas not required for operation and maintenance were restored to the original contour. Reclaimed areas were contoured, graded, and seeded as needed to promote successful re-vegetation, provide proper drainage, and prevent erosion. The re-vegetation plan was developed and approved by the Klickitat County Weed Control Board.

1.12.3 Operations and Maintenance

PacifiCorp performs regular maintenance on Project components. All normal maintenance activities for the Project occur within areas previously disturbed by construction. Heavy equipment utilized for road maintenance and snow plowing is inspected for fluid leaks and noxious weeds prior to work commencement. Large scale maintenance cranes utilize existing maintenance pads when possible, thus minimizing ground disturbance in the event a crane is utilized. Ground disturbing activities may include the occasional need to access underground cable or communications lines. The Project and its short transmission line are periodically inspected for hazards that may pose safety threats or potential damage to Project facilities. Any hazard trees will be trimmed or cut as needed. PacifiCorp will meet or exceed current APLIC recommendations in the event that any utility poles or power lines are built or retrofitted at the Site.

1.12.4 Decommissioning and Restoration

PacifiCorp developed a detailed Decommissioning Plan in March 2010 (PacifiCorp 2010). In the event that the Project is decommissioned, infrastructure will be removed, and the site will be graded and restored to as near its original condition as reasonably possible. Habitat that was removed as a result of the Project will be allowed to re-establish through natural succession, thereby restoring habitat over time for avian species.

1.12.5 List of Conservation Measures that Avoid/Minimize Impacts to Avian Species

The avoidance, minimization, and mitigation measures that are incorporated into Project design, construction, and operations are described below.

General

- The Project will seek to comply with all federal, state, and county environmental laws, orders, and regulations.
- On-site O&M contractors are provided annual training regarding wildlife handling and reporting requirements.

- PacifiCorp will continue to report the presence of bird carcasses at the Site in accordance with this BBCS to verify the effectiveness of the avoidance, minimization, and mitigation strategies incorporated in the Project operation and management. A detailed description of the adaptive management program is described in Section 6.0. PacifiCorp employees receive annual training in Wildlife Incident Reporting and Handling System (WIRHS) protocols to ensure they understand the procedures.

Siting and Surveys

As discussed above, Project siting was developed in coordination with WDFW and USFWS to avoid or minimize impacts to raptors. Specific measures taken include:

- Turbine locations were modified to ensure adherence to disturbance free buffers for raptor nests.
- An avian risk assessment and pre-construction surveys were conducted.
- Fragmentation of wildlife habitat has been and will continue to be minimized through the use, where practical, of lands already disturbed, such as utilizing existing roadways and locating the transmission line in close proximity to an existing highway.
- Turbines set back approximately 300 meters from any grade breaks, defined as an increase in slope to greater than 20%, of the ridge tops.

Surface Water, Soils, and Vegetation

- Appropriate storm water management practices that minimize attractions for birds were implemented. Stormwater Protection and Prevention Plans (SWPPPs) were prepared and implemented to ensure that erosion was minimized during storm events. Construction-caused deep ruts were leveled, filled and graded, or otherwise eliminated. Ruts, scars, and compacted soils were loosened and leveled. Damage to ditches, roads, and other features of the land were repaired. Water bars or small terraces were constructed along access road ditches on hillsides to minimize water erosion and to facilitate natural re-vegetation.
- Wind turbines and most ancillary facilities were built on uplands to avoid surface water features and designated floodplains.
- The Project complied with all federal regulations concerning the crossing of waters of the U.S. as listed in 33 CFR Part 323.
- Refueling and staging occurs at least 300 ft from the edge of a channel bank at all stream channels. Sediment control measures are utilized to minimize impacts to aquatic and riparian habitats.
- Roads, portions of roads, crane paths, and staging areas not required for operation and maintenance were restored to similar original contour. Reclaimed areas were contoured, graded, and seeded as needed to promote successful re-vegetation, provide for proper drainage, and prevent erosion.
- Equipment and vehicles are instructed to not cross riparian areas during operation or decommissioning activities.
- Existing roads and previously disturbed lands were used, where feasible, to reduce vegetation impacts within the Project area.
- Surface-disturbed areas were restored to the approximate original contour and reclaimed.
- Removal or disturbance of vegetation was minimized through site management.
- Shrub-steppe habitat was protected, with 2 acres of habitat protected for every 1 acre of permanent impact and 0.5 acre protected for every 1 acre of temporary impact to comply with

conditions set forth in the Klickitat County Planning Director's (Curt Dreyer) approval of the Project pursuant to the Energy Overlay Zone.

- Grassland/rangeland/Crop Reserve Program (CRP) land was protected on a 1 to 1 basis for permanent impacts and 0.1 acre protected for every 1 acre of temporary impact to comply with conditions set forth in the Klickitat County Planning Director's (Curt Dreyer) approval of the Project pursuant to the Energy Overlay Zone.
- Construction or routine maintenance activities are minimized or forbidden when soil is too wet to adequately support construction or operations equipment.
- Soil erosion control measures will be monitored, and will be repaired or replaced if needed.

Site Management

- To avoid attracting eagles and other raptors, the availability of carrion is reduced by removing carcasses discovered on-site during regular maintenance and monitoring activities. O&M personnel, or PacifiCorp contractors, will either pick up the carrion and dispose of it at an appropriate off-site facility or immediately call the WDFW to collect the wildlife carcass in an effort to remove potential avian attractants from turbines areas. Appropriate owners are called to remove livestock carcasses.
- The Project is located on private property. Hunting is not allowed near the project turbines. A benefit of this practice is safety and a reduction in attraction as gut piles and other carcass remnants are reduced.
- Hunting, fishing, or possession of firearms by PacifiCorp employees and designated contractor(s) on the project areas were and are prohibited during construction, operation, and maintenance.
- Project personnel are advised regarding speed limits on roads (25 mph) and to be alert to wildlife to minimize wildlife mortality due to vehicle collisions.
- Potential increases in poaching are reduced through employee and contractor education regarding wildlife laws. If violations are discovered, the offense will be reported to the WDFW and/or USFWS, depending upon the species.
- Typical travel is restricted to designated roads; and no off-road travel will be allowed except to perform operational activities and in emergencies.

Collision Risk

- Wind turbines are unguyed, tubular towers and have slow-rotating, upwind rotors.
- Collection and communication lines were buried thus minimizing and avoidind collision and electrocution risks to eagles and other avian species.
- Turbine lighting has been minimized to that which is required by the Federal Aviation Administration (FAA) and PacifiCorp is using red pulsating lights, consistent with the 2012 Guidelines. Kerlinger et al (2010) summarized several studies which showed that FAA lighting on wind turbines does not increase bird mortality (Kerlinger et al. 2010).
- In accordance with the 2012 Guidelines, each turbine also has a low voltage, shielded light (white incandescent) with a motion sensor at the entrance door.

Fencing

- Gates were installed on private roads to restrict public access to turbine locations. The substations were fenced as required for public safety. Existing public and private roads provide some public access to the Project; however, significant portions of the Project contain fencing used for cattle ranching activities and to restrict public access.

Hazardous and Solid Wastes

- All applicable hazardous material laws and regulations existing or hereafter enacted or promulgated regarding regulated chemicals were complied with, and a Spill Prevention, Control, and Countermeasure Plan (SPCC) was implemented. The only hazardous chemicals anticipated to be on-site are the chemicals contained in batteries, diesel fuel, gasoline, coolant (ethylene glycol), and lubricants in machinery. These hazardous chemicals are not stored in or near any stream, nor will any vehicle refueling or routine maintenance occur in or near streams. When work is conducted in and adjacent to streams, fuels and coolants will be contained in the fuel tanks and radiators of vehicles or other equipment.
- No burning or burying of waste materials will occur at the Project. Post construction waste materials were removed from the construction area.

Fire Protection

- A fire protection system was/is implemented during construction, using industrial best practices, and in accordance with all applicable fire safety codes.

- At all times during construction and operation, satisfactory spark arresters are required to be maintained on internal combustion engines and operations staff carries basic fire protection equipment during maintenance activities.

Weeds

- Certified weed-free straw mulches, certified weed-free hay bale barriers, silt fences, and water bars will be used, as needed, to control soil erosion.
- Herbicidal and mechanical measures are used to control noxious weeds in surface-disturbed areas.
- Equipment coming on-site is inspected for signs of noxious weeds.
- A re-vegetation plan was developed and approved by the Klickitat County Weed Control Board.
- All restored areas were monitored until vegetation was reasonable established.

Noise

- Effective exhaust mufflers will be installed and properly maintained on all construction equipment.
- PacifiCorp and its contractors adhere to a Project-wide speed limit of 25 mph or lower depending on the requirements of the specific equipment utilizing the roads. Nighttime construction work is minimized.

2.0 EXISTING ENVIRONMENT

2.1 Overview

The Project is located in an area known as the Goodnoe Hills Ridge Area. Typical topography consists of low rolling hills with areas of agricultural cultivation and livestock grazing. Soils consist of a Goldendale Silt loam with a basalt substratum, Lorena silt loam, and Walla Walla silt loam. Typical elevations range from approximately 2,500 feet to 2,800 feet above mean sea level. No surface bodies exist in the immediate vicinity of the Project, nor does the Project lie within a 100-year flood plain.

2.2 Avian Surveys near the Project

Avian surveys for a much larger project proposed by Kenetec Windpower, Inc. that included the current Project location were first conducted in late 1993 and 1994; these surveys are summarized in the February 1995 Draft EIS for the Washington Windplant #1 (Klickitat County and Bonneville Power Administration 1995).

Pre-construction avian studies were conducted that included fixed-point count surveys, raptor surveys, and raptor nest surveys. The number of birds, mean use, percent composition, and frequency of were calculated from the bird survey data to characterize the avian community and assess potential impacts. Important findings from several relevant studies of avian use near the Project are provided in the following bullets (Erickson et al. 2003a):

- Sixty-six unique avian species were observed over the course of all fixed point bird use surveys, with the mean number of species observed per survey being 6.7.
- A total of 569 individual bird observations within 324 separate groups were recorded during the fixed point bird use surveys in 2001 (Klickitat Programmatic Environmental Impact Statement).

- Species of birds most frequently observed during surveys were western meadowlark (*Sturnella neglecta*; 75% of surveys), red-winged blackbird (*Agelaius phoeniceus*; 41.7%), mourning dove (*Zenaida macroura*; 37.5%), and common raven (*Corvus corax*; 37.5%).

- The Columbia Hills raptor surveys in April 2000, documented 170 raptors of 10 species (both east and west of U.S. 97). No further information regarding species types and numbers by quadrant was available for this survey. The fall survey, conducted in October 2000, documented 70 raptors of 7 species, including red-tailed hawk (*Buteo jamaicensis*; 33), American kestrel (*Falco sparverius*; 3), golden eagle (7), northern harrier (*Circus cyaneus*; 4), rough-legged hawk (*Buteo lagopus*; 3), prairie falcon (*F. mexicanus*; 1), hawk/eagle sp. (5), Buteo sp. (5) and Accipiter sp. (1). An early winter raptor survey was conducted on December 12, 1998 and a late winter raptor survey was conducted on February 7, 1999. Red-tailed hawk, American kestrel, and northern harrier were consistently more prevalent in each of the four quadrants during both surveys.

- According to the Klickitat Programmatic Environmental Impact Statement (PEIS), four active red-tailed hawks nests and one Swainson's hawk (*Buteo swainsoni*) nest were found in the random survey blocks within two miles of the Project. One active prairie falcon nest was located just over two miles east of the Project. Eleven inactive nests, mostly within the Rock Creek drainage, were recorded as well. A portion of the Project area and a 2-mile buffer were included in the sample for the PEIS raptor nest surveys.

2.2.1 On-Site Pre-Construction Surveys

On April 8, 2006, a site visit was conducted to document land use and habitat changes since the 1995 DEIS (Jeffrey and Johnson 2006). Prior to the construction of the 17-turbine Goodnoe II infill project, standardized avian point count, raptor nest, and sensitive plant and wildlife surveys were conducted between April 8 and June 11, 2006 (Johnson et al. 2008). These additional surveys were conducted to characterize the avian community and assess potential impacts to sensitive plant and wildlife species. A

summary of these additional surveys is provided below and the final 2008 ecological baseline survey report is included in Appendix B.

Avian Point Count Surveys

Methods

Fixed point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). Four 800-m radius points were selected to survey representative habitats and topography of the study area (Figure 2). The four 800-m avian use plots provided coverage of 27.85% of the area within one km of turbines, which was in accordance with geographic coverage recommended in the 2013 ECPG. All species of birds observed during surveys were recorded; additionally large bird observations were mapped. Surveys were conducted approximately weekly during the spring migration (April 11-May 15, 2006) and early summer breeding season (May 16 – June 11, 2006; Table 3). Similar to a number of studies at other Wind Resource Areas (WRAs) throughout the US, point count duration was 20 minutes (e.g., Hoover and Morrison 2005, Smallwood et al. 2009, Strickland et al. 2011). Surveys were conducted during daylight hours and survey periods were varied to approximately cover all daylight hours during a season.

