Appendix A

Leaning Juniper I Eagle Take Permit Application
Eagle Conservation Plan

Leaning Juniper I Wind Facility
Eagle Conservation Plan

Gilliam County, OR

Submitted to:

U.S. Fish and Wildlife USFWS, Pacific Region
Migratory Bird Permit Office
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Submitted by:

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December 2019

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List of Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
CI	confidence interval
CRM	Collision Risk Model
CUP	conditional use permit
EA	environmental assessment
ECP	Eagle Conservation Plan
ECP Guidance	*Eagle Conservation Plan Guidance,* Module 1 – Land-based Wind Energy, Version 2
eagle take permit	Eagle Incidental Take Permit
EMU	eagle management unit
FAA	Federal Aviation Administration
ft	feet
GE	General Electric
Gilliam County	Gilliam County Planning Department
GPS	Global Positioning System
Guidelines	*Land-based Wind Energy Guidelines*
kV	kilovolt
LAP	local area population
m	meters
MBTA	Migratory Bird Treaty Act
MET tower	meteorological tower
mi	miles
min	minute
MW	megawatt
NEPA	National Environmental Policy Act
O&M	operations and maintenance
ODFW	Oregon Department of Fish and Wildlife
OLE	Office of Law Enforcement
PPM	PPM Energy, Inc.
Project	Leaning Juniper I Wind Facility
REA	resource equivalency analysis
RSA	rotor-swept area
SPUT	special purpose utility permit
TAC	Technical Advisory Committee
USFWS	U.S. Fish and Wildlife Service
WEST	Western EcoSystems Technology
WIRHS	Wildlife Incident Reporting and Handling System

1.0 INTRODUCTION AND PURPOSE

PacifiCorp owns and operates the 67-turbine, 100.5-megawatt (MW) Leaning Juniper I Wind Facility (Project) in Gilliam County, Oregon. The Project has been operational since 2006. PacifiCorp is upgrading the turbine nacelles and rotors. The current rotor diameter is 77 meters (m) and a 119-m overall turbine height; the upgraded equipment will have a 91-m rotor diameter and 133-m overall turbine height. The new, larger rotor diameter may change the risk to bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) and other avian species of colliding with turbine blades due to this increased size of the rotor-swept area (RSA)/hazard area. Existing ancillary facilities and support structures, such as turbine tower sections, onsite substations, collector lines, and operations and maintenance (O&M) buildings are 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 is submitting this eagle conservation plan (ECP) as part of an eagle incidental take permit (eagle take permit) pursuant to 50 Code of Federal Regulations (CFR) § 22.26 and to proactively address potential impacts on bald and golden eagles resulting from operation of the Project. This document includes information about the Project, site characteristics, field methods for collecting avian use data, results from avian studies, and a summary of PacifiCorp's efforts to avoid, minimize, or otherwise mitigate Project-related impacts to bald and golden eagles. PacifiCorp has also included proposed conservation measures to avoid and minimize risks to bald and golden eagles, including compensatory mitigation for any unavoidable take. This information is intended to support PacifiCorp's eagle take permit. As explained in greater detail below, the implementation of the conservation measures and mitigation measures included in this ECP are intended to fully mitigate any Project-related impacts to golden eagles to ensure no net loss to golden eagle populations.

1.1 History and Description

The Project was constructed on private land owned by Waste Management Services, in Gilliam County, Oregon. The turbines and supporting facilities are primarily located on dryland wheat agricultural fields and grazing land. The Project is located approximately three miles (mi) south of the city of Arlington, OR (Figure 1-1) and encompasses approximately 4,556 acres (7.1 mi^2). The Project consists of 67 1.5-MW General Electric (GE) turbines with a nameplate capacity of 100.5 MW of energy. The GE turbines have a rotor diameter of 77 m (252.625 feet [ft]) and the wind turbines are situated on 80-m (262-ft) tall steel tubular towers secured to concrete foundations.

The Project includes:

- 67 wind turbines, foundations, and pad-mounted transformers
- A buried electrical energy collection system between turbines
- One electrical substation
- Two permanent meteorological (MET) towers
- A 230-kilovolt (kV) overhead transmission line
- An onsite operation and maintenance facility
- Access roads and crane pads for construction and maintenance of all wind turbine generators.

The Project was initially Phase I of a two-phase project proposed by PPM Energy Inc. (PPM). Phase I became known as Leaning Juniper I and Phase II became known as Leaning Juniper II, which is not owned by PacifiCorp. Pre-construction wildlife baseline surveys were initiated in April 2003 for Leaning Juniper I and Leaning Juniper II project areas. (Kronner et al. 2005). A conditional use permit (CUP) from the Gilliam County Planning Department (Gilliam County) was issued to PPM for Leaning Juniper I in January 2005. Construction of the Project began in late 2005, and the Project became operational in September 2006.

The latitude/longitude location of each of the turbines being upgraded is shown in Table 1-1.

Table 1-1. Turbine Locations at the Leaning Juniper I Wind Facility

Turbine Name	Latitude	Longitude	Turbine Name	Latitude	Longitude
R6	45.62043	-120.192	L6	45.64882	-120.23
R5	45.6217	-120.192	L5	45.65093	-120.23
R4	45.62303	-120.193	L4	45.652	-120.231
(No ID)	45.62466	-120.195	S13	45.65766	-120.189
R2	45.62613	-120.195	S12	45.65896	-120.19
R1	45.62739	-120.196	G11	45.65457	-120.255
Q3	45.6309	-120.195	S11	45.66079	-120.191
Q2	45.63228	-120.196	O3	45.66027	-120.201
W2	45.63413	-120.181	G10	45.65602	-120.256
Q1	45.63355	-120.195	S10	45.66208	-120.191
W1	45.63576	-120.181	O2	45.66154	-120.202
P9	45.63744	-120.196	G9	45.65735	-120.256
P8	45.63887	-120.196	S9	45.66329	-120.192
P7	45.64028	-120.197	O1	45.66277	-120.203
V5	45.64183	-120.178	N5	45.6622	-120.216
V4	45.64287	-120.179	G8	45.65883	-120.257
P6	45.64191	-120.199	S8	45.66531	-120.193
V3	45.64449	-120.182	N4	45.66347	-120.217
P5	45.64335	-120.2	G7	45.66016	-120.259
V2	45.64577	-120.183	J3	45.66177	-120.241
V1	45.64707	-120.183	S7	45.66644	-120.194
P4	45.6463	-120.198	N3	45.66457	-120.218
P3	45.64773	-120.199	J2	45.66289	-120.241
U3	45.65059	-120.18	G6	45.6618	-120.259
P2	45.64906	-120.199	S6	45.66751	-120.195
L7	45.64761	-120.229	N2	45.6658	-120.219
U2	45.65158	-120.18	J1	45.66405	-120.242
P1	45.65035	-120.2	G5	45.66331	-120.259

Turbine Name	Latitude	Longitude	Turbine Name	Latitude	Longitude
U1	45.65257	-120.181	S5	45.66888	-120.197
N1	45.66694	-120.221	G4	45.66469	-120.26
S4	45.67007	-120.198	G2	45.66737	-120.262
G3	45.66598	-120.261	S1	45.67364	-120.201
S3	45.67126	-120.199	G1	45.66869	-120.262
S2	45.67237	-120.2			

PacifiCorp submitted a letter to Gilliam County (April 12, 2018 letter from Travis Brown, PacifiCorp, to Michelle Colby, Director Gilliam County Planning Department) providing written notification of the planned increase to the length of the turbine rotor blades and overall hub heights for all 67 turbines at the Project per Condition 38 of the Project's CUP. Gilliam County has approved PacifiCorp's planned turbine upgrades (May 8, 2018 letter from Susan Anderson, Interim Gilliam County Planning Director, to Travis Brown, PacifiCorp).

The Project was already completed when the U.S. Fish and Wildlife Service (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.