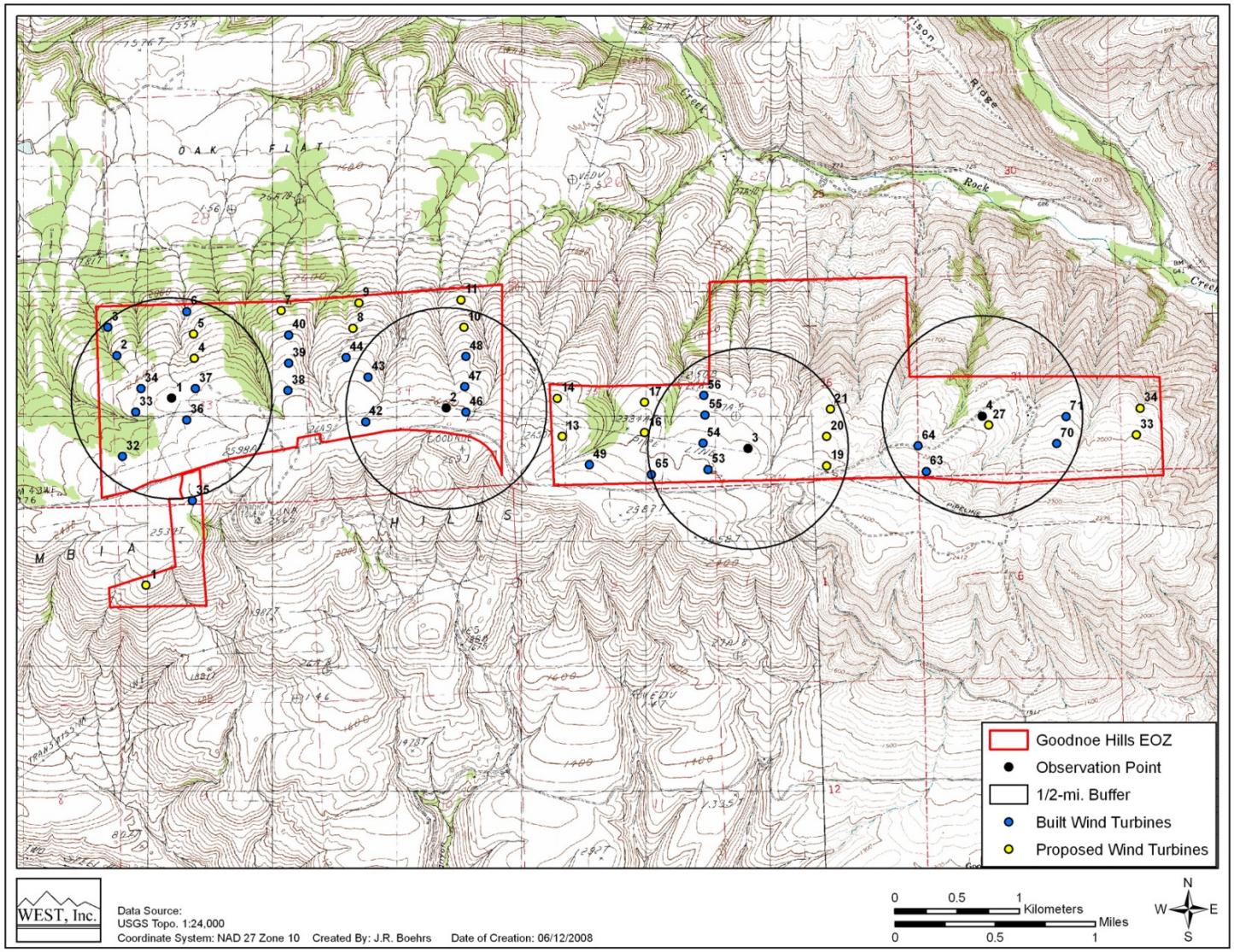


Figure 2. The 2006 fixed-point bird use survey points at the Goodnoe Hills Project, Klickitat County, Washington.

Table 3. Mean use (birds/800-m plot/20-min survey), mean number of species per 20-min survey, total number of species, and total number of fixed-point avian use surveys conducted by season and overall at the Goodnoe Hills Project, Klickitat County, Washington, from April 11 to June 11, 2006.

Season	# Visits	Mean Use	#Species/Survey	# Species	# Surveys
Spring	3	11.417	4.750	20	12
Summer	3	19.250	6.000	25	12
Overall	**6**	**15.333**	**5.375**	**31**	**24**

Results

Twenty-four 20-min point count surveys were conducted (Table 3). A total of 370 bird observations within 146 separate groups were recorded. Thirty-one unique species were observed; however, two species, western meadowlark and horned lark (*Eremophila alpestris*), composed approximately half all use in spring and summer (51.8 and 47.2%, respectively; Tables 4 and 5). Canada goose (*Branta canadensis*) also had relatively high use in summer (3.833 birds/survey), accounting for 19.9% of all summer use (Table 5).

Table 4. Small bird species observed within 800 m of observer and estimated mean use and percent frequency based on fixed-point avian use surveys conducted at the Goodnoe Hills Project, Klickitat County, Washington, from April 11 to June 11, 2006.

	Spring			Summer	
Species	use	%freq.	Species	use	%freq
western meadowlark	4.417	100.00	western meadowlark	6.000	91.67
horned lark	1.500	41.67	horned lark	3.083	75.00
vesper sparrow	0.917	50.00	European starling	1.000	33.33
American robin	0.750	16.67	vesper sparrow	0.833	33.33
European starling	0.417	25.00	grasshopper sparrow	0.333	25.00
Vaux's swift	0.333	8.33	western kingbird	0.333	25.00
western kingbird	0.167	8.33	Vaux's swift	0.333	16.67
mourning dove	0.167	8.33	Lewis's woodpecker	0.250	16.67
Lewis's woodpecker	0.167	16.67	black-headed grosbeak	0.167	16.67
chipping sparrow	0.083	8.33	Brewer's blackbird	0.167	16.67
violet-green swallow	0.083	8.33	lesser goldfinch	0.167	8.33
chukar	0.083	8.33	savannah sparrow	0.167	8.33
northern flicker	0.083	8.33	chukar	0.167	8.33
			northern flicker	0.167	16.67
			ash-throated flycatcher	0.083	8.33
			Bullock's oriole	0.083	8.33
			rock wren	0.083	8.33
			unidentified empidonax	0.083	8.33
			western wood-pewee	0.083	8.33

Table 5. Large bird species observed within 800 m of observer and estimated mean use and percent frequency based on fixed-point avian use surveys conducted at the Goodnoe Hills Project, Klickitat County, Washington, from April 11 to June 11, 2006.

	Spring			Summer	
Species	**use**	**%freq**	**Species**	**use**	**%freq**
common raven	0.833	41.67	Canada goose	3.833	8.33
American kestrel	0.667	58.33	American kestrel	0.500	41.67
red-tailed hawk	0.417	33.33	common raven	0.500	33.33
northern harrier	0.083	8.33	red-tailed hawk	0.417	41.67
sharp-shinned hawk	0.083	8.33	turkey vulture	0.250	25.00
Swainson's hawk	0.083	8.33	northern harrier	0.083	8.33
turkey vulture	0.083	8.33	prairie falcon	0.083	8.33

Passerines were the most abundant bird type in both the spring and summer (9.17 and 13.2 birds/survey, respectively; Table 6).

Mean bird use was higher in summer than in spring (19.250 and 11.417 birds/survey, respectively; Table 3), largely due to increases in waterfowl and passerine use (Table 6). Raptor use was similar between seasons, but slightly higher in the spring (1.417 birds/survey) than in the summer (1.333 birds/survey; Table 6). American kestrel had the highest use among raptors in both spring and summer (0.667 and 0.50 birds/survey, respectively), followed closely by red-tailed hawk (0.417 birds/survey each season; Table 5). Together, American kestrel and red-tailed hawk accounted for more than 80% of raptor use in either season.

Table 6. Mean use (number/800-meter plot/20-minute survey), percent composition, and percent frequency of occurrence for avian groups by season based on fixed-point avian use surveys conducted at the Goodnoe Hills Project, Klickitat County, Washington, from April 11 to June 11, 2006.

	Mean Use		% Composition		% Frequency	
Bird Group	**Spring**	**Summer**	**Spring**	**Summer**	**Spring**	**Summer**
Waterfowl	0	3.833	0	19.91	0	8.33
Raptors	1.417	1.333	12.41	6.93	83.33	83.33
Accipiters	*0.083*	*0*	*0.73*	*0*	*8.33*	*0*
Buteos	*0.500*	*0.417*	*4.38*	*2.16*	*33.33*	*41.67*
Northern Harriers	*0.083*	*0.083*	*0.73*	*0.43*	*8.33*	*8.33*
Falcons	*0.667*	*0.583*	*5.84*	*3.03*	*58.33*	*50.00*
Vultures	*0.083*	*0.250*	*0.73*	*1.30*	*8.33*	*25.00*
Passerines	9.167	13.167	80.29	68.40	100.00	91.67
Upland Gamebirds	0.083	0.167	0.73	0.87	8.33	8.33
Doves	0.167	0	1.46	0	8.33	0
Other Birds	0.583	0.750	5.11	3.90	25.00	33.33
Overall	**11.417**	**19.250**	**100**	**100**		

Overall, 15.12% of birds observed flying were recorded within the rotor swept area (RSA), 57.56% were below the RSA, and 27.33% were flying above the RSA (Table 7). Approximately 56% of flying raptor observations were of individuals below the RSA, 41.18% were within the RSA, and 2.94% were of

individuals above the RSA (Table 7). Higher raptor use (2.00 birds/20-min survey) occurred at point one, and use among other points ranged from 1.00 to 1.33 birds/survey (Figure 3).

Table 7. Flight height characteristics by avian group during fixed-point avian use surveys for the Goodnoe Hills Project, Klickitat County, Washington, from April 11 to June 11, 2006.

Group	# flocks flying	# birds flying	Mean flight height(m)	% birds Flying	Relation to rotor-swept height		
					below	within	above
Waterfowl	1	46	350.000	100.00	0.00	0.00	100.00
Raptors	32	34	34.906	97.14	55.88	41.18	2.94
Accipiters	*1*	*1*	*10.000*	*100.00*	*100.00*	*0.00*	*0.00*
Buteos	*11*	*13*	*40.364*	*100.00*	*38.46*	*61.54*	*0.00*
Northern Harrier	*2*	*2*	*60.000*	*100.00*	*0.00*	*100.00*	*0.00*
Falcons	*14*	*14*	*19.786*	*93.33*	*71.43*	*28.57*	*0.00*
Vultures	*4*	*4*	*66.500*	*100.00*	*75.00*	*0.00*	*25.00*
Passerines	40	81	15.325	30.22	86.42	13.58	0.00
Upland Gamebirds	0	0	N/A	0.00	N/A	N/A	N/A
Doves	0	0	N/A	0.00	N/A	N/A	N/A
Other Birds	6	11	18.000	68.75	90.91	9.09	0.00
Overall	**79**	**172**	**27.696**	**46.49**	**57.56**	**15.12**	**27.33**

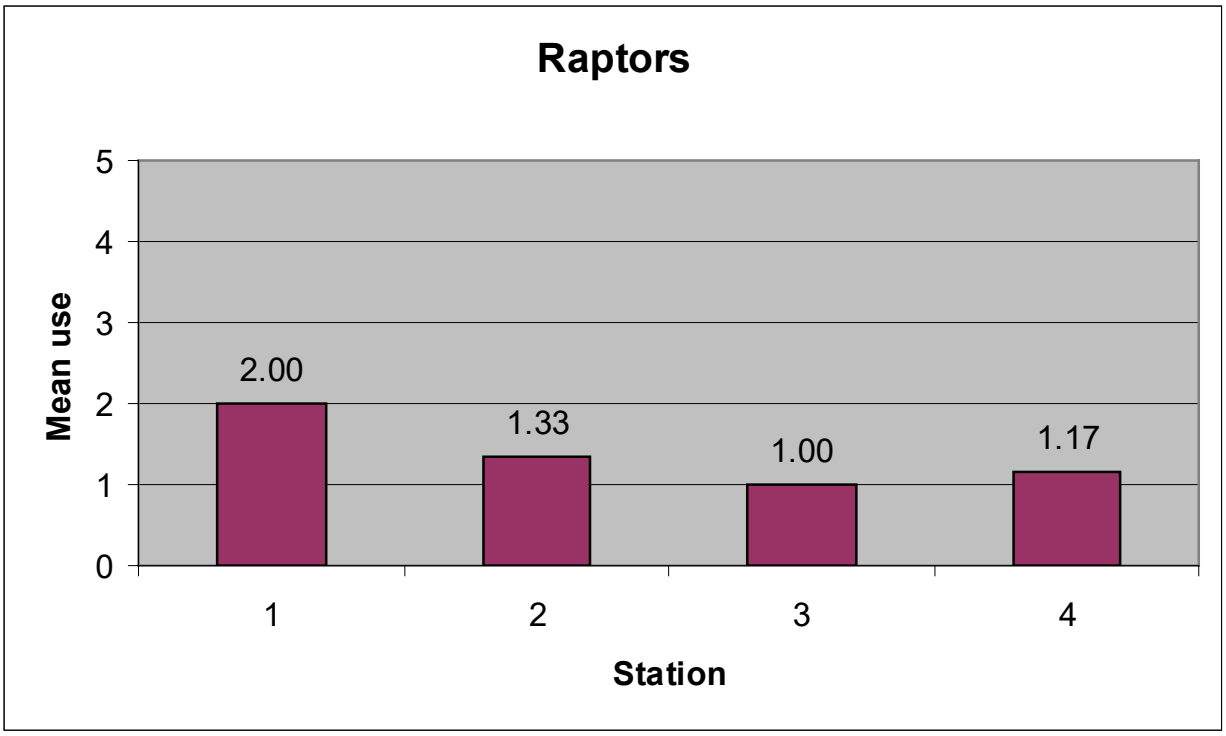


Figure3. Raptor use by survey station during fixed-point avian use surveys at the Goodnoe Hills Project, Klickitat County, Washington, April 11 to June 11, 2006.

Raptor Nest Surveys

Methods

Ground-based raptor nest surveys were completed from April 8 – 9 and again on May 1 – June 15, 2006 throughout the Project and a surrounding one-mile buffer. Both active and inactive nests were recorded and plotted on USGS 7.5' quad maps of the project area. Data recorded included species, nest stage, and nest substrate.

Results

Six red-tailed hawk, one Swainson's hawk, and one great horned owl (*Bubo virginianus*) nest were found during the 2006 raptor nest surveys (Figure 4). The raptor nest search area using the 1-mile buffer was approximately 22 square miles, and estimated raptor nest density was 0.37/mi^2, which is slightly above the typical raptor nest density of 0.30/mi^2 in the Columbia Hills (e.g., Jones and Stokes 1995).

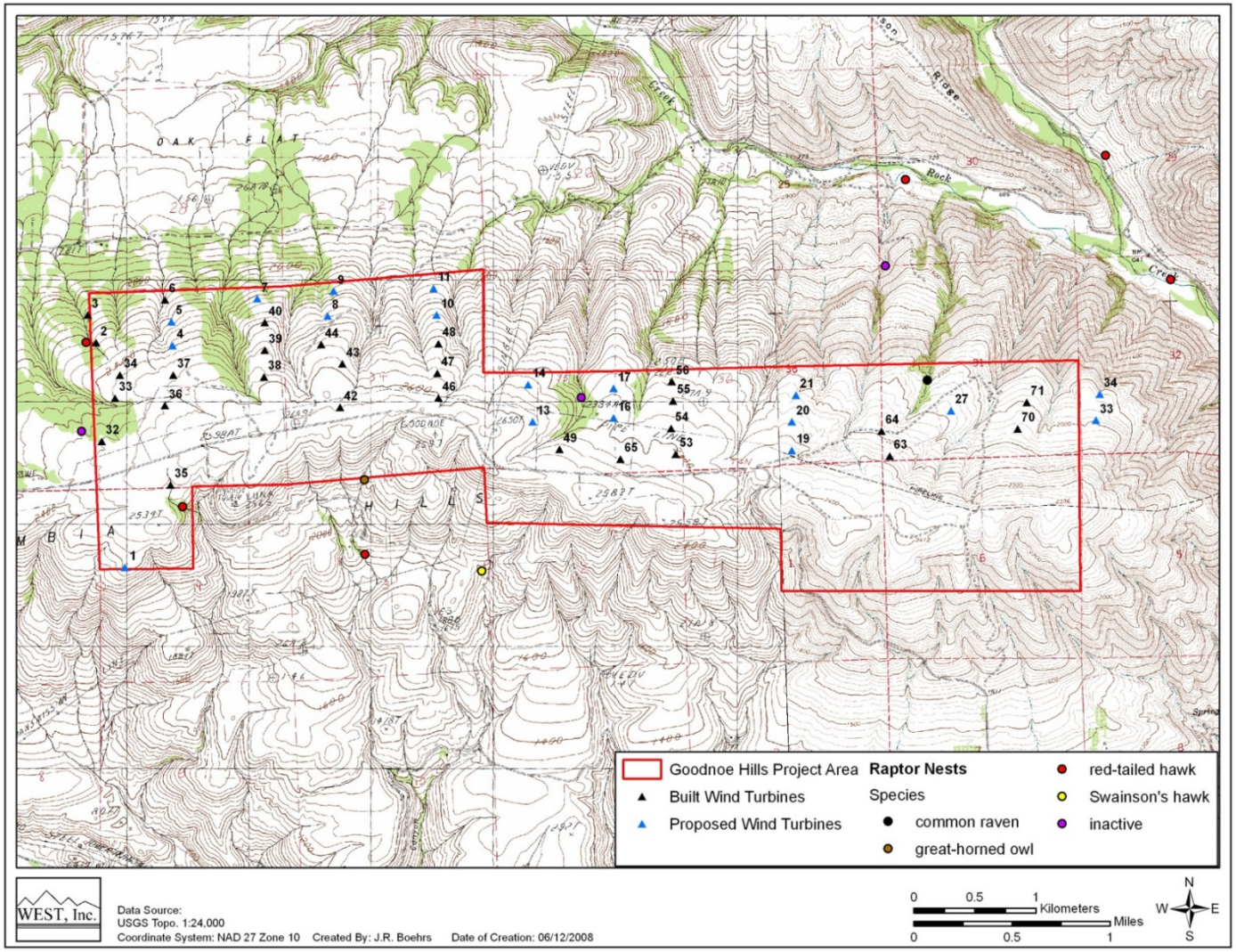


Figure 4. Location of raptor nests found during the 2006 raptor nest surveys at the Goodnoe Hills Project, Klickitat County, Washington.

Sensitive Plant and Wildlife Surveys

Methods

Sensitive plant and wildlife surveys were conducted along each of the proposed turbine strings for the original project. A buffer of 200 feet on all sides was used as the plant survey corridor. The sensitive plant survey was conducted by a local area resident with extensive experience conducting rare plant surveys in Klickitat County. A meandering walking transect was used throughout the survey area, focusing on potential suitable habitat for rare plant species.

Two sensitive wildlife surveys were conducted. The first survey was conducted on April 8–9, 2006, and involved searching for raptor nests and sensitive wildlife species by foot and vehicle across the entire project area. The second sensitive wildlife survey period was conducted in the vicinity of proposed wind turbines located in grassland/shrub steppe habitats between May 1 and June 15, 2006. The areas within 500 feet of the centerline of the proposed turbine corridors were surveyed for sensitive wildlife. Surveys consisted of walking transects spaced approximately 50 meters apart, and were conducted from dawn to no later than 1:00 PM with wind speeds not consistently exceeding 15 mph. All observations were recorded using GPS and/or 1:24,000 scale topographic maps and later mapped using GIS.

Bat surveys were not completed prior to construction. However, estimates developed utilizing survey results from similar wind projects located in arid environments of eastern Washington and Oregon predicted bat mortality was 1.6 bats per megawatt per year for a 90 turbine project.

Results

No rare plants were found. Soil types are quite variable, ranging from deep loess mounds to shallow rocky swales; consequently, vegetation is diverse. Some areas have been farmed and left fallow; others portions are relatively undisturbed and provide high quality habitat for native vegetation.

One group of 11 long-billed curlews (*Numenius americanus*) was observed flying over pasture habitat about two miles south of the project area. Twenty-three grasshopper sparrows (*Ammodramus savannarum*) and one individual of each of the following species were observed: Lewis's woodpecker (*Melanerpes lewis*), western bluebird (*Sialia mexicana*), gray flycatcher (*Empidonax wrightii*), and alligator lizard (*Elgaria multicarinata*; Figure 5).

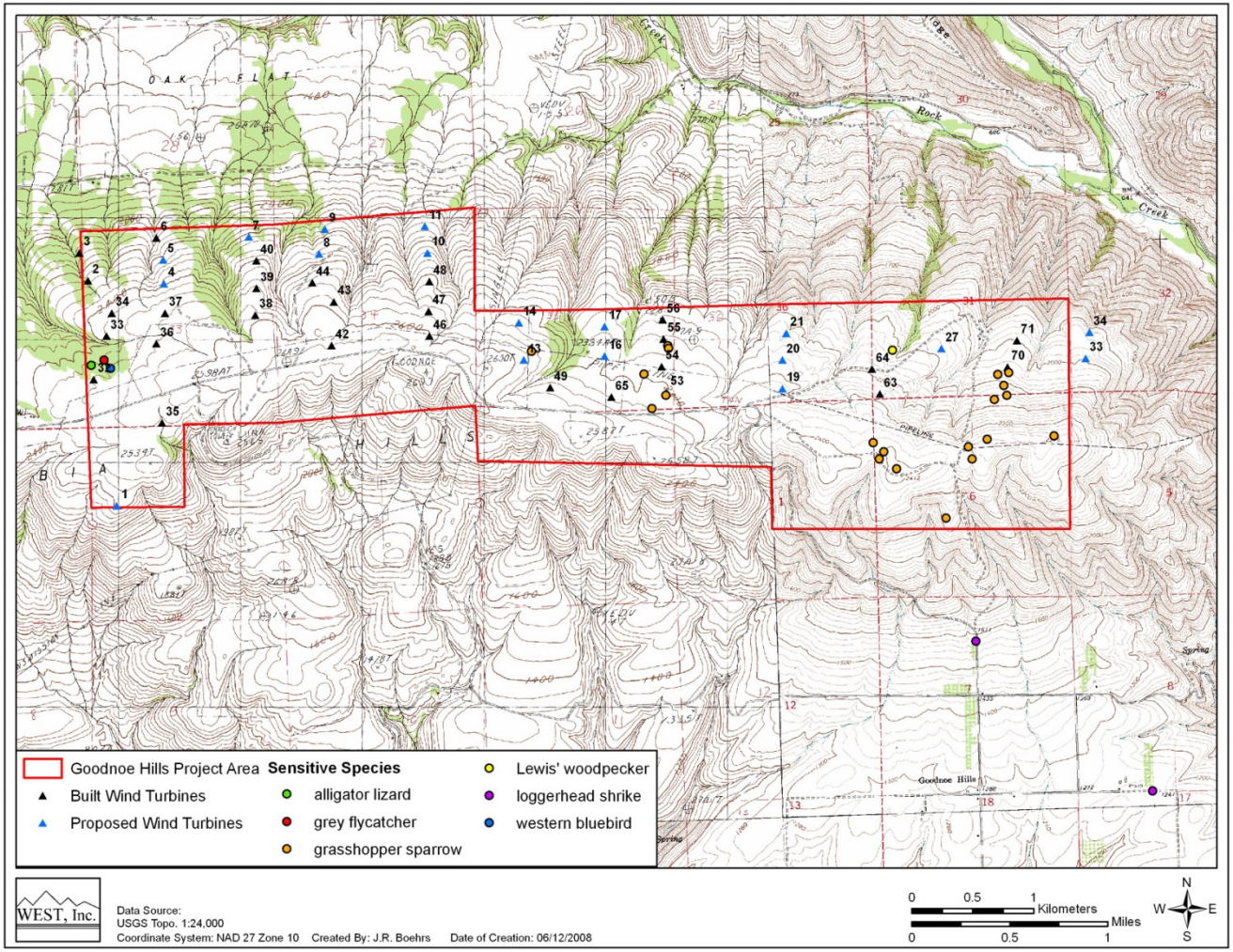


Figure 5. Location of species of concern observed during the 2006 avian surveys at the Goodnoe Hills Project, Klickitat County, Washington.

On-site Pre-Construction Avian Survey Conclusions

Passerines were the most abundant bird type recorded during the fixed-point avian use surveys, primarily consisting of two common species. American kestrel was the most commonly observed raptor species in all seasons, followed by red-tailed hawk; these two species accounted for the majority of raptor use at the Project. Seven raptor nests were found during pre-construction surveys, including one active Swainson's hawk nest and six active red-tailed hawk nests. One active great-horned owl nest was also found. A comparison between the Project and other regional facilities is presented in Section 3.1.2.

2.3 Threatened and Endangered Avian Species

No WDFW identified priority habitats were directly impacted by Project roads and turbine strings. Priority habitats are defined by the WDFW as "those habitat types or elements unique or significant value to a diverse assemblage of species." The nearest mapped priority habitats include the oak woodlots to the north of the Project area and the riparian habitat along Rock Creek approximately one mile east of the eastern end of the northern Project area.

Within a two-mile buffer of the Project area, other identified priority habitats include mule and black-tailed deer (*Odocoileus hemionus hemionus*; *Odocoileus hemionus columbianus*) winter range beginning approximately one-half mile east of the Project area.

A total of twelve species listed on the federal or state Endangered Species Acts are documented as occurring or potentially occurring within the vicinity of the project area. Of those twelve, only the Lewis' woodpecker and Vaux's swift (*Chaetura vauxi*) may occur with regularity within two miles of the Project area (Erickson et al. 2003a), and both species were observed during 2008 avian point count surveys (Johnson et al. 2008). All other species are expected to rarely occur within the vicinity of the Project area due to overall rarity or lack of suitable habitat (Erickson et al. 2003a).

Two avian species listed as USFWS Birds of Conservation Concern (BCC) in the Great Basin Bird Conservation Region (BCR) were recorded during baseline wildlife studies. Five individual Lewis's woodpecker observations were recording during avian use surveys and an additional individual was observed during sensitive wildlife surveys. One group of 11 long-billed curlews was also recorded during sensitive wildlife surveys (Johnson et al. 2008; Appendix B).

2.4 Bald and Golden Eagles

Both bald and golden eagles are known to migrate through the Project area. Discussions regarding habitat and observations of bald and golden eagles in the vicinity of the Project are provided below (Erickson et al. 2003a).

Bald Eagle

- No bald eagles were observed during 2006 pre-construction surveys (Johnson et al. 2008).
- Bald eagles have not been documented as nesting within two miles of the Project area.
- Bald eagles were documented as wintering within the vicinity of the Project area and two bald eagle nocturnal roosts were documented, and one was suspected, within two miles of the proposed development area.

- Previous studies have estimated that ten to twenty bald eagles were present within a Project area just west of the proposed development area (Erickson et al. 2003a).

Golden Eagle

- No golden eagles were observed during 2006 pre-construction surveys (Johnson et al. 2008).
- Golden eagles were not documented as nesting within one to two miles of the Project area during raptor nest surveys in 1995 (Kenetech and Cares Surveys; Klickitat County and Bonneville Power Administration 1995), 2001 (Klickitat PEIS), and 2003 (Western EcoSystems Technology [WEST]).
- Minimal usage by golden eagles was observed during pre-construction usage surveys in 1999 (Mariah Energy Winter Raptor Study), 2000 (Columbia Hills Raptor Surveys), and 2001 (Columbia Hills-Klickitat Valley Christmas Bird Count) (Erickson et al. 2003a).

3.0 PRE-CONSTRUCTION RISK ASSESSMENT

Impacts to avian species from wind energy projects may include collisions during construction and operation, as well as other impacts such as habitat loss/fragmentation and disturbance/displacement of individuals from converted habitats and areas near Project infrastructure. Data from pre-construction avian use surveys as well as publicly available information from other wind energy projects were used to provide an assessment of risk to avian species.

3.1 Impacts to Avian Species

3.1.1 Construction-Related Mortality

Project construction can result in impact to birds and other wildlife. Incidental impacts from construction activities could include the destruction of nests, eggs, or young, as well as collisions with vehicles and construction equipment. To minimize this potential, for the destruction of nests, eggs, and young, clearing of trees was avoided and minimized, where possible, during project construction.

To avoid and minimize mortality associated with vehicle collisions or other construction-related activities, Project personnel are advised regarding speed limits on roads (25 mph) and to be alert to wildlife. Implementation of the above measures is intended to avoid, minimize, and mitigate avian mortality that may result from construction activities consistent with agency policies.

3.1.2 Operation-Related Mortality

Collision with various man-made structures can be a significant source of bird mortality (Table 8). On a nationwide scale, wind turbines are estimated to be responsible for 0.01 to 0.02 percent of all avian mortalities due to human structures (Table 8, Erickson et al. 2001, 2002, 2005a).

Table 8. Estimated annual avian mortality from anthropogenic causes in the United States.

Mortality Source	Estimated Annual Mortality	Reference
Collisions with buildings	98-980 million	Klem 1990
Collisions with power lines	Tens of thousands to 174 million	USFWS 2002; APLIC 2006
Depredation by domestic cats	1.4 – 3.7 billion	Loss et al. 2013
Automobiles	60 - 80 million	Erickson et al. 2005a
Pesticides	67 million	Pimentel et al. 1991
Communication towers	6.8 million	Longcore et al. 2012
Aircraft	4,722	Dolbeer et al. 2009
Oil pits	500,000 - 1 million	USFWS 2009a
Wind turbines	213,760 – 573,000	Erickson et al. 2013; Smallwood 2013

The most recent estimates of annual bird mortality from wind facilities in the United States are 213,760 to 573,000 (Erickson et al. 2013; Smallwood 2013). Studies have shown avian mortality rates to be consistent across wind energy facilities, both nationally and by region. The number of avian mortalities at wind energy facilities is generally low when compared to the total number of birds observed at these sites (Erickson et al. 2002). Although avian collision mortality can occur during both the breeding and migration seasons, patterns in avian mortality at tall towers, buildings, wind turbines, and other man-made structures suggest that the majority of mortalities occur during the spring and fall migration periods (NRC 2007). Limited data from existing wind facilities suggest that migratory species represent roughly half of documented mortalities, while resident species represent the other half (NRC 2007).