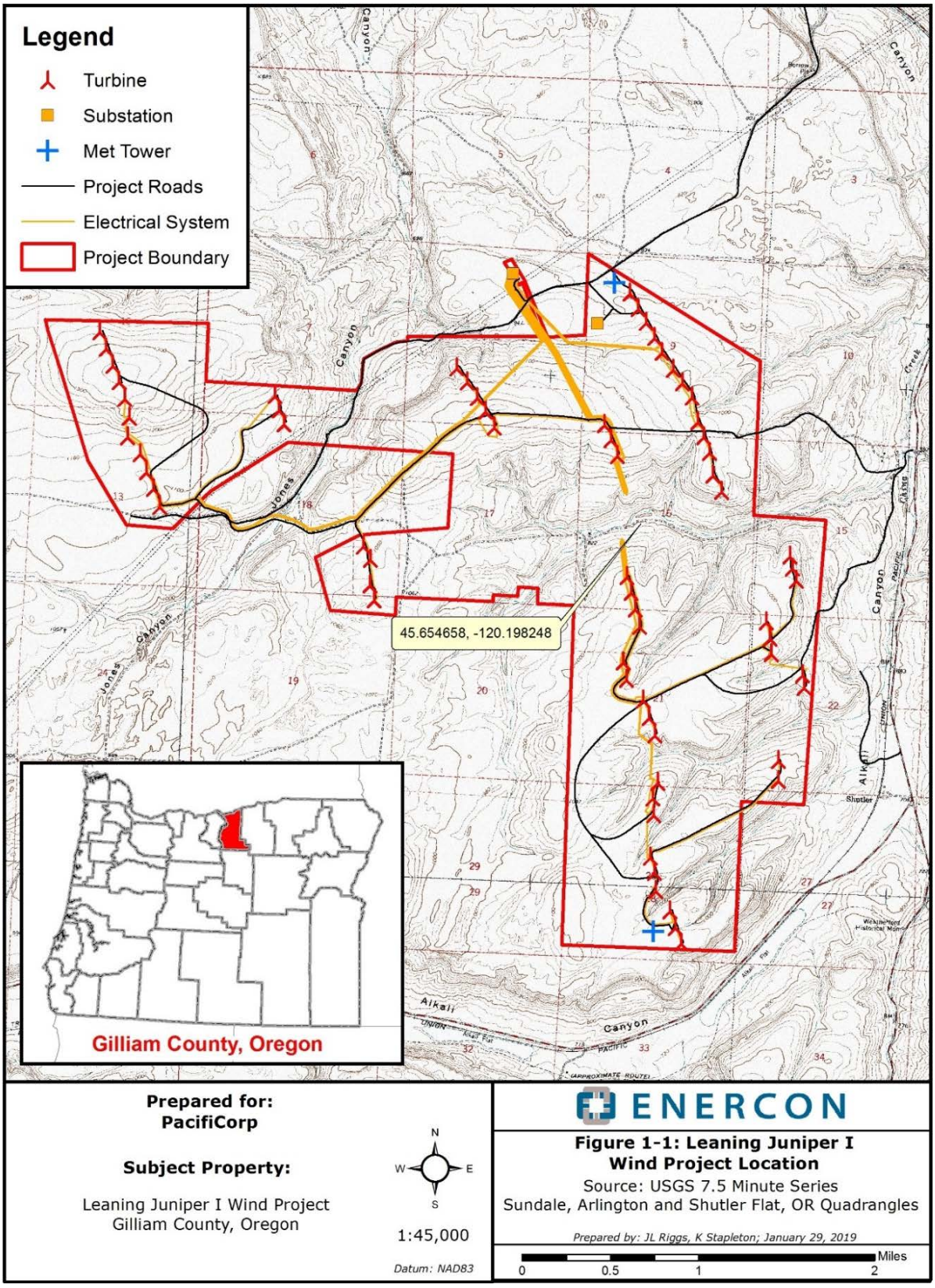

Figure 1-1. Leaning Juniper I Wind Project Location

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.

1.3 Purpose of the Eagle Conservation Plan

The purpose of this ECP is to avoid and minimize risk to bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). It also documents the steps PacifiCorp has taken and plans to take to avoid, minimize, and mitigate project-related impacts to bald and golden eagles. Additionally, it serves as the basis for PacifiCorp's eagle take permit application. As such, it documents the steps that have been taken and will be taken pursuant to an eagle take permit, to avoid, minimize, and mitigate project-related impacts to bald and golden eagles, and ensure no net loss to golden eagle populations. Although this Project was developed prior to issuance of the USFWS's ECP Guidance, it is understood that the USFWS will exercise discretion in applying the ECP Guidance to existing projects, and this ECP represents efforts to meet the intent of the law and ECP Guidance.

1.4 Contents of the Eagle Conservation Plan

This ECP has been developed in accordance with requirements set forth in the USFWS's ECP Guidance. The currently available ECP Guidance focuses on the development of ECPs in five stages, with each stage building on the prior stage. However, the ECP Guidance also notes that "for projects already in the development or operational phase, implementation of all stages of the recommended approach may not be applicable or possible" (USFWS 2013). The Project is in the operational phase, and accordingly PacifiCorp has coordinated with USFWS staff regarding the contents and analysis in this ECP.

Because the Project site has already been selected and is in the operational phase, this ECP focuses on Steps 2–5 of the ECP Guidance and does not focus on Step 1, the landscape-scale evaluation (although landscape-level analysis is used in the effects analysis). In summary, these steps entail a site-specific assessment of eagle use, a fatality risk assessment, identification and evaluation of conservation measures, and monitoring of results. Each stage is discussed in the following chapters.

1.5 Regulatory Framework

The regulatory framework for protecting eagles includes the BGEPA (16 U.S.C. 668-668d and 50 CFR 22.26) and the MBTA (16 U.S.C. 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 that 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 *Federal Register* (81 FR 91494, 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 2016a). 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 U.S.C. § 4321 et seq.) applies to issuance of eagle take permits because issuing such a permit is a federal action (USFWS 2016a). 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 that the take must be "compatible with the goal of stable or increasing breeding populations." To ensure that 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 2016a) 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 2016c).

2.0 SITE SUITABILITY AND PRE-CONSTRUCTION SURVEYS

PacifiCorp is committed to operating the Project in an environmentally responsible way. The Project was carefully planned over the course of several years with the USFWS, Oregon Department of Fish and Wildlife (ODFW), and Gilliam County involvement (Appendix A) to best achieve this commitment and is based on an intensive pre-construction biological evaluation of the Project site, literature searches, and field studies, as described below. The USFWS and ODFW provided input on survey methodologies and reviewed survey results and reports (Appendix A; Kronner et. al. 2005).

2.1 Existing Conditions

The Project is approximately three miles southwest of the town of Arlington in Gilliam County, OR on private land owned by Waste Management Disposal Services of Oregon, Inc. The Project area extends approximately five miles wide and four miles north to south. The topography in the Project area is rolling hills and elevations range from 700 to 1,300 feet above mean sea level. The Project is in a sparsely populated area that has been in agricultural use since at least the 1930s (Appendix A; Kronner et. al. 2005). The Project area contains a mix of ranch and farmlands, a county quarry, and an industrial park. Ranch and farmland are adjacent to the Project area to the north, east, and west, and landfills are adjacent to the south. The predominant land uses are agriculture and ranching; cattle typically graze the pasturelands during the winter and hay is produced in summer. Based on the 2004 habitat mapping effort (Appendix A; Kronner et. al. 2005), land cover within the Project area is a mix of native and non-native vegetation on shallow to deep soils. On a landscape scale, these areas are typically referred to as “agricultural farm land” and “shrub-steppe”. Dryland wheat was the most abundant habitat sub-type, followed by rabbitbrush-snakeweed-buckwheat/bunchgrass.

2.2 Pre-Construction Field Surveys

Since September 2002, PacifiCorp has engaged with the USFWS and ODFW regarding avian resources associated with all our wind facilities in Oregon (Appendix A). PacifiCorp coordinated with the USFWS and ODFW regarding the biological survey methods to be used. PacifiCorp subsequently disclosed and discussed the results of these studies with the USFWS and ODFW on several occasions (Appendix A; Kronner et. al. 2005).

Baseline pre-construction avian studies were conducted at the Project between August 2004 and August 2005. The baseline studies included fixed-point avian use surveys, raptor nest surveys, and wildlife habitat mapping (Appendix A; Kronner et. al. 2005). Pre-construction avian surveys were conducted to characterize the avian community and assess potential impacts. A summary of the pre-construction avian surveys (Appendix A; Kronner et. al. 2005) is provided below.

2.2.1 Fixed-Point Avian Use Surveys

2.2.1.1 Methods

Fixed-point avian use surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). Six 800-m radius points were selected to survey representative habitats and topography of the Project area (Appendix A; Kronner et. al. 2005). The location of all six

survey points shown on Figure 2-1 provide a clear view of all of the sky within an 800-m radius and 200-m above the ground of the points. Flight behavior for all birds was grouped into three categories; 1) Below the RSA (<25-m), 2) within the RSA (25-m to 125-m), and 3) above the RSA (>125-m). There was no survey ceiling. Surveys were conducted weekly from August 27, 2004, to August 15, 2005, except in June 2005, when only two surveys were conducted, with all six points surveyed each week. Each fixed-point count survey was 20 minutes long. A total of 293 20-minute (min) fixed-point avian use surveys were conducted for a total of 97.66 hours. Surveys were conducted during daylight hours and survey periods were varied to approximately cover all daylight hours during a season. Seasons were defined as spring (March 15–May 31), summer (June 1–August 14), fall (August 15–October 31), and winter (November 1–March 14). All species of birds observed during surveys were recorded and large bird observations were mapped.