Assuming avian use is generally related to mortality rates at wind energy facilities, the relative level of avian use at the Project may be compared to avian use at other facilities to assess the risk of mortality at the Project relative to other facilities. Avian use surveyed at several facilities across eastern Washington and Oregon ranged from 5 to 23.6 birds per 800-m plot per 20-minute survey, and averaged 12.1 (Table 9; Johnson and Erickson 2006). Among the Windtricity Project Areas, mean avian use was 13.4 birds/plot/20-min survey. Results of avian use studies for the two studies in Klickitat County were 11.9 (Bighorn) and 11.8 birds/plot/survey (Klickitat County EOZ; Table9; Johnson and Erickson 2006).

Post-construction monitoring reports from the Columbia Plateau Ecoregion show generally moderate levels of bird mortality (Table 10; Johnson and Erickson 2011). The highest bird carcass rate was recorded at the Biglow Canyon II facility in Oregon during the first year of post-construction monitoring (7.72 carcasses/MW/year); while the Leaning Juniper facility, also in Oregon, had the second highest estimated bird carcass rate in the Pacific Northwest: 6.66 bird carcasses/megawatt (MW)/year. The rates at the Leaning Juniper and Biglow Canyon II study were relatively high compared to other sites in the area, with the third highest rate (3.20 carcasses/MW/year) less than half the rate reported at Leaning Juniper. The Marengo II facility in Washington had the lowest reported carcass rate: 0.16 bird carcasses/MW/year. Across the 25 studies reviewed, the mean bird carcass rate was 2.36 bird carcasses/MW/year (Table 10; Johnson and Erickson 2011).

Raptor use recorded during surveys at several facilities across eastern Washington and Oregon ranged from 0.26 to 1.05 raptors per 800-m plot per 20-minute survey, and averaged 0.57 (Table 9; Erickson et al. 2006). Among the Windtricity Project Areas, mean raptor use was 0.65 birds/plot/20-min survey. Raptor use studies recorded during the two studies in Klickitat County were 0.57 (Bighorn) and 0.71 raptors/plot/survey (Klickitat County EOZ; Table 9; Johnson and Erickson 2006).

Raptor carcass rates ranged from zero to 1.79 raptor carcasses per MW per year (mean: 0.19, median: 0.09 carcasses/MW/year at 18 wind energy facilities across western North America (Johnson and Stephens 2011). High raptor carcass rates were reported for Diablo Winds (1.79 raptor carcasses/MW/year) and SMUD Solano (0.53 raptor carcasses/MW/year), both located in California, relative to the remaining 16 facilities; raptor carcass rate estimates at the remaining 16 facilities ranged from zero to 0.15 raptor carcasses/MW/year (mean: 0.07; median: 0.09 carcasses/MW/year; Johnson and Stephens 2011). Based on a 2011 cumulative impact analysis of avian carcasses at 23 wind energy facilities in the Columbia Plateau Ecoregion (CPE), the estimated raptor carcass rate was 0.08 carcasses/MW/year (Johnson and Erickson 2011). Diurnal raptors accounted for about 7% of carcasses in the CPE (Johnson and Erickson 2011).

Avian and raptor carcass rates for the Project were expected to be low given the relatively few turbines (47 turbines), and the low raptor carcass rates observed at other wind energy facilities in the region (Erickson et al. 2003a). Post-construction carcass searches were implemented at the Project to provide estimates of actual avian carcass rates (see Section 4.0 below).

Table 9. Avian use estimates (number observed per 800-meter plot per 20-minute survey) for several Wind Resource Areas in eastern Washington and Oregon (Johnson and Erickson 2006).

		Mean Avian Use	
Wind Resource Area	**Location**	**Raptors**	**All Birds**
Hopkins Ridge	Columbia, Co., WA	0.64	5.6
Combine Hills	Umatilla Co., OR	0.60	6
Klondike	Sherman Co., OR	0.47	17.5
Vansycle	Umatilla Co., OR	0.41	13.1
Elkhorn	Union Co., OR	1.05	21.7
Shepherd's Ridge	Morrow Co., OR	0.61	6.5
Leaning Juniper	Gilliam Co., OR	0.52	23.6
Condon	Gilliam Co., OR	0.37	5.8
Stateline	Walla Walla, Co., WA Umatilla Co., OR	0.41	13.1
Nine Canyon	Benton Co., WA	0.26	9.4
Desert Claim	Kittitas Co., WA	0.77	15.3
Kittitas Valley	Kittitas Co., WA	0.90	12
Reardan	Lincoln Co., WA	0.90	13
Klickitat County EOZ	Klickitat Co., WA	0.71	11.8
Zintel Canyon	Benton & Yakima Cos., WA	0.44	19
Wild Horse	Sherman Co., OR	0.40	5
Maiden	Klickitat Co., WA	0.38	11.6
Biglow		0.30	9.1
Bighorn		0.57	11.9
Mean		**0.57**	**12.1**
Range		**0.26-1.05**	**5-26.3**
Windtricity Project Areas		**0.65**	**13.4**

Table 10. Estimated all bird and raptor mortality rates (mortalities/MW/year) at several wind energy facilities in the Columbia Plateau Ecoregion.

Facility Name, State	Raptor Mortalities/ MW/Study Period	All Bird Mortalities/ MW/Study Period	Nocturnal Migrant Mortalities/MW / Study Period	References
Big Horn, WA	0.15	2.6	0.57	Kronner et al. 2008
Goodnoe Hills, WA	0.17	1.40	NR[a]	URS Corporation 2010a
Hopkins Ridge (Year 1), WA	0.14	1.23	0.46	Young et al. 2007
Hopkins Ridge (Year 2), WA	0.07	2.99	1.36	Young et al. 2009
Marengo I, WA	0	0.48	NR	URS Corporation 2010b
Marengo II, WA	0.05	0.16	NR	URS Corporation 2010c
Nine Canyon, WA	0.05	2.76	0.45	Erickson et al. 2003b
Nine Canyon II, WA	0	0.06	NR	Erickson et al. 2005b
Stateline, WA/OR	0.09	2.92	0.83	Erickson et al. 2004
Stateline II, WA/OR	0.11	1.23	0.68	Erickson et al. 2007
Tuolumne (Windy Point I). WA	0.29	3.20	NR	Enz and Bay 2010
Wild Horse, WA	0.09	1.55	0.88	Erickson et al. 2008
Biglow Canyon I (Year 1), OR	0.03	1.76	0.44	Jeffrey et al. 2009a
Biglow Canyon I (Year 2), OR	0.04	2.47	0.88	Enk et al. 2010
Biglow Canyon II (Year 1), OR	0.20	7.72	7.19	Enk et al. 2011
Combine Hills, OR	0	2.56	0.27	Young et al. 2006
Condon, OR	0.02[b]	0.05[b]	NR	Fishman 2003
Hay Canyon, OR	0	2.21	NR	Gritski and Kronner 2010a
Klondike, OR	0	0.95	0.35	Johnson et al. 2003
Klondike II, OR	0.11	3.14	2.11	NWC and WEST 2007
Klondike III, OR	0.15[c]	3.19[c]	0.90	Gritski et al. 2010
Klondike IIIa, OR	0[c]	2.54[c]	NR	Gritski et al. 2009b
Leaning Juniper, OR	0.21	6.66	1.56	Gritski et al. 2008
Pebble Springs, OR	0.04	1.93	0.84	Gritski and Kronner 2010b
Vansycle, OR	0	0.95	0.32	Erickson et al. 2000
Mean	**0.08**	**2.36**	**1.18**	

[a] NR = Not reported or calculated

[b] These estimates are not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and was not used in calculation of the mean values.

[c] Huso estimator used (see Huso 2010).

Meteorological Towers

Other possible risks to birds may result from collisions with the meteorological (MET) towers that have been constructed in the Project area. Data on MET tower impacts to birds indicate that, overall, the average number of discovered bird mortalities per year is similar for MET towers as for turbines; however, at one site in Wyoming, average avian mortality was three times greater at guyed MET towers than at the turbines (Young et al. 2003).

More data on bird mortalities are available for communications towers. Avian mortality at communication towers varies greatly depending on tower height, lighting, color, structure, and the

presence of guy wires (The Ornithological Council 2007). Although variable across habitats, the majority of collision mortalities at communications towers consist of passerines, particularly night migrants. Reported mortality rates at guyed communication towers 380 to 480 feet tall range from one bird per tower per 20 days to 12.3 birds per tower per 20 days, depending on the type of lighting on the tower – white strobe lighting typically results in the lowest mortality rate (The Ornithological Council 2007). In addition to baseline mortality rates, single night mass mortality events periodically occur at lighted communications towers on cloudy nights.

All existing MET towers located within the Project boundary use lattice frames to avoid impacts from guyed MET towers.

3.2 Other Impacts

3.2.1 Habitat Loss/Fragmentation

Construction of wind energy facilities may impact birds through habitat loss or fragmentation. The removal of habitat and conversion of interior habitat to edge habitat during construction of turbines and associated facilities may permanently displace certain bird species from the Project footprint. Construction of the 47-turbine Project resulted in the permanent disturbance of less than 20 acres of habitat. The primary habitat lost agricultural wheat crop and cattle grazing pasture. Temporary land disturbances resulting from the construction of the turbines and associated infrastructure have been reclaimed and re-vegetated so that natural succession could occur.

3.2.2 Disturbance/Displacement

In addition to removing habitat, Project wind turbines may displace wildlife from an area due to creation of edge habitat, the introduction of vertical structures, and disturbances directly associated with turbine operation (e.g., noise and shadow flicker) (USFWS 2012d, NRC 2007). Impacts are concentrated near turbine locations and along access roads, although available data indicate that avoidance of wind turbines by birds generally extends 245 to 2,625 ft from a turbine, depending on the environment and the bird species affected (Strickland 2004). The magnitude of these impacts is expected to be minimal, as the Project has resulted in a relatively small amount of habitat loss and disruption relative to the surrounding landscape. Impacts are expected to consist primarily of shifts in species distribution within the Project area that are similar to existing conditions resulting from anthropogenic effects (USFWS 2012d). Any disturbance associated with third parties exercising their subsurface rights is not included in this BBCS.

A review of the literature by Dooling (2002) on how well birds can hear in noisy (windy) conditions suggests that birds cannot hear the noise from wind turbine blades as well as humans can. In practical terms, a human with normal hearing can probably hear a wind turbine blade twice as far away as can the average bird. Although Dooling's study was intended to explore potential avoidance measures for birds (i.e., collision mortality), he found that birds habituate to acoustic disturbances and that blade noise becomes inaudible to some bird species at 82 ft from the turbine, suggesting that impacts from noise may be minimal at these distances.

4.0 POST-CONSTRUCTION MONITORING (Tier 4)

Under the 2012 Guidelines, Tier 4 recommends that post-construction studies assess whether predictions of mortality risk and direct and indirect impacts to habitat of species of concern were correct. For utility-scale projects, USFWS recommends at least one year of monitoring.

PacifiCorp implemented a one year post-construction monitoring and reporting program to estimate and evaluate project impacts. The program followed standard protocols to monitor wildlife impacts and the measures to meet compliance requirements during operations of the project. A summary of the post-construction monitoring study is included below. The final-post construction monitoring report is included in Appendix C. These reports were provided to the TAC and USFWS.

PacifiCorp contractors and staff will report any avian carcasses found during daily routine maintenance activities, monthly monitoring events, and quarterly site inspections using the WIRHS protocols, year-round for the life of the Project. Searches will not be performed when weather conditions make turbines inaccessible in a standard road vehicle. Carcasses found during maintenance, monthly monitoring, or site inspections will not be used to develop estimates of carcass rates as they were not found during standardized avian carcass searches designed to gather data necessary to estimate mortality. As part of the overall Project monitoring effort, avian carcasses discovered at the Project will be handled under the Wildlife Incident Reporting and Handling System (WIRHS) manual for the life of the project (Appendix D). Bird carcasses may be retained and provided to USFWS in accordance with applicable agency policies or federal permits.

4.1 Standardized Carcass Searches - February 2009 to January 2010

One year of post-construction monitoring has been completed at the Project to assess carcass rates at the Project. The results of post-construction monitoring surveys were reported to the members of the TAC.

4.1.1 Methods

The methods for the carcass search studies are broken into four primary components: 1) standardized carcass surveys of selected turbines and meteorological towers; 2) searcher efficiency trials to estimate the percentage of carcasses found by searchers; 3) carcass removal trials to estimate the length of time that a carcass remains in the field for possible detection; and 4) adjusted mortality estimates for bird species calculated using the results from searcher efficiency trials and carcass removal trials to estimate the total number of bird mortalities within the Project area. Carcasses found within search plot were included in the mortality rate estimate calculations, including carcasses found outside scheduled search times, under the assumption that the carcasses found incidentally on search plots would have been found during subsequent standardized searches. The estimate uses the results from a pre-determined random sample to estimate facility-wide mortality rates; therefore, it is not appropriate to include carcasses found outside of the search plots in the estimated carcass rate calculations. Searcher efficiency trials were conducted to estimate how visible birds were. A large portion of the search plots had good visibility because there were relatively large cleared areas around turbines. Visibility was lower further away from turbines; however, the cover was such that it is likely that few large birds, especially raptors, were missed during surveys, and it is likely that any golden eagle carcass occurring within a search plot would have been found.

In accordance with TAC recommendation, 24 of the 47 turbines were selected for surveying using a systematic design with a random start. Search plots at turbines were 180 m (591 ft) on a side, and standardized carcass surveys occurred at all 24 turbines once every 4-week (28-day) period throughout the summer (June 1 to August 1) and winter (November 1 to March 14), and once every two weeks (17 days) during the spring (March 15 to May 31) and fall (August 1 to October 31) migration periods.

A total of 59 carcasses (24 large birds and 35 small birds) were placed for searcher efficiency trials. A total of 42 bird carcasses were placed for carcass removal trials. Due to dramatically fewer days in the first trial, the results from the first trial were considered suspect and were not included in the analysis. Therefore, carcass removal was based on the placement of 31 carcasses: 22 large bird and nine small bird carcasses.

4.1.2 Results

A total of 455 scheduled turbine searches were completed and 19 bird carcasses and five feather spots were located. An additional four bird carcasses were found incidentally. Five of the 23 carcasses and five feather spots were raptors: American kestrel (2), red-tailed hawk (2), and golden eagle (1; Figures 6 and 7). The golden eagle carcass was a juvenile found on April 27, 2009.

Sixty-six percent of the small bird trial carcasses and 62.5% of the large bird trial carcasses were detected during searcher efficiency trials. Based on scavenger trial data, the mean removal time was 7.41 days for large birds and 10.44 days for small birds. The adjusted carcass estimate for small birds was 2.04/wind turbine/year (1.02/MW/year). The adjusted carcass estimate for all large birds (raptors, waterbirds, waterfowl) was 0.76/wind turbine/year (0.38/MW/year). The adjusted carcass estimate for raptors at wind turbines was 0.34/turbine/year (0.17/MW/year). The adjusted carcass estimate for all birds combined at wind turbines was 2.80/turbine/year (1.40/MW/year). Eagle mortality rates are reported in Section 4.1.4.

Eight bats, including two silver-haired bats (*Lasionycteris noctivagans*) and six hoary bats (*Lasiurus cinereus*) were found during migration periods at Goodnoe Hills. One silver-haired bat was found in late May near some trees at turbine G-49. Five hoary bats were located in a single day in mid-August in the eastern third of the project area. Turbine G-59 had three of those five bats. The remaining hoary and silver-haired bats were found in mid-September and mid-October respectively. Neither the hoary nor the silver-haired bat is listed as federal or state threatened or endangered species.

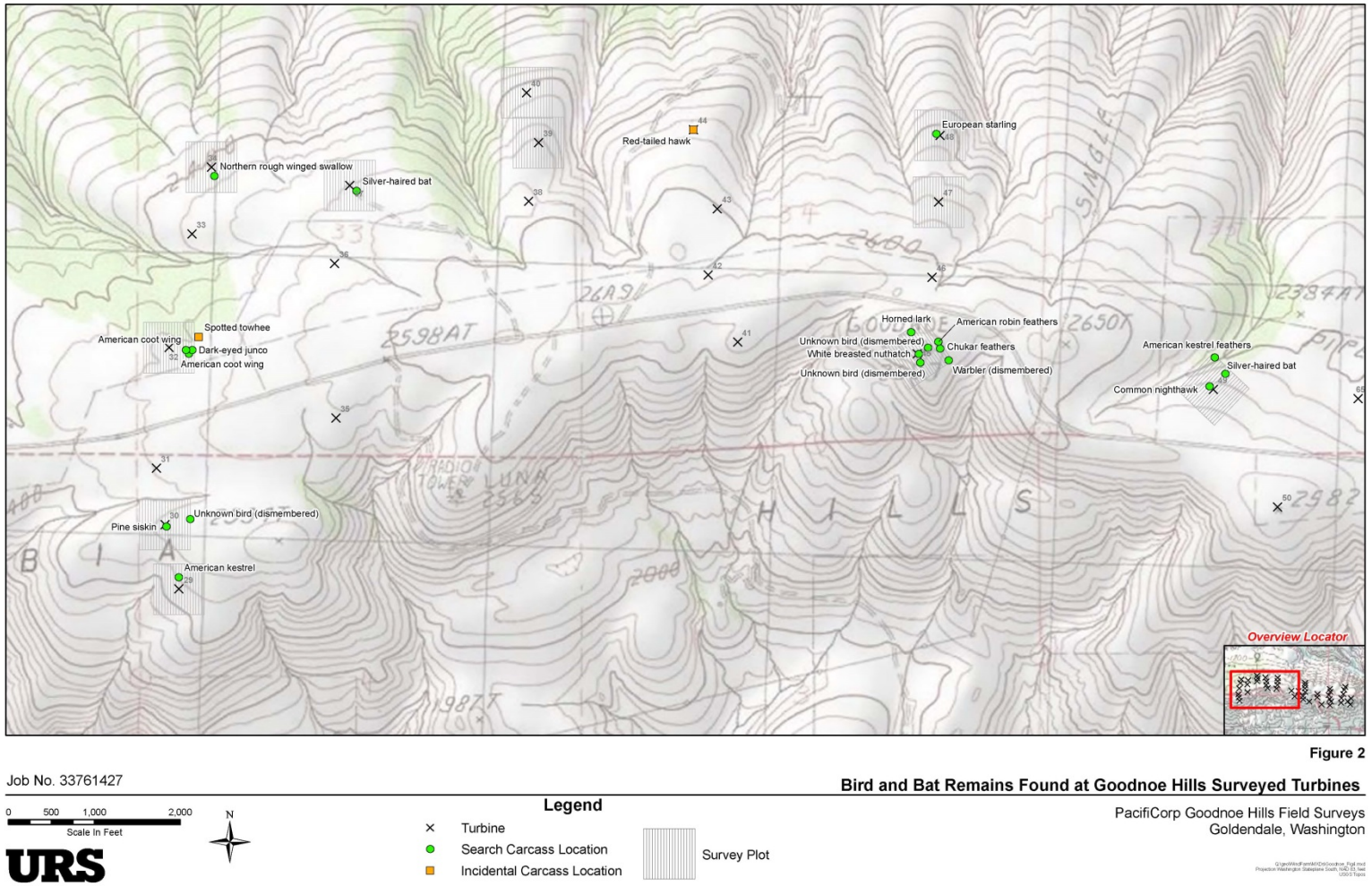


Figure 6. Location of avian carcasses on the western half of the Goodnoe Hills Project, Klickitat County, Washington, from February 2009 to January 2010.

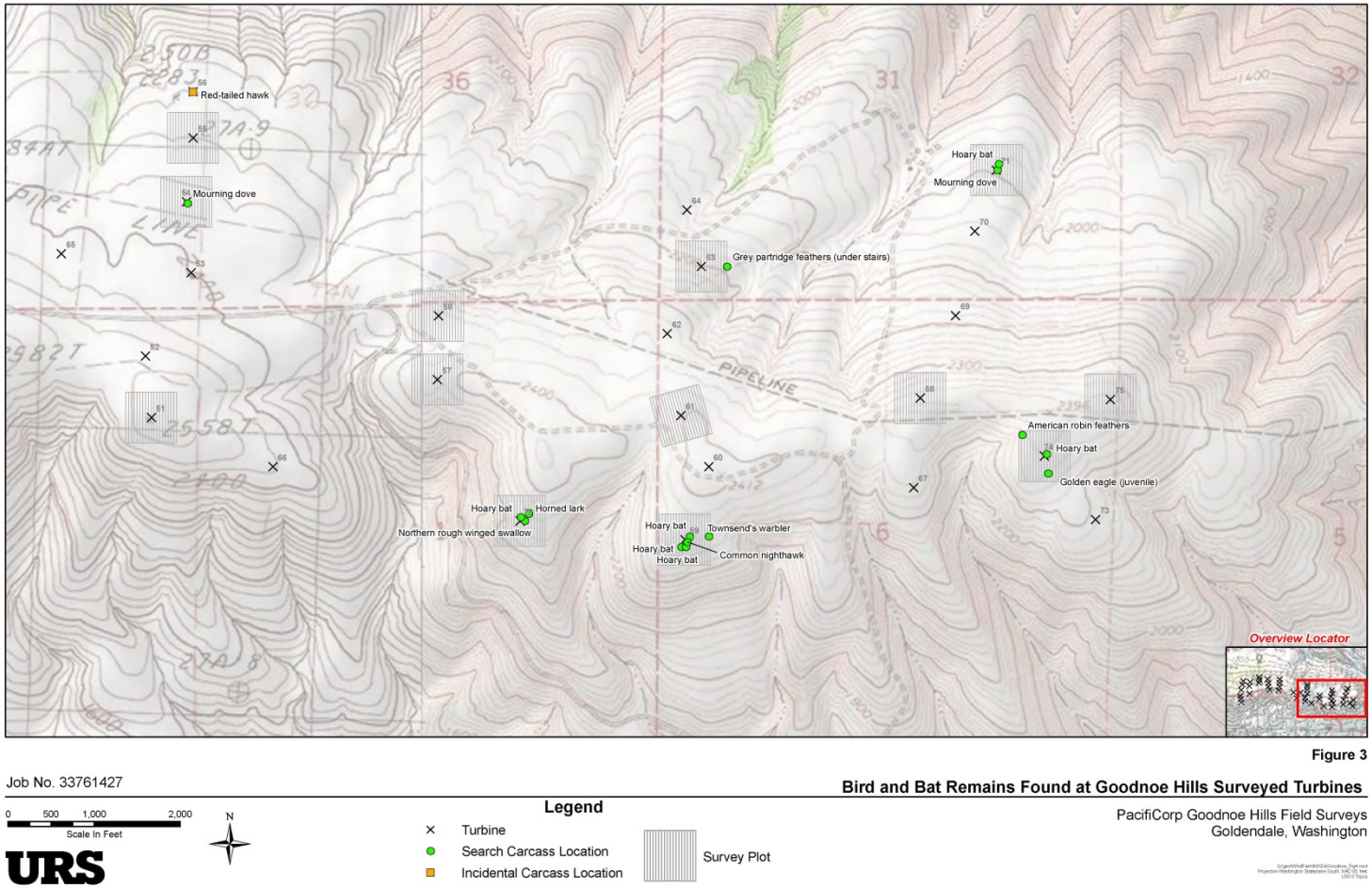


Figure 7. Location of avian carcasses on the eastern half of the Goodnoe Hills Project, Klickitat County, Washington, from February 2009 to January 2010.

4.1.3 Conclusions

The 2012 Guidelines recommend, under Tier 4a, that for operational facilities like the Project, an evaluation of avian impacts be compared to "existing facilities with similar landscapes, species composition, and use." Several post-construction studies in eastern Oregon and Washington have released publicly available reports. The adjusted raptor carcass rates reported at these facilities ranged from zero to 0.21 raptor carcasses/MW/year (Table 11). Raptor carcass rates at the Project were 0.17 raptor carcasses/MW/year over the one year of completed post-construction monitoring studies (Appendix C). The raptor carcass rate estimate for the Project are moderate to high compared to estimated raptor rates at other wind energy facilities in eastern Washington and Oregon (Table 11). However, red-tailed hawk and American kestrel composed the majority of raptor carcass discoveries at the Project and the impacts to these species from the Project are unlikely to result in population-level impacts.

For all bird species combined, the estimated annual carcass rate was 1.4 bird carcasses/MW/year. The all bird rates estimated for the Project are low compared to the rates reported at facilities in eastern Washington and Oregon, which ranged from 0.9 to 6.7 carcasses/MW/year (Appendix C). Compared to these other wind energy facilities/studies, the estimated rate for all birds at the project is moderate. Bat estimated annual carcass rate was 0.34 bat carcasses/MW/year, significantly lower than pre-constructions estimates.

Table 11. Comparison of Goodnoe Hills wind project bird and bat mortality rates with similar projects in eastern Oregon and Washington.

	Mortality rate (#/MW/year)			
Project	**All Birds**	**Raptors**	**Bats**	**Source**
Goodnoe Hills, WA	**1.4**	**0.17**	**0.34**	**Current Study**
Hopkins Ridge,WA (2008)	3.0	0.07	1.4	Jeffrey et al. 2009b
Wild Horse, WA	1.6	0.09	0.4	Erickson et al. 2008
Big Horn, WA	2.6	0.15	1.9	Jeffrey et al. 2009b
Combine Hills, OR	2.6	0.00	1.9	Jeffrey et al. 2009b
Klondike I, OR	0.9	0.00	0.8	Jeffrey et al. 2009b
Klondike II, OR	3.1	0.11	0.4	Jeffrey et al. 2009b
Klondike III, OR (2008)	3.3	0.06	1.26	Gritski et al. 2009a
Leaning Juniper, OR	6.7	0.21	1.98	Gritski et al. 2008
Nine Canyon, WA	2.8	0.05	2.5	Jeffrey et al. 2009b
Stateline, WA/OR	2.4	0.10	1.7	Jeffrey et al. 2009b
Vansycle	1.0	0.00	1.1	Jeffrey et al. 2009b

4.1.4 Eagle Carcasses

One golden eagle carcass was identified during the standardized carcass search study, from February 2009 to January 2010 (Appendix C). The juvenile golden eagle carcass was located on the eastern side of the Project (Figure 7). Based on the one year of standardized carcass searches, an observed golden eagle carcass rate is one golden eagle/year for the Project. An additional golden eagle was found incidentally in September of 2013.

Golden eagle carcasses were not used for experimental bias trials at the Project. Due to differences in the searcher efficiency and removal rates expected for golden eagles compared to the species used for trials (rock pigeons [*Columba livia*] or domestic mallards [*Anas platyrhynchos*]), it is likely not

appropriate to use the large bird searcher efficiency and removal rates at the project to provide an adjusted mortality rate estimate for eagles. A review of existing studies and modeling efforts conducted by Smallwood (2007) reported that 88% of predicted large raptors would remain available for detection after 90 days and 100% would be detected by searchers. Further, a removal study conducted in Altamont Pass, California, indicated that approximately 94% of large raptors remained after 68 days (ICF Jones & Stokes 2008), which was significantly higher than the rate observed for the smaller and medium sized birds.

Based on this information, an assumption was made that the probability of an eagle being available for detection and detected by searchers would be 90%. Large to medium raptor removal rates are generally expected to be low and the visibility around most turbines is such that it is expected that most eagle carcasses would be detected.

The one golden eagle carcass identified during standardized monitoring was found within a standardized search plot (2.1% of the 47 turbines) over the single year of study. To calculate an estimate of the annual adjusted number of carcasses expected, we multiply the one eagle carcass found within a standardized search plot by the ratio of turbines searched (since not all of the turbines were included in standardized searches), then divide by 0.90 (the estimated probability of available and detected), and finally divide by one to get an annual estimate (since one year of standardized surveys were conducted): ([(1*(47/24)/0.90)]/1) – this results in an estimate of 2.18 eagle carcasses per year. Using the observed carcass rate (including incidentals) and the standardized adjusted carcass rate, the estimated range of annual carcass rate is between 1.00 (0.0106/MW/year; the observed golden eagle carcass rate) and 2.18 (0.0232/MW/year; the adjusted mortality estimate) golden eagles per year in the Project area.

4.2 Ongoing Monitoring

Year-round for the life of the Project, PacifiCorp contractors and staff will report, using WIRHS protocols, any carcasses found during daily routine maintenance activities, monthly monitoring events, and quarterly inspections. Searches will not be performed when weather conditions make turbines inaccessible or unsafe to access in a standard road vehicle.

5.0 GOLDEN EAGLE POPULATION CUMULATIVE IMPACTS

One of the principle questions under the 2012 Guidelines focuses on whether adverse impacts on a given species will be significant. Similarly, the 2013 ECPG evaluates regional and local take thresholds to ensure that eagle take does not rise to the level of significance. As discussed below, the level of cumulative impact to golden eagles at the Project is not significant. The adaptive management program (discussed below in Section 6.0) is intended to avoid, minimize, and mitigate for impacts to golden eagles (and other MBTA species). Furthermore, it is anticipated that implementing the measures discussed in this BBCS will ensure that impact to golden eagles will not result in a significant impact to local or regional populations.

The Project lies within the Great Basin Bird Conservation Region (BCR). Golden eagle density estimates within the Great Basin BCR are estimated to be 0.0255 mi^2 in the ECPG (USFWS 2013a). The estimated number of golden eagles in the Great Basin BCR was 6,859 golden eagles (USFWS 2013). To be conservative, assuming a golden eagle carcass rate of 2.18 golden eagles per year at the Project, the annual carcass rate would compose 0.03% of the total estimated golden eagle population in the Great Basin BCR.