2.2.1.2 Results

A total of 10,303 individual bird observations within 1,520 separate groups (flocks) were recorded. Forty-two unique species were observed, and an additional 58 unidentified bird types were recorded (Appendix A; Kronner et al. 2005).

Passerines were the most abundant bird type, accounting for 73.6 percent of all groups observed and 68.3 percent of the total number of birds observed. Raptors comprised 20.2 percent of all groups and 3.0 percent of all birds observed. The highest overall bird use occurred in the winter (47.244 birds/800-m plot/20-min survey), followed by fall (19.615 birds/800-m plot/20-min survey), spring (11.758 birds/800-m plot/20-min survey), and summer (6.750 birds/800-m plot/20-min survey). Raptor use was highest in the summer (1.067 birds/800-m plot/20-min survey), followed by fall (0.528 birds/800-m plot/20-min survey), spring (0.394 birds/800-m plot/20-min survey) and winter (0.244 birds/800-m plot/20-min survey). Swainson's hawk (*Buteo swainsoni*) was the raptor species with the highest overall use in summer and spring (summer 0.517 birds/800-m plot/20-min survey and spring 0.106 birds/800-m plot/20-min survey), the ferruginous hawk (*Buteo lagopus*) had the highest raptor use in fall (0.046 birds/800-m plot/20-min survey), and the red-tailed hawk (*Buteo jamaicensis*) had the highest raptor use in winter (0.112 birds/800-m plot/20-min survey) (Appendix A; Kronner et al. 2005).

During the study, 11 golden eagle detections were recorded (Appendix A; Kronner et al. 2005). Nine golden eagles in 9 flocks were observed flying. The numbers observed/recorded do not indicate a population size as the same bird could have been counted more than once during the survey and during the season. Golden eagles were seen during October, January, February, and March. Overall mean golden eagle use is 0.24 eagles/800-m plot/20-min survey. A total of 81.82 percent of the golden eagles observed were flying. All eagle observations represent eagles documented within an 800-m radius of the survey point and 200-m above ground level. A total of 77.8 percent of the golden eagles observed were flying at turbine RSA. The exposure risk index is 0.015 golden eagles/20-min point count/800-m. The RSA used for the Project was 30-m to 130-m above the ground. The number of "eagle minutes" was not recorded during surveys. No bald eagle detections were recorded during the survey (Appendix A; Kronner et al. 2005).

Table 2-1. Seasonal Golden Eagle Observations

Species	Spring	Summer	Fall	Winter	Total
Golden Eagle	3	0	4	4	11
Bald Eagle	0	0	0	0	0

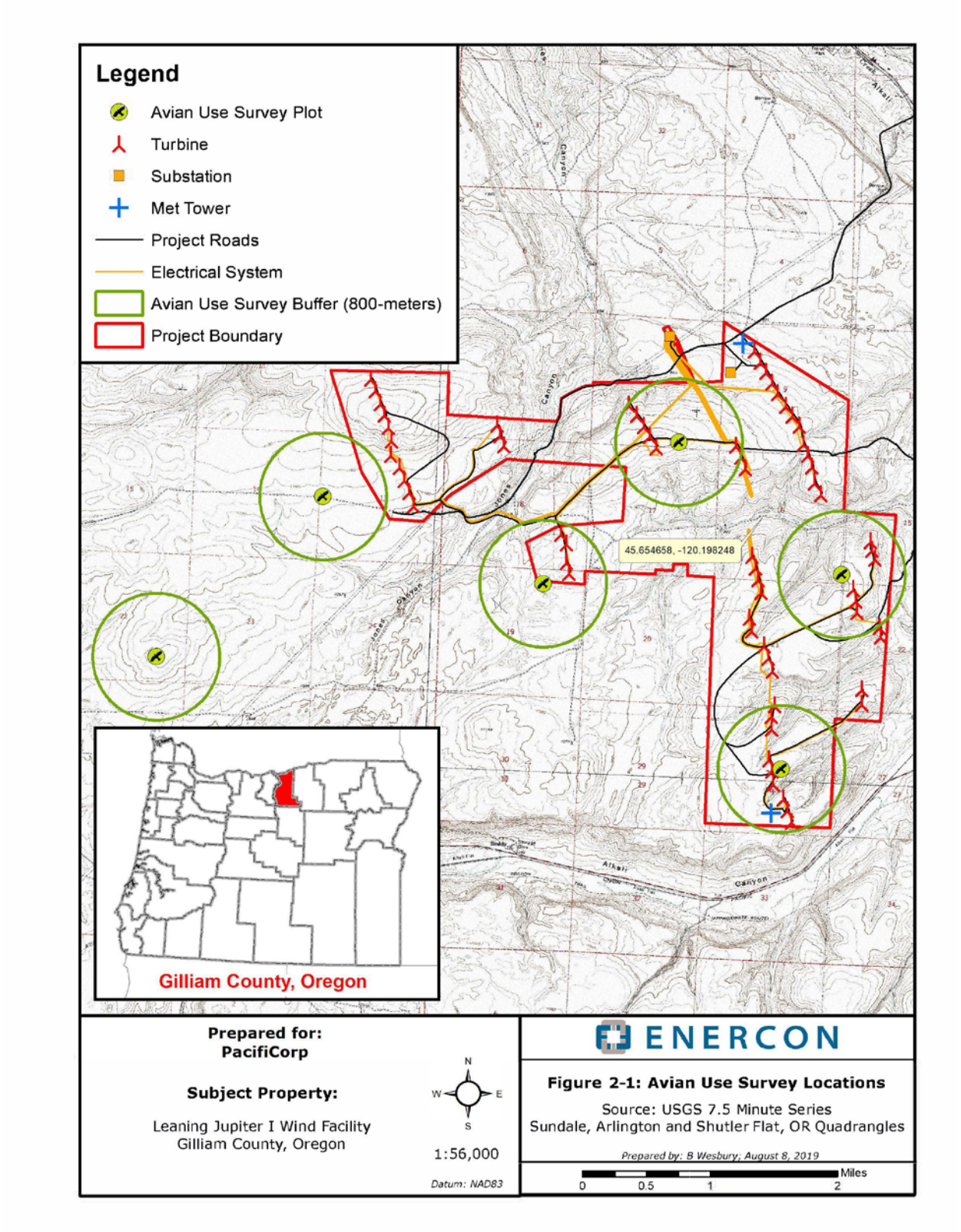

Figure 2-1. Leaning Juniper I Wind Avian Use Survey Locations

2.2.2 Raptor Nest Surveys

2.2.2.1 Methods

Aerial raptor nest surveys were completed in the summer of 2005 throughout the Project area and a buffer of approximately 2 miles from the proposed turbine strings based on the May 2005 turbine layout (Appendix A; Kronner et. al. 2005). Initial surveys were flown by helicopter from May 1–June 8. The entire site was searched; however, survey effort was concentrated in areas that provided suitable nesting potential (e.g., trees, rock outcrops, cliffs, and other structures such as power line poles and old windmills). All potential and confirmed raptor nests were recorded, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or observational data from the ground-based surveys. Inactive nests (without sign of use) were assessed for the type of bird that may have used the nest in the previous year or earlier in the season. Stick nests in trees that appeared to have been constructed and used by common ravens were included in "inactive" status because the structure could be attractive to raptors in future years. All nest locations were recorded using a hand-held Global Positioning System (GPS) unit.

2.2.2.2 Results

Twenty-seven active raptor nests and 22 inactive nests were recorded in a survey area of 61 square miles during the 2005 raptor nest surveys. The species recorded during the survey includes: Swainson's hawk, red-tailed hawk, ferruginous hawk, common raven, great horned owl, and prairie falcon (Appendix A; Kronner et al. 2005).

No bald or golden eagle nests were observed during raptor nest surveys.

2.2.2.3 Supplemental Information

Based on eagle nest data provided by the USFWS, there are six golden eagle nests within a 10-mile radius of the Project. A review of golden eagle nests within a 10-mile radius of the Project was considered because it is consistent with the ECP Guidance. The nearest known golden eagle nest is located about 4.5 miles east/northeast of the Project and was active in 2005 (Appendix A; Kronner et al. 2005). The latitude/longitude geographic coordinates, distance, and direction from the Project of eagle nests within a 10-mile radius of the Project are shown in Table 2-2; no bald eagle nests were located. A map showing the location of golden eagle nests within a 10-mile radius of the Project is provided in Figure 2-2.

PacifiCorp contracted Western EcoSystems Technology (WEST) Inc. to analyze the potential impacts to avian and bat species assuming a larger rotor diameter. A summary of the analysis is provided below. The technical memorandum prepared by WEST can be found in Appendix B.

The current rotor diameter is 77-m and a 119-m overall turbine height; the upgraded equipment will have a 91-m rotor diameter and 133-m overall turbine height. To calculate the potential risk from the larger turbine blades, the proportion increase in the RSA was calculated. The proportion increase in the RSA was then directly applied to the reported fatality rates. The reported adjusted all bird fatality estimate was 9.99 birds/turbine/year (670 birds total per year) and the reported adjusted bat fatality estimate was 2.97 bats/turbine/year (200 bats total per year) (Appendix A; Gritski et. al. 2008). Approximately 91 percent of the all bird fatalities were small birds (Appendix

A; Gritski et. al. 2008). The proportion increase was 40 percent. Under this proportional increase, the predicted fatality rate for the new turbine blades is 13.83 birds/turbine/year (927 birds total per year) and 4.51 bats/turbine/year (278 bats total per year).These predicted rates assume 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.

Based on eagle nest data provided by the USFWS, there are six golden eagle nests within a 10-mile radius of the Project. The nearest known golden eagle nest is located about 4.7 miles northwest of the Project and was active in 2005 per Northwest Wildlife Consultant biologist Karen Kronner's notes. The latitude/longitude geographic coordinates, distance, and direction from the Project of eagle nests within a 10-mile radius of the Project is shown in Table 2-2. A map showing the location of eagle nests within a 10-mile radius of the Project is provided in Figure 2-2.

Table 2-2. Eagle Nest Locations, 10-mile Radius of the Leaning Juniper Wind I Facility

Nest Name	Latitude	Longitude	Direction	Distance
Blalock	45.69267	-120.380341	NW	4.66mi
John Day R	45.61935	-120.469691	W	9.45mi
Lower Eightmile Canyon	45.6855	-120.067131	ENE	4.65mi
Lower Willow Creek	45.70481	-120.024483	ENE	7.07mi
Scott Canyon Mouth	45.53559	-120.356956	SW	8.39mi
Spring Hollow Rock Creek	45.44925	-120.115561	S	9.94mi

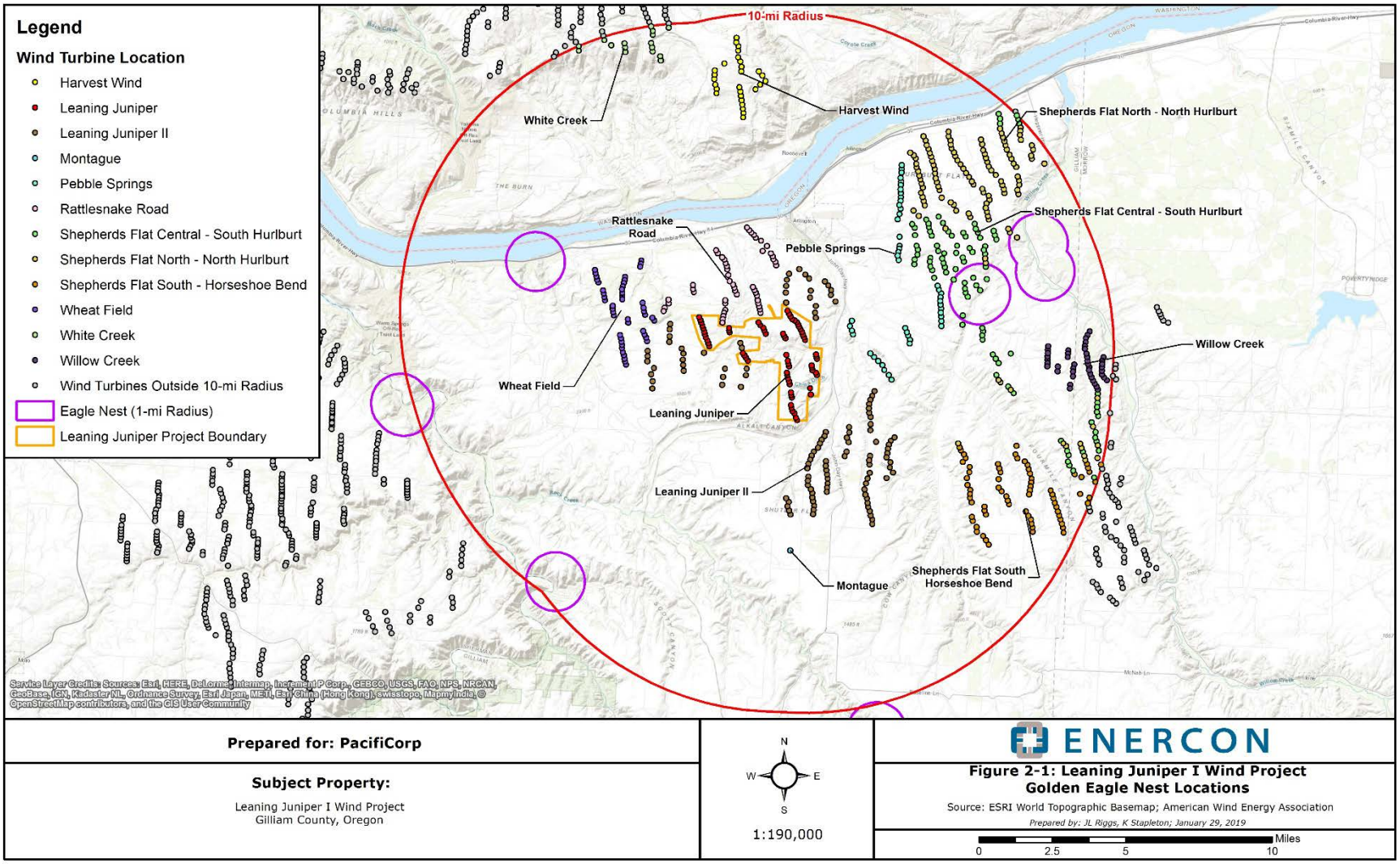

Figure 2-2. Leaning Juniper I Wind Project Golden Eagle Nest Locations

2.3 Post-Construction Avian Fatality Monitoring

PacifiCorp implemented a two-year post-construction monitoring and reporting program to estimate and evaluate project-related impacts on birds and bats (Appendix A; Gritski et. al. 2008). The Leaning Juniper wildlife plan outlining the various study components (Appendix A; Kronner and Gritski 2007) was previously submitted to the appropriate permitting agencies and other individuals. The monitoring program follows the protocol described in the *Leaning Juniper Wind Power Project 2006–2008 Wildlife Monitoring Final Report* prepared by Northwest Wildlife Consultants, Inc. (Appendix A; Gritski et. al. 2008), which outlines the protocols to monitor wildlife impacts and the measures to meet compliance requirements during operation of the Project. Summaries of the post-construction surveys along with comparisons to pre-construction risk assessments are included below. The report was provided to the USFWS, ODFW, and the Technical Advisory Committee (TAC) (Appendix A; Gritski et. al. 2008).

2.3.1 Standardized Avian Carcass Searches

A two-year post-construction monitoring study to assess avian carcasses discovered at the Project was developed and implemented from August 2006 through July 2008 (Appendix A; Gritski et. al. 2008).

2.3.1.1 Methods

The methods for the carcass search studies are broken into four primary components:

1) Standardized carcass surveys of selected turbines to document project-related avian and bat mortalities;
2) Searcher efficiency trials to estimate the percentage of avian and bat carcasses found by searchers;
3) Carcass removal trials to estimate the length of time that an avian or bat 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 project-related bird mortalities.

Standardized Carcass Searches

During the carcass studies at the Project, 34 of the 67 turbines were selected for surveying. Half of these turbines (17) were searched during the first year (August 2006–July 2007), the remaining turbines 17 of the 34 turbines were monitored the second year (August 2007–July 2008). Turbines were selected for searching based on position in the landscape, representative distribution, and land use within the Project area. Search plots at turbines were 240 m (787.4 ft) on a side. Standardized carcass surveys occurred once every four weeks (28 days) during summer (June 1 to August 1) and winter (November 1 to March 14), and once every two weeks (14 days) during the spring (March 15 to June 1) and fall (August 1 to October 31) migration periods (Appendix A; Gritski et. al. 2008).

Plots were searched by experienced searchers and personnel trained in proper search techniques. Searchers walked parallel transects spaced at 8-m intervals across the search plots,

walking at a rate of approximately 45-60 meters per minute along each transect and searching both sides out to 4-5 meters for casualties. There were no areas within any plot that was not searchable.

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 (Appendix C). 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.

PacifiCorp Carcass Searches

A PacifiCorp biologist has conducted vehicle and walking inspection surveys at the Project each month since January 2013. The biologist visits all 67 turbines every two months to search for bird and bat fatalities. 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 searching for avian and bat fatalities.

In addition to monthly carcass searches conducted by a PacifiCorp biologist, a safety inspection of each turbine has been conducted by PacifiCorp personnel every three months since operations began in 2006. Safety personnel conducting the inspection 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. No bald or golden eagle fatalities were documented during these carcass searches.