The USFWS has previously identified annual take levels of 5% of annual production to be sustainable for a range of healthy raptor populations, and annual take levels of 1% of annual production as a relatively benign harvest rate over at least short intervals when population status was uncertain (Millsap and Allen 2006, USFWS 2012c). This was the approach used to establish take thresholds at the eagle management unit scale (BCR level for golden eagles; USFWS 2009b).

The USFWS has identified take rates of between 1% and 5% of the estimated total eagle population size at the local-area population scale (140 mile buffer surrounding the project) as significant; with 5% being at the upper end of what might be appropriate under the BGEPA preservation standard, whether offset by compensatory mitigation or not (USFWS 2013). The Draft Eagle Conservation Plan Guidance Appendices (USFWS 2012c) recommend calculating the local-area 5% benchmark as follows:

(Local-area * Regional Eagle Density) * 0.05.

A 140 mile buffer surrounding the Project encompasses the following BCRs: Great Basin (31,063 mi^2), Northern Rockies (14,053 mi^2), and Northern Pacific Rainforest (17,957 mi^2). The regional density estimates for golden eagles are available in the ECPG for the Great Basin (0.0255 eagles/mi^2), Northern Rockies (0.0309 eagles/mi^2), and the Northern Pacific Rainforest BCR (0.0016 eagles/mi^2). Using the equation above an estimated local area population size for the Project is approximately 1,254 golden eagles. Based on this analysis, the local-area 5% benchmark would be 62 eagles annually. An assumed carcass rate of 2.18 eagles per year would result in 0.17% of the estimated local area population which is also well below the 1% to 5% level identified by the USFWS as being significant under the BGEPA preservation standard. This estimate is not predicted to have significant adverse impacts on the local golden eagle population.

The above analysis only presents the contribution of the eagle carcasses at the Project to losses to the local area eagle population and does not include an assessment of cumulative impacts resulting from other current or projected wind facilities (or other anthropogenic sources of eagle mortality) within the 140-mile buffer surrounding the project. It is expected, however, that currently planned and future projects will be subject to the same regulatory framework that ensures their effects will be avoided, minimized, and mitigated; therefore, currently planned and future project should result in no net loss to the local area population

6.0 ADAPTIVE MANAGEMENT & EXPERIMENTAL MEASURES

The 2012 Guidelines direct developers and operators to evaluate the probability of significant adverse impact when assessing measures to avoid, minimize, and mitigate impacts. PacifiCorp is currently evaluating the need for additional ongoing operational monitoring beyond the WIRHS system (discussed in Section 4.4. above). Section 6.0 builds off of earlier Sections and sets out an adaptive management plan for the Project and advanced conservation practices. The adaptive management plan includes ongoing and future strategies (i.e., mitigation and advanced conservation practices) to avoid and minimize impacts to avian resources.

6.1 Adaptive Management Plan

PacifiCorp is currently unaware of a model BBCS that includes accepted protection and conservation measures to address eagle or other avian impacts at existing operational wind energy facilities considered to be in Tier 4. As such, PacifiCorp has developed this BBCS including the following adaptive

management plan based on the Site specifics and data available to monitor for impacts and avoid, minimize and mitigate impacts to eagles and other avian species.

PacifiCorp's adaptive management plan – developed under Tier 4 of the 2012 Guidelines – is a package that: 1) evaluates baseline mortality rates reported in the final post-construction monitoring report; and 2) evaluates triggers to monitor the potential effects of various avoidance, minimization, and mitigation measures that may be implemented on carcass rates; and 3) reviews and implements, as appropriate, recommendations from the TAC and from the USFWS related to resource avoidance, minimization, and mitigation measures designed to reduce Project impacts on avian species.

Actions described below include an investigation of the probable causes of bird mortalities that could trigger the need for adaptive management (e.g., weather events or other considerations correlating with carcass discoveries). Combined, this BBCS provides a framework for assessing if the adaptive management triggers as defined below have been reached.

6.1.1 Mitigation for MBTA Species (Non-Eagles)

To date, the estimated carcass rates for non-eagles were within the pre-construction predictions and are considered low to moderate relative to other wind energy projects in the region. However, under the adaptive management framework set out in this BBCS, if through direct observation carcass rates for non-eagles increases to a level considered "significant" as described in the 2012 Guidelines, PacifiCorp will engage the USFWS regarding the appropriate measures to avoid, minimize or mitigate impacts to migratory birds.

The baseline studies indicated low probability of significant adverse impacts to all birds and to date, all-bird mortality was similar to predicted risk. Under this scenario, the Land Based Wind Energy Guidelines (USFWS 2012d) recommend that no further monitoring or mitigation should be needed for all birds. If the number of non-eagle migratory carcasses is significantly greater than pre-construction predictions, then PacifiCorp will meet and confer with USFWS and applicable actions will be carried out. If a particular cause of the carcass discoveries can be identified, PacifiCorp will develop specific actions as appropriate in consultation with USFWS to address the issue.

6.1.2 Mitigation for Golden Eagles

PacifiCorp has compared the identified carcass rate for all birds to the pre-construction risk assessments as well as to other projects. The identified carcass rates for non-eagles were within the pre-construction predictions and are considered low to moderate relative to other wind energy projects. However, upon discovery of a bald or golden eagle carcass at the Project, the following actions will continue to be taken:

1. PacifiCorp will tarp the carcass and fill out the appropriate WIRHS reporting form.
2. PacifiCorp will notify the designated USFWS, consistent with permit requirements, and where practicable, within 48 hours of carcass identification.
3. PacifiCorp will, if requested by USFWS, meet and confer with the USFWS to help determine the circumstances under which the carcass was discovered.
4. PacifiCorp will work with the USFWS to evaluate available mortality data and, as appropriate, implement additional monitoring measures, or implement measures to help reduce potential risks to eagles.

6.1.3 Advanced Conservation Practices and Compensatory Mitigation for Golden Eagles and Other Raptors

In addition to the above actions, PacifiCorp has and/or will implement the following advanced conservation practice (ACP). These measures are designed to identify impacts and provide ongoing conservation and benefits to eagles and other raptors, with the goal of enhancing eagle populations but, also have the potential to benefit other avian species:

1. PacifiCorp will continue to remove the potential source(s) of bird attraction in the Project area (e.g., dead animals, carrion, prey habitat) in accordance with applicable state and federal law. PacifiCorp has carrion removal contracts in place with vendors at all Washington wind facilities to collect and remove observed carrion which could create an attraction for foraging raptors and other scavengers. Depending upon the carcass observed, PacifiCorp contacts applicable carcass owners to request permission before relocating or disposing of carcasses.

6.2 Reporting

Reporting will be completed as described in the WIRHS document in Appendix D.

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Appendix A. PacifiCorp's RESPECT Corporate Policy

PacifiCorp's RESPECT policy outlines the basic seven principles that define PacifiCorp's environmental policy. The seven principles, **R**esponsibility, **E**fficiency, **S**tewardship, **P**erformance, **E**valuation, **C**ommunication, and **T**raining, are described in detail in Figure 1 of this document. PacifiCorp utilized these seven principles, in addition to the U.S. Fish and Wildlife Service's *Consideration for Avian and Bat Protection Plans* white paper, in the development of this document.

Appendix B. Pre-Construction Baseline Wildlife Survey Report

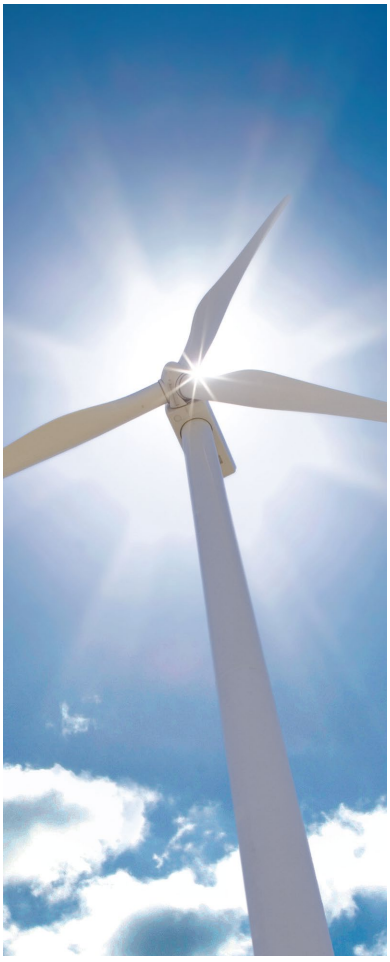
Appendix C. Post-Construction Monitoring Reports

Appendix D. PacifiCorp's Wildlife Incident Reporting and Handling System

Appendix C. Goodnoe Hills Wildlife Incident Reporting and Handling System

Pacific Power Renewable Energy Sites

Wildlife Incident Reporting and Handling System (WIRHS)



PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

TABLE OF CONTENTS

BACKGROUND AND INTRODUCTION

The US Fish and Wildlife Service (USFWS) requests that mortality discoveries of birds protected under the Bald and Golden Eagle Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act be reported. PacifiCorp intends to report all avian mortality discoveries found in the Project over the entire life of the project as part of the project operations and monitoring efforts. The purpose of this Wildlife Incident Reporting and Handling System (WIRHS) manual is to standardize and describe the actions taken by project personnel in response to wildlife incidents found in the project. The manual is intended to be working directions for personnel encountering a wildlife incident to fulfill the obligations of PacifiCorp in reporting bird incidents.

PACIFICORP POLICY

Employees or subcontractors of PacifiCorp, have a responsibility to comply with all environmental laws and regulations. Most birds that occur in the Renewable generation sites are protected by the federal Migratory Bird Treaty Act and eagles are further protected by the Bald and Golden Eagle Protection Act.

MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act of 1918 (MBTA) is the cornerstone of migratory bird conservation and protection in the United States. The MBTA offers protection of 836 species of migratory birds, including waterfowl, shorebirds, seabirds, wading birds, raptors, and passerines. Generally speaking, the MBTA protects all birds in the U.S. except gallinaceous (upland game) birds, rock doves (pigeons), European starlings, and house (English) sparrows.

BALD AND GOLDEN EAGLE PROTECTION ACT

In June 1940, Congress signed into law the Bald and Golden Eagle Protection Act (BGEPA). This law afforded additional protection to the bald and golden eagle. Penalties for violations of the BGEPA are up to $250,000 and/or 2 years imprisonment for a felony (violations are defined as a felony), with fines doubled for organizations.

ENDANGERED SPECIES ACT

In 1973 the Endangered Species Act (ESA) was passed to protect endangered and threatened species and to provide a means to conserve their ecosystems. Under the ESA, Federal agencies are directed to utilize their authorities to conserve listed species, as well as "Candidate" species that may be listed in the near future, and make sure that federal agencies' actions do not jeopardize the continued existence of these species. As with the MBTA and the BGEPA, the ESA as amended prohibits the taking of species listed under the act as threatened or endangered.

PacifiCorp's WIRHS will be active for the life of the site. The WIRHS is designed to provide a means of recording and collecting avian and bat mortality discoveries found in the project to minimize and avoid attracting scavenging wildlife. It is the responsibility of PacifiCorp employees and subcontractors to report all avian and wildlife incidents to appropriate personnel or your immediate supervisor.

WILDLIFE INCIDENT REPORTING

The following procedures are to be followed when project personnel or others observe an avian or bat mortality discovery or injury while on site. These procedures are intended to be in place for the life of the Project and are independent to any monitoring studies. Implementation of this WIRHS will be part of the PacifiCorp staff training program.

WHEN TO USE THE WIRHS - WHAT CONSTITUTES A REPORTABLE INCIDENT?

For the purposes of this reporting system, *incident* is a general term that refers to any bird or bat, or evidence thereof, that is found either dead or injured within the project. Note that an incident may include an injured animal and does not necessarily indicate death as in a carcass or mortality discovery.

An intact carcass, carcass parts, bones, or scattered feathers or an injured bird or bat are all considered reportable incidents. Report all such discoveries even if you are uncertain if the carcass or parts are associated with a project structure.

A *mortality discovery* is any find where a carcass, carcass parts, bones, or feather spots are observed. An *injury* or injured animal is any bird or bat with an apparent injury, or that exhibits signs of distress to the point where it can not move under normal means or does not display normal escape or defense behavior.

Prior to assuming a bird or bat is injured, it should be observed to determine if it can not or does not display normal behaviors. For example, raptors will occasionally walk on the ground, especially if they have captured a prey item. Raptors also "mantle" or hold their wings out and down covering a prey item. These types of behaviors may make the wings appear broken or the animal injured. Identification of specific behaviors typical to bird life cycles and distress behaviors will be part of the facility staff training program, otherwise a biologist with expertise will be notified as to uncertain bird behavior.

Note: Any incident involving a threatened or endangered species or a bald or golden eagle must be reported to USFWS within 48 hours of identification. See project personnel listing for contact information.

MATERIALS NEEDED TO RECOVER/REPORT AN INCIDENT

The supplies needed for this WIRHS will be contained in a "run-kit" storage device (e.g., Rubbermaid storage container, backpack, or airlines luggage) available on site at the Operations and Maintenance Office. The run-kit includes the following items:

A copy of this WIRHS
Wildlife Incident Report Forms
1 - large, portable, tool boxes or storage boxes (lockable; **i.e.** http://www.walmart.com/catalog/product.do?product_id=2476189&findingMethod=rr)
1 - 5 pack of Sharpies, multicolor
1 - 5 pack of pens

1 - 5 pack of mechanical pencils
2 - packs of 3" X 5" index cards
2 - boxes of 1 gallon & quart size zip lock freezer bags (16 gallon & 16 quart)
1 - packages of 12" zip ties (Wal-Mart or Home Depot/Lowe's 30ct minimum)
1 - boxes of garbage bags (13 gallon)
1 - boxes of disposable gloves (30 pair count or more per box/bag) (**i.e.** http://www.walmart.com/catalog/product.do?product_id=10715978)
1 - "inexpensive" digital cameras (minimum 3.0 mega pixels) (**i.e.** http://www.walmart.com/catalog/product.do?product_id=9134433)
1 - salad or BBQ tongs (forceps if available) (**i.e.** http://www.walmart.com/catalog/product.do?product_id=10097014)
1 - packages of red "survey marking flags" (20 pack or larger) (Home Depot or Lowe's carry these)
2 - pairs of inexpensive leather gloves (16 large and 16 medium) (Wal-Mart or Home Depot/Lowe's)
1 - large canine transporters/carriers (**i.e.** http://www.walmart.com/catalog/product.do?product_id=10893743)
1 - dark blankets or large throws (**i.e.** http://www.walmart.com/catalog/product.do?product_id=10371352)
1 - medium hand towels
2 - small collapsible cardboard boxes (large enough for small bird or bat)
1 - small padlocks that will fit in tool box lock opening (**i.e.** http://www.walmart.com/catalog/product.do?product_id=8251841)

INCIDENT RECOVERY AND REPORTING PROCEDURES:

If an animal is found or if you determine a bird/bat is injured, the following procedures should be followed:

1. If the incident discovered is an injured bird, initially move to a distance far enough away that it is not visibly disturbed or uneasy due to your presence. Follow the procedures for reporting and care of injured wildlife found below.