Searcher Efficiency Trials

Searcher efficiency trials were conducted to estimate the percentage of avian and bat fatalities that were actually found by searchers by placing carcasses in search plots and documenting the number of these carcasses found by searchers during standardized carcass searches. Small carcasses (e.g., European starlings, quail, juvenile ringed-necked pheasants, and small rock doves) were used to simulate small birds such as passerines, and large carcasses (e.g. adult ring-necked pheasants, large rock doves, and mallards) were used to simulate large birds such as raptors, game birds and waterfowl. Carcasses were distributed throughout the two habitat types – cultivated agriculture and grassland/shrub-steppe. The trial carcasses were removed immediately following each trial (Appendix A; Gritski et al. 2008).

Carcass Removal Trials

Estimates of carcass removal were used to adjust carcass counts (carcasses found) for removal bias for the 2-year monitoring period. Carcass removal trials were conducted during each of the four seasons, resulting in a total of 80 carcasses. The carcass removal trials consisted of randomly placing 10 carcasses of birds of two size classes (same classes as the searcher efficiency trials) onto separate trial plots for 30 days. These plots were located on non-searched turbines to avoid confusing carcass removal trials carcasses with actual wind facility related fatalities. Carcasses were checked every day for the first 4 days and again on day 7, day 10, day

14, day 20, and day 30. At the end of the 30-day trial period, any remaining birds and feathers were removed and stored or disposed of appropriately (Appendix A; Gritski et. al. 2008).

European starlings, quail, juvenile ringed-necked pheasants, and small rock doves were used to simulate small birds such as passerines. Adult ring-necked pheasants, large rock doves, and mallards) were used to simulate large birds such as raptors, game birds and waterfowl. Small and large birds were separated by measurements. All birds 11 inches and larger in length were placed into the large bird category and all birds smaller than 11 inches were placed in the small bird category. Specific measurements provided in *The Sibley Guide to Birds* (Sibley 2000) were used for these criteria.

Estimated Fatalities

Estimates of the probability that a carcass will be seen by an observer during a search (searcher efficiency) are used to adjust carcass counts for observer bias. The failure of an observer to detect a carcass that is on the search plot may be due to its size, color or time since death as well as conditions in its immediate vicinity, such as vegetation density, shade, etc. Data from searcher efficiency trials in each year were fit to a logistic regression model, with odds of observing a carcass modeled as a function of size and season and their interaction. Nine carcasses originally placed in the trial were not included in the analysis because they were never retrieved (likely scavenged before they could be found) (Appendix A; Gritski et. al. 2008).

Estimates of the probability that a carcass will not be removed in the interval between searches are used to adjust carcass counts for removal bias. Removal includes removal by predation, scavenging, being obscured by farm machinery tilling activities, or decomposition. Data from carcass removal trials in each of the two years were fit to an interval-censored parametric failure time model, with carcass persistence time modeled as a function of size and season and their interaction (Appendix A; Gritski et. al. 2008).

The annual estimated fatality rate is reported as an estimate of (assumed wind project related) collision-induced bird and bat fatalities in seven primary categories: 1) passerines, 2) raptors, 3) Galliformes, 4) doves, 5) shorebirds, 6) woodpeckers, and 7) bats. All carcasses located within areas surveyed, regardless of species, were recorded and if a different cause of death was not apparent, the fatality was attributed to Project operation, consistent with the approach commonly used at other regional fatality studies. The total number of avian and bat carcasses found were adjusted with removal and searcher efficiency bias trial data to determine the fatality estimate. During the study period 74 carcasses (40 in the first year, 34 in the second) whose deaths were attributable to the operating wind project were found in the search plots. Data from carcass removal trials were fit to an interval-censored parametric failure time model, with carcass removal/persistence time modeled as a function of size and season and their interaction (Appendix A; Gritski et. al. 2008).

The per turbine estimate and confidence limits were multiplied by 67 to give total annual fatality estimates (Cochran 1977). No closed form solution is yet available for the variance of this estimator, so 90 percent confidence intervals were calculated by bootstrapping (Manly 1997) searcher efficiency and carcass persistence estimates 1000 times and applying them to the carcass data to estimate fatality. The 5th and 95th quantiles from the 1000 bootstrapped estimates formed the 90 percent confidence limits of the estimated fatality (Appendix A; Gritski et. al. 2008).

The estimator used in this study is similar to the one used by Jain and Kerlinger (2007) at the Maple Ridge, New York Wind Project and Big Horn Wind Project study but is different from other estimators commonly used at other wind projects (Vansycle: Erickson et al. 2000; Klondike II: NWC and WEST, 2007).

2.3.1.1 Results

Standardized Carcass Searches

Thirty bird carcasses comprising 14 identified species were found during the first year of carcass surveys at the Project. No bald or golden eagle fatalities were documented during these studies (Appendix A; Gritski et. al. 2008).

Twenty-four bird carcasses comprising 14 identified species were found during the second year of carcass surveys at the Project. There were seven raptor fatalities recorded during the two-year study. Three of the fatalities were found as incidental discoveries; the other fatalities were observed during scheduled carcass searches (Appendix A; Gritski et. al. 2008). No bald or golden eagle fatalities were documented during these studies or incidentally while traveling through the project area (Appendix A; Gritski et. al. 2008).

PacifiCorp Carcass Searches

A total of eleven bird and bat carcasses have been documented since the PacifiCorp vehicle and walking inspections began in 2013. Birds and bats that are found are collected, frozen, recorded on a tracking table, and reported to the USFWS and ODFW as outlined in PacifiCorp's salvage permits. No golden or bald eagle fatalities were documented during these carcass searches.

Searcher Efficiency Trials

A total of 118 large bird and 114 small bird trials were conducted during the two-year study period. Searcher efficiency trials were held on 22 days over the study period totaling 232 total trial birds.

Seventy-six carcasses (40 large birds and 32 small birds) were placed on 29 plots for the first year of searcher efficiency trials. The overall large bird searcher efficiency was 80.0 percent and the overall small bird efficiency was 64 percent. (Appendix A; Gritski et. al. 2008).

One hundred fifty-six carcasses (78 large birds and 78 small birds) were placed on 49 plots for the second year of searcher efficiency trials. The overall large bird searcher efficiency was 56 percent and the overall small bird efficiency was 37 percent. (Appendix A; Gritski et. al. 2008).

Carcass Removal Trials

Twenty large birds and 20 small bird carcasses were placed for carcass removal trials. Based on scavenger trial data, the estimated average persistence time was 40.61 days for large birds and 10.33 days for small birds (Appendix A; Gritski et. al. 2008).

Estimated Fatalities

Total bird fatality at the Project is estimated to be 669.28 birds per year with a 90 percent confidence interval (CI) of 414.88-1049.13. On a per turbine basis this is 9.99 bird fatalities per year (90 percent CI: 6.19-15.66) or 6.66 birds per MW (90 percent CI: 4.13–10.44). Passerines had the highest per turbine rates of any avian taxonomic group with a mean of 9.13 birds per turbine (90 percent CI: 5.41-14.51) and 6.09 birds per MW (90 percent CI: 3.61–9.67) (Appendix A; Gritski et. al. 2008). Raptors had an annual fatality estimate of 21.47 (90 percent CI: 16.67–

27.95) for the project. On a per turbine basis the estimated mean is 0.32 raptors per turbine per year (90 percent CI: 0.25-0.42) or on a per MW basis, 0.21 per MW per year (90 percent CI: 0.17–0.28) (Appendix A; Gritski et. al. 2008).

2.4 Comparison to Other Regional Projects

In Oregon and Washington, many post-construction monitoring studies have been conducted, and 33 studies have made the results of their avian fatality monitoring efforts public (Appendix A; Gritski et. al. 2008). Bird mortality rates from operating wind facilities in Oregon and Washington have ranged from 0.64 mortalities/MW/year during the 2008 study at Elkhorn, OR, to 8.45 mortalities/MW/year at Windy Flats, WA. For all bird species combined, the estimated annual carcass rate at the Project was 6.66 mortalities/MW/year (Appendix A; Gritski et. al. 2008). The all-bird estimated annual carcass rates estimated for the Project are within the range of the rates reported for all other facilities in Oregon and Washington.

Raptor mortality rates ranged from zero at several operating wind facilities in Oregon and Washington to 0.47 mortalities/MW/year averaged over a four-year study at White Creek, WA (Appendix A; Gritski et. al. 2008). The raptor mortality rate estimates for the Project are low compared to estimated raptor rates at other operating wind facilities in Washington and Oregon. Based on raptor use (0.558 raptors/plot/20-minute survey) data collected during the baseline study, the predicted raptor mortality rate was 0.09/turbine/year. The adjusted raptor mortality rates at the Project were higher than predicted. The estimated raptor mortality rate at the Project was 0.32 raptors/MW/year, based on an unweighted mean of two years of monitoring (Appendix A; Gritski et. al. 2008).