If the incident discovered is a mortality discovery or injured bat the following procedures apply.

2. Initially, leave the subject animal in place. A flag may be used to mark it's location for easy finding while specific data is being recorded. If it is a mortality discovery, leave the subject animal in place until all the data is recorded. It is recommended that any flagging be marked with the date, time and initials of the recorder.

3. Prepare a Wildlife Incident Report Form. The form and instructions for filling out the form are provided below.

4. Prepare a 3x5 card label that includes the exact date and time of the find and the observer's initials that are recorded on the Wildlife Incident Report Form. Use a Sharpie to record information on the label and write in large letters. This label is critical to correlating the carcass and photographs back to the data forms in the future and will be bagged and stored with the carcass.

5. Photograph the incident as it was found in the field. Take at least two pictures: a close up shot of the animal as it lays in the field and a broader view of the animal (marked by a flag) with the road, turbines, or other local features in the view. For the close up picture lay the 3x5 card label marked with the date, time and initials of the recorder facing up next to the carcass so that it appears in the picture.

6. Following completion of the report form and photographs, the mortality discovery should be collected. In the case of a scavenged mortality or feather spot it is important to collect all parts so that it is not encountered and counted again at a later date. The mortality discovery or parts should be bagged in a Ziploc freezer bag (or other such adequate sample bag such as Whirlpaks) or garbage bag in the case of large birds. The 3x5 card label should be included in a second Ziploc bag with the bag holding the actual animal (double bagged). It is advisable to use plastic disposable gloves to collect casualties for hygiene and potential disease considerations.

Injured bats (that can not fly) are also to be collected. Due to disease considerations and safety, injured bats should be collected with long forceps using disposable gloves. Confine the injured bat in a shoebox with a lid, punched air holds, and a soft cloth. The Operations project manager, project biologist, or monitoring study Field Coordinator (see list of contacts) should be notified immediately and will be responsible for euthanizing injured bats.

7. Report the find to the authorized representative or PacifiCorp staff within 24 hours. As soon as possible after the mortality discovery is collected it should be stored in the site freezer and an entry completed in the freezer log book. Follow the instructions on the freezer log book for logging fatalities into the freezer. Include the card label double bagged with the mortality discovery in the freezer.

Any incident involving a State or Federally listed threatened or endangered species or a bald or golden eagle must be reported to the USFWS and/or state wildlife agencies within 48 hours of identification. These finds will be reported to the agency verbally or via email by the authorized representative or PacifiCorp staff. See project personnel listing for contact information.

WILDLIFE INCIDENT REPORT FORM INSTRUCTIONS

SECTION 1 – DISCOVERY DATA

Date and Time: Record the date and time when the incident was found and the report is completed.

Name(s): Record the name(s) of the person(s) who made the discovery and filled out the report form.

SECTION 2 – LOCATION INFORMATION

Structure: Record the nearest turbine or met tower number. If no project facility is nearby indicate that the incident was found on site and the approximate location.

Distance from Structure: Record the approximate distance to the structure from where the incident was found. Pacing is a good means of estimating distance.

Direction from Structure: Record the general direction such as N (north), NE (northeast), E (east) etc. from the structure to where the incident was found. If the direction is unknown indicate in the Location Remarks (below) if the incident was on the road side or non-road side from the turbine.

Location Remarks: Include in this section any other information about the incident location that might be helpful such as found on the road, found on the turbine pad, found directly under guy wires, power lines overhead, etc.

SECTION 3 – WEATHER INFORMATION

Identify the weather condition present at the time of the incident

SECTION 4 – SPECIES IDENTIFICATION

Species: If known, record the species. If unknown, record "unidentified" or "unknown".
Mortality/Injury: Circle the appropriate choice.

Disposition of the Incident: Incidents located by project personnel are to be collected. The disposition of the find in most cases will be that it is stored in the site freezer. In cases of injured birds (see procedure below) the disposition may be the wildlife rehabilitator or if an eagle or threatened or endangered species is found, the incident will be turned over to the USFWS.

Condition: Circle appropriate description. *Complete* is an intact carcass or carcass that appears complete with no obvious signs of scavenging. *Dismembered* is a carcass with appendages missing or amputated from body. *Feathers* indicates an incident where only feathers were found, a feather spot.

Field Notes and Physical Condition: This section is for recording any field notes or observations specific to the incident. For example, describe observations about the incident at the time it was found. Some good observations to include are whether the carcass appears fresh or is old and desiccated, whether it was infested with insects, whether maggots were present, the condition of the eyes – dried and sunken versus moist and round, whether all appendages were present or if one

or more were missing (e.g., missing right wing). Notes recorded in this section are helpful in estimating the time since death.

Estimated Time Since Death: Indicate the approximate number of days since the time of death based on your best judgment. Very fresh carcasses which may be only a few hours old will generally have no insect infestations and eyes may be round and wet appearing. Insect infestations can occur relatively quickly, especially in warm weather, and even carcasses less than 24 hours old may have flies or beetles on them. The presence of fly larvae (maggots) would indicate a carcass is a few days (generally >24 hours) to a week old. A dried carcass with all the flesh removed is likely to be greater than 14 days and if bones are visible it could be over 30 days old. In cold weather, carcasses will appear fresh for longer time periods and may not experience insect scavenging.

Field Marks used: Include in this section any notes or information such as identification marks that helped you determine the species of the bird or bat. If the species was unknown but you have an educated guess, or you know the bird was a raptor for example but don't know the species, include it here.

Photos: Indicate whether photos were taken and if so how many.

SECTION 5 – ADDITIONAL COMMENTS

Document any additional information in this section. (e.g. behavior observed if injured; details of carcass – missing body parts, injuries, number of feathers in feather spot; indications of cause of death; field marks for identification, characteristics of where found - hidden or exposed)

SECTION 6 – CHAIN OF CUSTODY

Disposition of Carcass: Record the method of disposition of the carcass, date, time and the initials of the person performing the disposition. If the carcass is release to the USFWS, document the person's name, date and time, including the PacifiCorp representative that approved the disposition.

SECTION 7 – AGENCY RECORD OF CONVERSATION

Name of Field Personnel/Manager Notified: Record the name, date and time that the O&M Project Manager, project biologist, or the monitoring study Field Coordinator was notified about the find. Record the name, date, and time of all governmental agency notifications.

INJURED WILDLIFE – PROCEDURES FOR REPORTING AND CARE

The following procedures apply to injured birds:

Fill out a Wildlife Incident Report Form as for a mortality discovery, but first, the primary objective is to provide immediate care for the injured animal. If safely possible and authorized to do so, capture the injured bird by placing a dark cloth or towel over the animal. By removing its ability to see, birds generally calm down and are more easily handled. Place the bird in a box that has a towel or other material for the animal to hide under or grasp on to.

While capturing the animal, assess the injury so you'll know what to report to the authorized representative, PacifiCorp staff, and/or the wildlife rehabilitator. As soon as possible after capture, contact the authorized representative or PacifiCorp staff about the find and for further instruction (see contact list).

Minimize additional stress to the animal by keeping it cool if it is a hot day or keeping it slightly warm if it is a cool day. Placing the box in a darkened room with closed doors may be helpful in minimizing stress while the appropriate arrangements are made for care.

If the injured bird is a Federally or State listed species, an authorized representative or PacifiCorp staff will notify the appropriate U.S. Fish and Wildlife and/or state wildlife representatives (see contact list). If the injured animal is found after normal weekday office hours, leave a message (if possible) and report it again the next available working day.

If you can't reach the authorized representative or PacifiCorp staff, phone the nearest rehabilitation center and request further instruction (see contact list). The rehabilitation center is required to report any injured raptor to the WDFW and USFWS within 48 hours. If the injured bird is an eagle or has been gun shot, it should also be reported to federal and state law enforcement offices. Describe the injury to the rehabilitation center and they will determine if it should go directly to a veterinary clinic.

Deliver the animal to the specified location. If applicable, request that the veterinary clinic make arrangements to deliver the bird to the designated rehabilitation center following treatment. PacifiCorp will pay for all veterinary bills.

Attachment A: Wildlife Incident Reporting Form
CONFIDENTIAL BUSINESS INFORMATION

SECTION 1: LOCATION INFORMATION

Date: _____ Time: _____ Observer: _____ ID No.: _____

Found during (choose one): _____Scheduled Carcass Search _____Incidental Find

Project Location:_____

SECTION 2: LOCATION INFORMATION (if known)

Location: _____Nearest Turbine #_____ _____Other – describe:

_____Weather Station #_____

Distance and Bearing to nearest turbine or weather tower as *measured from carcass to structure*:

Azimuth (degrees): _____ Distance (meters): _____

GPS Unit: _____ State Plane Coordinates: Northing_____ Easting_____

Landform (all applicable): _____Flat/Rolling _____Steep slope _____Hilltop _____Depression

Habitat or Community Type(s) present at carcass location:

_____Standing Crops _____CRP/Pasture _____Plowed/Fallow

_____Forest _____Scrubland _____Other – describe:_____

Location Notes:_____

SECTION 3: WEATHER INFORMATION

Weather History (select all that apply):

___Clear ___Calm ___Fog ___Cloudy ___Light Rain ___Storm ___Snow ___Blizzard

___Gusty Winds ___Sustained High Winds ___Violent Storm

Weather Notes:_____

SECTION 4: SPECIES INFORMATION (if known)

Species: _____ Photo No.: _____

Sex (circle): _____Male _____Female _____Unknown

Age (circle): _____Adult _____Juvenile _____Unknown

Disposition of carcass (project office freezer, other): _____

Estimated time since death or injury: _____

Condition: ___Injured ___Intact ___Scavenged ___Dismembered ___Feather Spot

___Other – describe: _____

Bird banded or tagged – describe thoroughly:_____

Species Notes:_____

SECTION 5: ADDITIONAL COMMENTS:

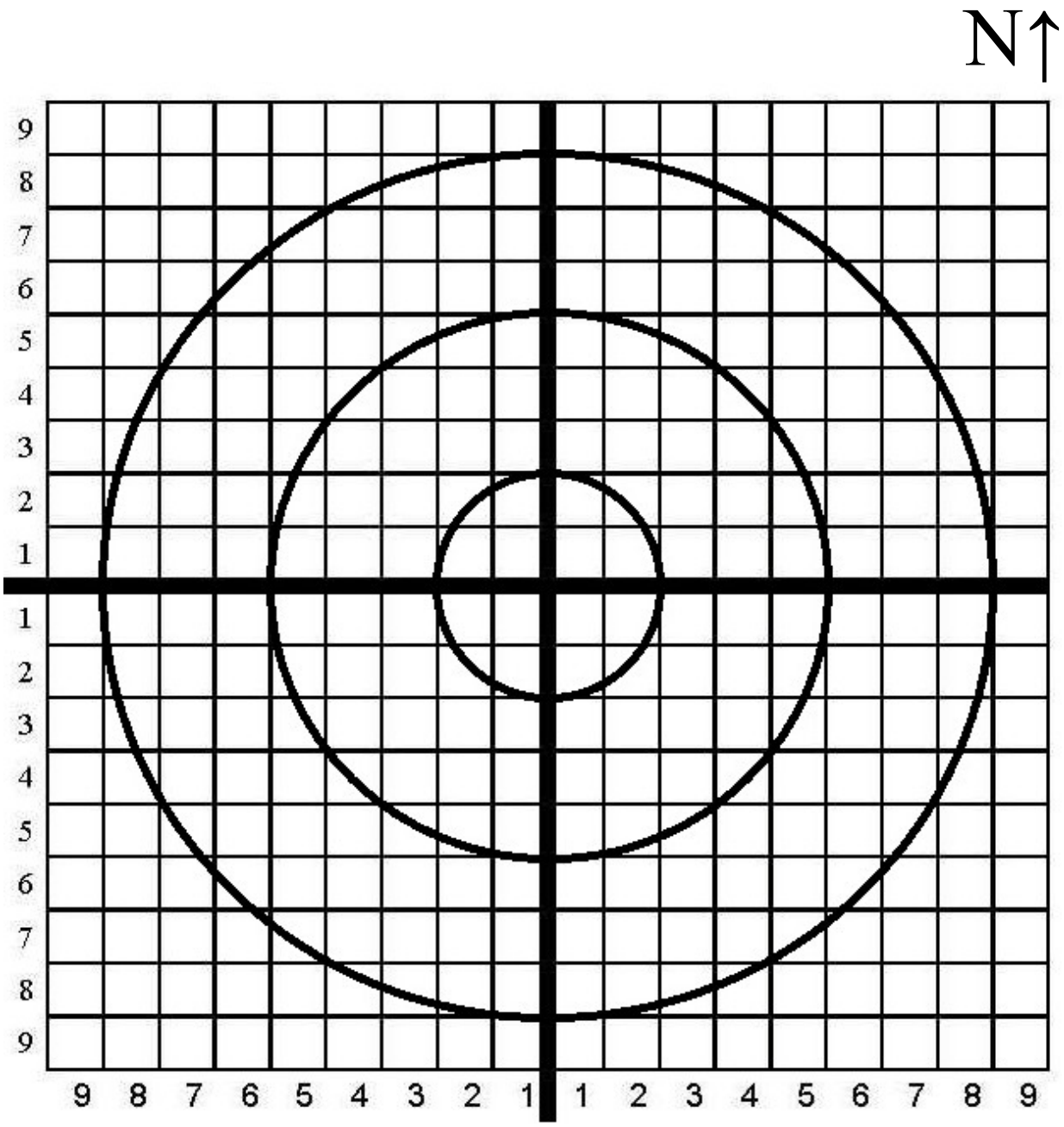
SECTION 6: CHAIN OF CUSTODY

Disposition of carcass: _____ Date: _____ Time: _____ Initials: ___
Disposition of carcass: _____ Date: _____ Time: _____ Initials: ___
Disposition of carcass: _____ Date: _____ Time: _____ Initials: ___
Disposition of carcass: _____ Date: _____ Time: _____ Initials: ___

If Release to USFWS:
USFWS Person's Name: _____ Date: _____ Time: _____
PacifiCorp Representative: _____ Signature: _____