3.0 RISK ASSESSMENT

Using the data gathered pursuant to PacifiCorp's various site assessments and field studies as summarized in Chapter 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 fixed-point avian use surveys for the Project, there is risk of collisions with Project turbines. Golden eagles generally appear to be more susceptible than bald eagles to collisions with wind turbines, apparently due to differences in the ecology of the species (e.g., distribution on the landscape, nesting habitat, hunting habitat and habits, migration ecology). However, publicly available post-construction fatality data at sites with relatively high pre-construction bald eagle use are lacking.

As of 2012, only seven bald eagle fatalities have been reported at wind farms in the United States (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.

The Project contains suitable big-game habitat and two species were recorded during pre-construction studies (Appendix A; Gritski et. al. 2008). When big-game animals die, they become an accessible food source for resident wintering eagles. The presence of big-game carrion increases the risk of eagles colliding with turbines. Even if big-game carrion is not present in the Project in any given year, it is reasonable to assume eagles would fly through the Project to access big-game carrion on adjacent land; therefore, there is a risk of collision with turbines while foraging. The risk of collision is subject to change in location and intensity over time, depending on predator and prey abundance and annual weather patterns, among other factors.

Although golden eagle fatalities have been reduced at wind farms with older-generation turbines (Kerlinger et al. 2006; Kerns and Kerlinger 2004; Orloff and Flannery 1992), fatalities still occur at wind farms with newer-generation turbines, including Diablo Winds, CA (WEST 2008); High Winds, CA (Kerlinger et al. 2006); Goodnoe Hills, WA (*Seattle Times* 2009); and Elkhorn, OR (*Daily Journal of Commerce* 2010).

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 golden eagles to the Project to forage and create a potential for the risk of collision. Seven distinct patches of Washington ground squirrel colonies totaling approximately 250 acres were documented in and near the Project during pre-construction surveys (Appendix A; Kronner et. al 2005). It is not feasible to determine what level of collision risk the presence of prey species in the Project poses to golden eagles; however, due to the apparent moderate potential presence of prey species, this risk is likely moderate.

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 eagle take permit. It is understood the USFWS Region 1 will independently complete the eagle fatality prediction 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 2013) 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 to generate a fatality prediction, which would then be used to update the collision prior of the CRM. USFWS will conduct this analysis as part of the environmental assessment (EA) that is completed pursuant to the NEPA requirements related to the federal action of issuance of an eagle take permit. Hence this ECP does not include the USFWS's prediction of eagle fatalities for the Project.

3.1.2 Electrocution

Utility lines (transmission and distribution) can potentially result in electrocution of bald and golden eagles, which often perch on power poles during foraging and have wing spans large enough that the bird can 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.

The risk of electrocution to bald and golden 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 4.3.

3.1.3 Disturbance and Displacement

Disturbance and displacement of golden eagles from wind farm development is not well studied. Chatfield and Erickson (2011) evaluated golden eagle use at 75 wind facilities throughout the United States and Canada, and the results of this study indicated that golden eagles continue to use the same habitat following construction of wind energy facilities. Thus, it is likely that the risk of disturbance and displacement to golden eagles at the Project is low.

3.1.4 Habitat Fragmentation

Habitat fragmentation can exacerbate the problem of habitat loss for golden eagles by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce golden eagle productivity through increased nest predation and parasitism and reduced pairing success. The Project is not likely to significantly increase the degree of habitat fragmentation in the area because most of the Project is located on habitat that is already fragmented due to intensive agriculture and access roads. Nevertheless, to the extent habitat fragmentation could occur, the likelihood has been reduced through measures taken during the design and construction phases of the Project. These measures are described in Sections 4.1 to 4.3 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); and minimizing surface disturbance to the maximum extent possible.

3.2 Categorizing Site According to Risk

The USFWS's ECP Guidance recommends Project developers or operators use a standardized approach to categorize the likelihood that a project will meet the standards for issuance of an eagle take permit. 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; therefore, the USFWS has determined that risk categorization does not apply to operational projects and it should not be assigned a risk category.

3.2.1 Conclusion

In summary, the documented use of the Project by bald and golden eagles demonstrates that the Project poses minimal risks to these species. There is a minimal potential risk of impacts to bald and golden eagles due to collision with turbines and low risk of disturbance or displacement from existing habitats due to habitat fragmentation. There is also a low potential risk of bald and golden 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).

No bald or golden eagle fatalities have been documented at the Project to-date. Though there is currently not a strong linkage between pre-construction use studies (predicted risk) and recorded bald and golden eagle fatalities at wind facilities (Erickson et al. 2002; Ferrer et al. 2011; NWCC 2010), the post-construction fatality data are consistent with the pre-construction use studies and desktop analyses, which indicated risk to bald and golden eagles would be minimal, largely because pre-construction use was low and there are no specific physical characteristics (e.g., prominent north-south ridgelines, riparian corridors, extensive water bodies, high prey density) that would concentrate bald and golden eagles.

Nonetheless, as required for an eagle take permit, PacifiCorp has undertaken conservation measures to avoid and minimize the risks to bald and golden eagles to ensure no net loss to the golden eagle population. These measures are discussed in detail in Sections 4.1 to 4.5.

3.3 Cumulative Effects

USFWS manages eagles at both the eagle management unit (EMU) and local area population (LAP) geographic scales to determine if issuing an eagle take permit for the Project would be consistent with the USFWS's eagle preservation standard (USFWS 2016a). The EMU for both species of eagles is four administrative flyways (Atlantic, Mississippi, Central, and Pacific). The Pacific flyway is further divided into three EMUs; southwest (south of 40 degrees N latitude), mid-

latitude (north of 40 degrees to the Canadian border), and Alaska (USFWS 2016a). For the Project, the LAP of eagles overlaps and is composed of eagles in the mid-latitude Pacific flyway EMU. 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 138 km (86 miles) for bald eagles and 175 km (109 miles) for golden eagles (USFWS 2016a).The Project's LAP will be assessed using the estimated total bald and golden eagle population size in each EMU (USFWS 2016b) and the proportion of each in the LAP.

USFWS Region 1 will use their cumulative effects tool to complete the LAP analysis in the EA that will be prepared to decide whether to issue an eagle take permit for the Project and the level of golden eagle take that could potentially be authorized. This analysis incorporates both records of federal eagle take permits issued (i.e., authorized take) and unpermitted eagle mortality records (i.e. electrocution, collisions, shootings, poisonings, etc.) 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.

4.0 AVOIDANCE AND MINIMIZATION OF RISKS IN PROJECT DESIGN

This chapter 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 A. PacifiCorp consulted and coordinated with the USFWS, ODFW, and Gilliam County regarding avoidance and minimization measures during planning and design of the Project (Appendix A). The Project will seek to comply with all federal, state, and county environmental laws, orders, and regulations.

4.1 Site Selection and Project Design

The Project was sited in coordination with the Gilliam County Planning Department and ODFW to avoid and minimize impacts to avian species. Although the USFWS's Guidelines and ECP Guidance were not available at the time the Project infrastructure was sited, the Project was generally consistent with these guidelines.

- The Project was sited primarily on agricultural cropland, minimizing impacts to native habitat.
- Existing roads were used to the extent possible to minimize habitat loss and fragmentation.
- The Project used state-of-the-art turbine technology, including un-guyed, tubular towers and slow-rotating, upwind rotors to limit the risk of avian collision.
- Electrical collector cabling and communication lines between turbines were buried whenever possible to reduce the potential for collision and electrocution risks to eagles and other avian species.
- An avian risk assessment and pre-construction biological surveys were conducted (Kronner et al 2005).
- Turbine locations were modified to exclude locations to avoid or minimize impacts to raptors.
- No Project infrastructure features were placed within one mile of a known ferruginous hawk nest.
- The Project complied with all federal regulations concerning the crossing of waters of the U.S. as listed in 33 CFR Part 323.
- Turbine lighting was minimized to that which is required by the Federal Aviation Administration (FAA) and red pulsating lights are being utilized, consistent with the USFWS's Guidelines (USFWS 2012). Kerlinger et al. (2010) summarized several studies which showed that FAA lighting on wind turbines does not increase bird mortality.
- In accordance with the USFWS's Guidelines (USFWS 2012), each turbine has a low voltage, shielded light (white incandescent) with a motion sensor at the entrance door.