SECTION 7: AGENCY RECORD OF CONVERSATION

Contact Name: _____ Agency: _____
Contact Phone Number: _____ Date: _____ Time: _____
PacifiCorp Representative: _____
Discussion Topics and Comments: _____



Scale: 1 square = 10 x 10 meters Circles: 20m, 50m, 80m

Attachment B: Project Personnel Listing and Contact Information

GOODNOE HILLS (WASHINGTON)

PacifiCorp

Mike Isaacson, PacifiCorp
Cell: (509) 314-0308
Mike.Issacson@pacificorp.com

or

Michael Ichisaka, PacifiCorp
Office: (503) 813-6617
Michael.Ichisaka@pacificorp.com

or

Jonathan Gross, PacifiCorp
Office: (307) 577-6639
jonathan.gross@pacificorp.com

State:

Washington Department of Fish and Wildlife
Bill Weiler
Office: 509-365-0075
weilewjw@dfw.wa.gov

County (Klickitat):

Mo-chi Zoe Lindblad
Office: 509-773-5703
mochil@co.klickitat.wa.us

Federal Agencies
U.S. Fish and Wildlife Service
Corky Roberts
Special Agent, Office of Law Enforcement
Office: 509-375-6202
14852 NE 95th Street
Redmond, Washington 98052

Wildlife Rehabilitation Center

Lynn Thompkins
"Blue MT Wildlife"
Pendleton, OR
Office: (541) 278-0215

Jimmy Bathke
Professional Falconer
(509) 773-4214

Marcia Flamm
"Raptor House Rehab Center"
Selah, WA
Home: (509) 945-7334

Mike Fuller, DVM
"Ellensburg Animal Hospital"
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Ellensburg, WA 98926
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Attachment B: Project Personnel Listing and Contact Information

LEANING JUNIPER (OREGON)

PacifiCorp

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or

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Michael.Ichisaka@pacificorp.com

or

Jonathan Gross, PacifiCorp
Office: (307) 577-6639
jonathan.gross@pacificorp.com

State:

Oregon Department of Fish and Wildlife
Steve Cherry
Office: 541-676-5230

County (Gilliam):

Susie Anderson
Office: 541-384-2381

Agencies

U.S. Fish and Wildlife Service
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Special Agent, Office of Law Enforcement
Office: 425-883-8122 ext. 223
14852 NE 95th Street
Redmond, Washington 98052

Wildlife Rehabilitation Center

Lynn Thompkins
"Blue MT Wildlife"
Pendleton, OR
Office: (541) 278-0215

Jimmy Bathke
Professional Falconer
(509) 773-4214

Marcia Flamm
"Raptor House Rehab Center"
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"Ellensburg Animal Hospital"
1800 Vantage Highway
Ellensburg, WA 98926
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Attachment B: Project Personnel Listing and Contact Information

Black Cap Solar (OREGON)

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or

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State:

Oregon Department of Fish and Wildlife
Steve Cherry
Office: 541-676-5230

Agencies

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Special Agent, Office of Law Enforcement
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Redmond, Washington 98052

Wildlife Rehabilitation Center

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Pendleton, OR
Office: (541) 278-0215

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Professional Falconer
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MARENGO I/II (WASHINGTON)

PacifiCorp

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Tom Schirm
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Selah, WA
Home: (509) 945-7334

Mike Fuller, DVM
"Ellensburg Animal Hospital"
1800 Vantage Highway
Ellensburg, WA 98926
Office: (509) 925-2833

Attachment C: Freezer Tag

Facility:______________________________ Sample Log #:____________________________
(from log book)
Date:_________________________________ Time:_________________________________

Collector's Name/Employee # or Company's name:_________________________________

Circle one: Bird / Bat Species:_________________________________

Facility:______________________________ Sample Log #:____________________________
(from log book)
Date:_________________________________ Time:_________________________________

Collector's Name/Employee # or Company's name:_________________________________

Circle one: Bird / Bat Species:_________________________________

Facility:______________________________ Sample Log #:____________________________
(from log book)
Date:_________________________________ Time:_________________________________

Collector's Name/Employee # or Company's name:_________________________________

Circle one: Bird / Bat Species:_________________________________

Facility:______________________________ Sample Log #:____________________________
(from log book)
Date:_________________________________ Time:_________________________________

Collector's Name/Employee # or Company's name:_________________________________

Circle one: Bird / Bat Species:_________________________________

Attachment C: Freezer Tag

_____ FACILITY

ID	Date of Find	Time of Find	Turbine I.D.	Bird or Bat Species	CS or INCID	O&M or BIOL	Collector's Initials	Carcass in Freezer (Y/N)	Disposition
16-001									
16-002									
16-003									
16-004									
16-005									
16-006									
16-007									
16-008									
16-009									
16-010									
16-011									
16-012									
16-013									
16-014									
16-015									
16-016									
16-017									
16-018									
16-019									
16-020									

Appendix D. PacifiCorp Renewable Resources Retrofit Plan for Washington and Oregon Wind Energy Projects

PacifiCorp Renewable Resources Retrofit Plan for Washington and Oregon Wind Energy Projects

September 25, 2019

Overview

This document, and documents reference herein, provide a detailed plan for mitigating eagle take at PacifiCorp's operating wind projects utilizing power pole retrofits as contemplated in the 2012 Land-Based Wind Energy Guidelines (LWEGs) and Eagle Conservation Plan Guidance (ECPG) documents. The number of poles retrofitted per eagle, and project, will determined by the individual project's approved take levels outlined in the respective Eagle Conservation Plan (ECP) and calculated using the U.S. Fish and Wildlife Service's Resource Equivalency Analysis (REA) model for eagles. The retrofits will be performed within two (2) years of the issuance of an either 5 year or 30 year Eagle Take Permit (ETP). Regardless of the ETP term, the retrofits will be performed every five years at either the time of ETP renewal (5 year permit) or at the five year review period of a 30 year term permit. The retrofits will be performed on PacifiCorp owned power poles, either distribution or transmission, and within the same Eagle Management Unit in which the mortality occurred. Location priority will be focused on those poles in PacifiCorp service districts near the operating project(s) at which the mortality occurred. Locations would also be selected based on eagle risk and additionally to existing PacifiCorp Avian Protection Plan (APP) efforts. Retrofits may occur on poles that meet eagle risk criteria in PacifiCorp's service territory within the same Eagle Management Unit.

Rocky Mountain Power (RMP) Transmission and Distribution (T&D) Operations will conduct pole retrofitting for PacifiCorp's Renewable Resources Wind Energy Generation group (Wind Operations) using RMP's standardized APP risk assessment and retrofitting process as detailed in RMP's APPs. This includes proactive risk assessment surveys to identify avian risk poles, GIS analysis of data, job preparation and review, retrofitting implementation, inspection, follow-up surveys, and any needed longer-term corrections and maintenance. Survey methodology used was originally developed in conjunction with U.S. Fish and Wildlife Service (Ecological Services and Law Enforcement) and Utah Division of Wildlife Resources in 2001 and has been refined over time.

Prioritization of Circuits for Risk Assessment Surveys

Within PacifiCorp's APP, circuits are prioritized for risk assessment surveys based on historic electrocution and collision rates of eagles and other protected birds.

Prioritizations are made on a rolling five-year plan, with circuit prioritization data reviewed annually based on changes in bird mortality data and input from USFWS. Circuits that are a higher priority are conducted first as part of RMP T&D Operation's APP commitments. Circuits used for compensatory mitigation for Wind Operations are selected so that there is no overlap or conflict with APP planning in the current five-year cycle. Retrofit conducted for Wind Operations are additive to those conducted as part of PacifiCorp's APP.

Risk Assessment Survey Methodology

Data Collection/Field Surveys

Surveys are conducted in areas of suitable habitat for open-country raptors including sagebrush, grasslands, meadows, pasture, cropland, pinyon/juniper, and similar habitats. Surveys are

conducted in rural and remote areas, however locations with heavy development (e.g. urban or suburban areas) are not surveyed.

Field surveys are conducted by trained biologists equipped with tablet computers with Arc GIS maps of survey areas depicting the locations of poles. Observers walk power lines, visually inspecting the ground as well as poles and lines for evidence of bird use and carcasses. They search an area encompassing 4.5m (15ft.) on each side of the central line and a 7.6m (25ft.) radius around each pole for carcasses, prey remains, pellets, molted feathers, and whitewash.

At each pole, data is recorded on the habitat type, pole configuration, avian mortalities, live species observed, evidence of raptor use, and presence of raptor, corvid, or other nests on or near structures. Pole configuration data includes: configuration type, number of energized phases, number of transformers, presence of exposed energized equipment, material of crossarm and brace, location of ground wire, and presence of historic or current bird protection devices (perch discouragers, perches, insulator covers, bushing caps, arrester caps, cutout covers, hose, covered conductor, line markers, etc.). In addition, the surveyor assesses whether or not the structure is avian-safe and assigns it an overall risk score (low to high). If an avian mortality is discovered, the species, number of individuals, distance to nearest pole, and cause of death (if known) and supporting evidence are recorded. Remains of all birds excluding eagles or threatened/endangered species are buried on site. In the event of an eagle or threatened/endangered species mortality, the U.S. Fish and Wildlife Service Office of Law Enforcement (OLE) is notified and provides instructions on carcass disposition (e.g, burial, salvage and transport to USFWS or state game warden, etc) as per company Special Purpose Utility Permits (SPUT) and agency agreements. For observations of live raptors, corvids, waterfowl, wading birds, cranes, and sage-grouse, the species, number of individuals, and behavior(s) are recorded. Evidence of raptor use, including presence of pellets, whitewash, molted feathers, or prey remains, and concentrations of prey populations, such as prairie dog colonies or high abundances of rabbits or other small mammals, are documented. If a nest is observed, the species (if known), location, and status of nest (active/inactive) are recorded.

GIS Data Analysis

The existing pole layer of PacifiCorp's GIS data is used as a base map to which survey data is added. The field data is then analyzed spatially with other existing datasets such as bird-caused outages, historic bird mortalities, nest locations, etc.

Each structure is evaluated in GIS and structures meeting the following criteria are selected for retrofitting:

- Poles with avian mortalities
- Poles adjacent to current and historic mortality poles (5 spans on each side)
- Poles near mortality poles with a similar configuration
- Circuits, lines, or taps where multiple mortalities have occurred
- Poles located within suitable habitat that are within 1-km of a raptor or raven nest and have evidence of use (e.g., pellets, whitewash, molted feathers)
- Poles with raptors observed perching on them
- Poles with raptor or raven nests and adjacent poles within five spans of these nests

- Deadend equipment poles in remote or rural areas
- Configurations that have been documented to have a heightened risk, if applicable, in a local area
- Non-raptor-safe poles in otherwise raptor-safe lines
- Non-raptor-safe poles with perch discouragers and two adjacent poles in each direction
- Incomplete or improper installation of existing avian protection devices
- Portions of circuits or lines with a history of bird-caused or unknown-cause outages
- Poles with covers or other bird protection that is degraded or needs replacement
- Surveyor field risk assessment (for poles categorized in the field as medium to high risk)

For circuits being addressed as compensatory mitigation for Wind Operations, RMP T&D Operations still maintains responsibility to retrofit certain structures as per company policy. This includes: eagle mortality poles and five adjacent poles in each direction; poles with other protected bird mortalities; poles needing nest management; and poles needing maintenance/repairs that is not avian-related. Other non-avian-safe poles that pose a risk to eagles as identified above will be used as compensatory mitigation structures for Wind Operations. Once poles to retrofit are identified, a comprehensive remedial action plan is developed with the appropriate service district that identifies a course of action, timeline, and resources required. A spreadsheet is prepared by RMP's T&D Environmental Services that includes a list of bird protection materials to be installed at each structure. The job is reviewed by a trained avian job reviewer, who assesses engineering, construction, and crew work considerations. RMP Wires Work Planning (RMPWWP) creates a Systems, Applications, and Products (SAP) work notification and job packet for each pole, works with Logistics and T&D Operations to order materials and schedule crews. Line crews conducting the retrofitting are given the job packet, spreadsheet, and photos of each pole, as well as training on proper installation and documentation.

At bi-weekly RMP APP Steering Group meetings, the progress of APP survey and retrofitting jobs are tracked. As work is completed, after photos are taken of retrofitted poles and SAP orders are closed out. Inspections of retrofitted work are conducted as per RMP's avian inspection protocol. If poles fail inspection, these jobs are sent back to T&D Operations to be corrected.

One year after retrofitting, follow-up surveys are conducted at 25% of the poles originally surveyed to evaluate the effectiveness of remedial actions and risk assessments. Poles selected for follow-up surveys include those that were retrofitted, poles with previous mortalities, and those that were not previously identified as a high risk. Based on the results of follow-up surveys, additional remedial actions may be conducted or risk assessment methodology and retrofitting materials may be modified. In addition, periodic longer term follow-up surveys are conducted as part of PacifiCorp's APP at various locations to assess long-term effectiveness.

Comparison of Pole Retrofits Conducted for RMP T&D Operations APP versus Wind Operations Eagle Compensatory Mitigation

There are various components of this retrofitting effort that are either distinctly different for RMP T&D Operations and Wind Operations, or consistent for both. Consistency is applied as appropriate to ensure cost and process efficiencies, consistency, and use of company best practices. Differences may occur in areas as needed to clearly separate obligations between the two business units and prevent any duplicative or overlapping efforts. Areas of consistency include the following:

- Use of RMP APP policies and procedures
- Use of RMP APP survey methodology
- Use of RMP APP retrofitting techniques, standards, and best practices
- Use of RMP APP job preparation, review, and inspection processes
- Use of RMP APP Steering Group to oversee and track jobs
- Use of applicable RMP business units to assist with different components of jobs (e.g., T&D Environmental Services, RMPWWP, T&D Operations, Finance, Inspections, etc.)

Areas with differences include:

At the circuit scale:

- Circuits identified for retrofitting for Wind Operations eagle compensatory mitigation will not include circuits in the current RMP APP five-year plan. Circuits to be surveyed and retrofitted for Wind Operations will be selected based on compatibility with Wind Operations' Eagle Conservation Plan (e.g., location, eagle habitat), will have clear separation from current RMP avian work, and will be subject to review and approval by Wind Operations.

At the pole scale:

- Separating mortality poles from non-mortality poles. This includes all poles in surveyed circuits with eagle mortalities and five adjacent poles in each direction, as well as all poles with other protected bird mortalities. These mortality poles are to be retrofitted by RMP T&D Operations.
- Other poles on a surveyed circuit will remain available for retrofitting as part of Wind Operations' eagle compensatory mitigation efforts.

Retrofit survey schedule, locations, and completion summary documents will be provided to U.S. Fish and Wildlife Service staff to review for each respective project.