4.2 Construction

- Tree clearing activities was 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 0.5-mile of any active raptor nests during the 2- to 3-month period when raptors were incubating.
- Appropriate storm water management practices that minimize attracting birds were implemented.
- Deep ruts in the soil caused by construction activities 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 revegetation.
- Wind turbines and most ancillary facilities were built on uplands to avoid surface water features and designated floodplains.
- Refueling and equipment staging occurred at least 300 feet from the edge of a channel bank at all stream channels.
- Sediment control measures were used to minimize impacts to aquatic and riparian habitats.
- Equipment and vehicles used during O&M and decommissioning activities will not cross riparian areas.
- Surface disturbance was limited to that which is necessary for safe and efficient construction.
- Construction activities were minimized or forbidden when soil was too wet to adequately support construction or operations equipment.
- Soil erosion control measures were monitored and repaired or replaced when needed.
- All applicable hazardous material laws and regulations regarding regulated chemicals were complied with, and a spill prevention, control, and countermeasure plan was implemented. The only hazardous chemicals onsite were the chemicals contained in batteries, diesel fuel, gasoline, coolant (ethylene glycol), and lubricants in machinery. These chemicals were not stored in or near any stream, nor did any vehicle refueling, or routine maintenance occur in or near streams. When work was conducted in and adjacent to streams, fuels and coolants were contained in the fuel tanks and radiators of vehicles or other equipment.
- All machinery was routinely inspected to check for leaks and is contained and repaired promptly if a leak was detected.
- All hazardous waste generated during construction was disposed of in a manner specified by local and state regulations or by the manufacturer.

- A fire protection system was implemented during construction, using industry best practices, and in accordance with all applicable fire safety codes.
- At all times during construction, satisfactory spark arresters were required to be maintained on internal combustion engines.
- Equipment coming onsite were inspected for signs of noxious weeds.
- Effective exhaust mufflers were installed and properly maintained on all construction equipment.
- Construction activities were typically limited to daylight hours and all equipment was equipped with sound-control devices.

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

Once construction of the Project was completed, disturbed areas were graded to their 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 agreed to by the Gilliam County Planning Department. In areas temporarily disturbed for construction and where topsoil was stripped, it was stockpiled, segregated, and restored to the original location post-construction. Measures were implemented in compliance with the Project's construction storm water pollution prevention plans, National Pollutant Discharge Elimination System permit, and project erosion control plans. Areas around each turbine that were disturbed during construction were reverted to the original land use after construction except for a maintenance access pad. A final site cleanup was completed and included any waste materials. Any roads widened or created during construction will be maintained throughout the life of the Project to limit erosion.

4.4 Operations and Maintenance

PacifiCorp will perform maintenance on Project infrastructure for the life of the Project. PacifiCorp and the turbine O&M contractor will control, monitor, operate, and maintain the Project by means of the supervisory control and data acquisitions system, and regularly scheduled onsite 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 pickup trucks. Each turbine has an associated maintenance pad for activity requiring a heavy operating crane. No significant construction is required to utilize the crane pads and disturbance is kept to a minimum during maintenance activities.

The following avoidance and minimization measures will be implemented for the life of the Project to minimize risks to eagles and other wildlife species. Several measures implemented during construction also apply to O&M.

- The Project will be kept free of debris and unused or non-working equipment by storing unused equipment and supplies off-site or in designated areas, promptly removing damaged or unusable equipment from the site, and promptly repairing or

decommissioning turbines that are no longer in commercial operation when economically feasible to do so.

- In compliance with the CUP, a weed management control and response plan was developed in consultation with the Gilliam County Weed Control Board. PacifiCorp consulted with the Gilliam County Weed Control Board and ODFW regarding appropriate see mixes for reseeding efforts areas temporarily disturbed during construction. 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.
- Fragmentation of wildlife habitat has been and will continue to be minimized through the use, where practical, of lands already disturbed, by using existing roadways and agricultural cropland for O&M.
- Routine maintenance activities are minimized or forbidden when soil is too wet to adequately support construction or operations equipment.
- Post-construction monitoring studies were conducted for two years following construction to estimate and evaluate Project-related impacts. The results of all monitoring studies, including avian mortality and nest surveys, were provided to USFWS and ODFW in annual reports since monitoring was initiated in 2006 (Gritski et al. 2008).
- PacifiCorp will continue to monitor for the presence of bird carcasses at the site to verify the effectiveness of avoidance, minimization, and mitigation strategies incorporated into the Project's O&M.
- PacifiCorp employees receive training in WIRHS protocols to ensure they understand the procedures if/when bird carcasses are discovered.
- To avoid attracting eagles and other raptors to turbine areas, wildlife carcasses discovered within the Project during regular O&M will be removed. O&M personnel, or PacifiCorp contractors, will pick up any wildlife carcasses and dispose of them at an appropriate off-site facility, or immediately call the ODFW to collect a wildlife carcass. Appropriate owners will be called to remove cattle carcasses.
- The Project is primarily located on private property. Hunting is not allowed within 300 feet of the turbines and substation, and all vehicle access is restricted to county roads.
- Hunting, fishing, or possession of firearms by PacifiCorp employees and designated contractor(s) on the Project are prohibited.
- Travel in the Project is restricted to designated roads; no off-road travel is allowed except to perform operational activities and in emergencies.
- The speed limit on roads in the Project is 25 mph to minimize wildlife mortality from vehicle collisions.
- Wildlife poaching is reduced through employee and contractor education regarding wildlife laws. If violations are discovered, the offense will be reported to the ODFW and/or the USFWS, depending upon the species.
- The substations are fenced for public safety and the O&M building is fenced for security.

- All onsite vehicles are regularly monitored for petroleum leaks. Any spills are cleaned up immediately upon discovery and reported to appropriate agency if required.
- Operations staff carries basic fire protection equipment during maintenance activities.
- Employees and others on site are informed of the locations of fire extinguishers and nearby hospitals and given local emergency telephone numbers.
- Turbine strings, access roads, and other disturbed areas are monitored regularly to prevent the spread of noxious weeds.
- Equipment coming onsite is inspected for signs of noxious weeds.
- O&M activities adhere to the applicable noise standards for Oregon.
- All hazardous waste generated during operations is disposed of in a manner specified by local and state regulations or by the manufacturer.

4.5 Decommissioning and Restoration

At the end of the Project's economic life, PacifiCorp expects to explore alternatives for decommissioning or repowering of the Project. If required, PacifiCorp will 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 for more than 270 consecutive days or the Project is decommissioned, PacifiCorp would obtain the necessary authorization from the appropriate regulatory agencies to decommission the facility. Generally, decommissioned wind energy projects contain a high "scrap value" due to the materials and equipment contained in the infrastructure (i.e., steel infrastructure, electric generators, and copper).

In general, decommissioning the Project means the removal of footings and foundations to a level of three feet below the surface or burying foundations below an allowed depth. Any unsalvageable material would be disposed of at authorized locations. The soil surface would be restored, as close as reasonably possible, to its original condition and reseeded with approved seed mixes, where required. The substations may not be removed if they are required for other purposes. If the buried and overhead power lines could not be used by PacifiCorp, all structures, conductors, and cables would be removed unless otherwise allowed or required to remain in place.

Reclamation procedures would be based on site-specific requirements and techniques prescribed in the Project's decommissioning plan. Demolition or removal of equipment and facilities will meet applicable environmental and health regulations. Additionally, PacifiCorp may salvage economically recoverable materials or recycle materials for future uses.

5.0 EAGLE FATALITY MONITORING

Monitoring for eagle fatalities at the operating Project is a critical component of this ECP and a requirement for issuing an eagle take permit 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 removal trials; and
4) Adjusted mortality estimates.

5.1 Standardized Carcass Surveys

PacifiCorp will conduct systematic searches every month at all 67 turbines for eagles for two years after issuance of an ETP. The protocols will be developed in coordination with USFWS, PacifiCorp scientist/analysts, and biological contractors based on most recently available information. The protocols will be formalized in the ETP conditions.

PacifiCorp will obtain the necessary permits or agency permission 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 site topography and for safety, carcass searches will not be conducted on slopes ≥ 30 percent. 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, toe of steep slope, etc. The location of search areas ≥ 30 percent will be mapped using U.S. Geological Survey 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 Correction 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. Carcasses can be missed by searchers (searcher efficiency) or can be removed from the search area during the time when the surrogate carcasses are dropped and the survey (carcass removal), resulting in a downward bias of the annual fatality

estimate. Bias correction monitoring provides estimates of these biases, the level of which can be used to estimate potential true total number of turbine-related fatalities that occur each year.

Searcher efficiency may be influenced by vegetation, topography, and searcher-specific variability. In addition to directly biasing the fatality estimate, searcher efficiency can bias the estimation of scavenger removal rates because scavenger removal studies rely on searchers, are influenced by their biases, and exert quasi-experimental influences on estimators.

5.2.1 Searcher Efficiency Trials

The primary objective of searcher efficiency trials is to estimate the percentage of eagle carcasses that searchers can find. Estimates of searcher efficiency are then used as a correction factor to calculate adjusted eagle fatality. Because of their large size, eagles are more easily detected by qualified, trained searchers than smaller birds. Recent studies suggest that searcher efficiency for eagles is approximately 90 percent. (New et al. 2015; Rabie et al. 2014, Smallwood 2013).

Searcher efficiency trials will follow methods described in previous studies (Erickson et al. 2003; Erickson et al. 2004). Searchers will search for carcasses using the same methods presented in Section 5.1.1. The trials will be conducted four times per year for three years following eagle take permit issuance. Searcher efficiency trials will be completed during each season to account for different field conditions (i.e., 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 (March 16–May 15), breeding season (May 16–August 15), fall migration (August 16–October 31), and winter (November 1–March 15). Although seasonal trials will not address fluke weather events, they will address field conditions relevant to the overall period.

Turkey hunting decoys with feathers attached will be used for the searcher efficiency trials. This surrogate is proposed because it is approximately the same size as a golden eagle and used by other similar studies at wind facilities; however, we will examine using other representative carcass surrogate during the study.

Twenty carcass surrogates per season (80 total) 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 Removal Trials

The objectives of the carcass removal 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 (Gritski et al. 2010; NWC and WEST 2007). Some projects reported mean carcass persistence as high as 128 days (New et al. 2015; Rabie et al. 2014; Smallwood 2013). Carcass removal trials will be completed seasonally and concurrently with the searcher efficiency trials described above, provided PacifiCorp can obtain sufficient number and consistency of raptor carcasses to support the trials. Different seasonal rates for carcass removal 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 (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), and other large birds will be used for carcass removal trials. This surrogate is proposed as it is readily available and used by other similar studies; however, we will examine using other representative carcasses during the trials. Carcasses will be placed as described for searcher efficiency trials. They will be checked on days 1, 2, 3, 5, 6, 7, 10, 14, 21, and 28 following placements, or until they are all removed. All birds used in the carcass removal 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 removal rate will be derived from the carcass removal 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 that 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 removal bias (Huso 2011; Huso et al. 2012).

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 three years following eagle take permit issuance, as discussed in greater detail in Section 5.3.2. Adjusted fatality estimates are based on observed carcasses found during formal carcass searches, the probability that a searcher will miss a carcass (searcher efficiency correction factor), the probability that 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 statistical estimator used in Huso (2011) and Huso et al. (2012) is currently thought to be reliable for reducing biases in the data. 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 on May 17, 2017 (MB00466B-0). This permit is valid through March 31, 2020. 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 hours 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. Any state-listed species fatality will be reported to ODFW within 48 hours. 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. Carcass will be handled with rubber gloves to protect the handler from diseases and parasites.

5.3 Annual Reports

PacifiCorp will submit written reports to the USFWS during the first quarter in each of the three years following eagle take permit 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.

5.4 Long-term Monitoring

Following the completion of the three years of eagle fatality monitoring, PacifiCorp will implement an internal monitoring program, which will be used by PacifiCorp's wildlife biologist and onsite 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 that the turbines at the sites are frequently inspected for possible avian or bat impacts and that 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 three years of eagle fatality monitoring studies.

The Project will be visited by PacifiCorp's wildlife biologist once per month. All 67 turbines and access roads will be searched by vehicle and pedestrian surveys over a two-month period. 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 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 hours 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 that are 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.

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.

6.0 COMPENSATORY MITIGATION AND ADAPTIVE MANAGEMENT

Compensatory mitigation is required for any eagle take permit authorizing take that would exceed take limits (USFWS 2016a). Take limits for golden eagles is set at zero. PacifiCorp will implement compensatory mitigation consistent with the 2016 Eagle Rule to meet the eagle preservation standard (USFWS 2016b). This section identifies compensatory mitigation and adaptive management techniques to offset eagle mortality associated with operation of the Project that could affect species' population.

Compensatory mitigation may be necessary to ensure that the standard of no net loss to the population is achieved whenever golden eagles are taken at the Project. However, it is PacifiCorp's understanding that there would be limitations on how much compensatory mitigation would be required for future golden eagle take at the Project, given that the Project was operational as of September 2006 and hence it is part of the environmental baseline in the USFWS FEA of April, 2009. USFWS will coordinate with PacifiCorp on this point and clarify how compensatory mitigation requirements would apply to the Project for future golden eagle take.

6.1 Compensatory Mitigation through Power Pole Retrofitting

Compensatory mitigation for bald and golden eagle take will be achieved through retrofitting power poles (as defined in Section 6.2) in the same EMU as the Project.[1] 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 (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 PacifiCorp's *Renewable Resources Retrofit Plan for Washington and Oregon Wind Energy Projects* (Appendix D).

[1] Retrofits will be prioritized to be undertaken within the same local area population.

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 percent 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 5.3.1.

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 that uncertainties exist, adaptive management provides resource managers the latitude to change monitoring protocol 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 expected. The priority will be to determine if documented eagle fatalities were indeed caused by turbine collisions on 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 mitigation measures are put into place, additional monitoring to determine the effectiveness of the voluntary mitigation measures will be conducted. Voluntary mitigation measures may be operational or non-operational as shown in Table 6-2 and would be implemented in a tiered fashion. Each subsequent step or tier will trigger more robust corrective actions to mitigate or compensate for 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 eagle take permit.

Table 6-2. 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 data and wind turbine operational data. Consult with USFWS to review appropriate measures to minimize likelihood of future take. Evaluate take levels relative to permitted value.	1 bald and golden 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 BMPs, habitat management, ACP, or other activities deemed appropriate. Consult with USFWS to determine potential course of action.	At any time when 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 which 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 further refine 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 Project have taken one less than the permitted take level for bald and golden eagles.

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Appendix A

Leaning Juniper I Wind Energy Facility Avian Protection Plan

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

Leaning Juniper I Wind Energy Facility
Avian Protection Plan

Pacific Power


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Version 1.0

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1.0 *INTRODUCTION*

PacifiCorp 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 Avian Protection Plan ("APP") for the Leaning Juniper I Wind Energy Project (the "Project" or "Site") located in Gilliam County, Oregon. The purpose of the APP 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. In accordance with the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (2012 Guidelines; USFWS 2012d), and the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013a), this APP includes bird-use surveys, risk monitoring, impact assessments, post-construction monitoring, an adaptive management process, and conservation measures intended to avoid and minimize risk to birds, including eagles.

1.1 Purpose of the APP

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; BLM 2013). Energy from wind-powered generation resources serves an important role in meeting PacifiCorp's loads, including Oregon 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 2010). PacifiCorp continues to develop and refine this APP for the Project to avoid and minimize impacts to birds.

This APP 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 APP 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;
- actions taken to avoid and minimize impacts to birds 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 species;
    - comparison of post-construction avian carcass rates 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 APP Term

This APP 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 APP through adaptive management (*see* Section 6.0). Should operation continue beyond the initially expected life of the Project, this APP 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 APP.

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 APP, PacifiCorp is voluntarily committing to measures to avoid, minimize, and mitigate impacts on species protected under the MBTA.

The USFWS states in guidance and policy documents that it is not possible to absolve individuals, companies, or agencies from liability, even if they implement bird mortality avoidance or other similar protective measures described in an APP (USFWS 2012d). However, the USFWS does provide guidance that it focuses resources on investigating and prosecuting those entities who take migratory birds without identifying and implementing reasonable, prudent, and effective measures to avoid that take (USFWS 2012d). For example, the USFWS's Office of Law Enforcement (OLE) carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have implemented effective steps to avoid take of migratory birds and by encouraging others to implement measures to avoid take of migratory birds. OLE states that "it will look for opportunities to foster relationships with, and provide guidance to, individuals, companies, and industries during the development and maintenance of their operational plans"; and that it focuses investigative efforts "on individuals or companies that fail to utilize conservation measures or otherwise minimize negative impacts on migratory birds." (USFWS 2012a

[CD-B53]). Moreover, OLE states that it will "[p]rovide the company or individual the opportunity to take remedial action to halt and/or minimize the take" and to "[d]ocument those communications and the relevant actions taken, or not taken, by the company or individual following notice." (USFWS 2012a [CD-B53]).

Consistent with USFWS' policy position related to migratory birds - as described in the 2012 Guidelines and 2013 ECPG - PacifiCorp seeks to continue working closely with USFWS personnel to identify measures and mitigation activities to protect migratory birds.

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."

The USFWS published a final rule (Eagle Permit Rule) on September 11, 2009, under the BGEPA (50 CFR § 22.26) authorizing limited issuance of permits to take bald and golden eagles. A permit would authorize the take of bald and golden eagles where the take is: (1) compatible with the preservation of the bald eagle and the golden eagle; (2) is necessary to protect an interest in a particular locality; (3) is associated with but not the purpose of the activity; and, (4) for individual incidences of take, the take cannot be practicably avoided, and for programmatic take, the take is unavoidable even though advanced conservation practices are being implemented.

The USFWS explained its approach to issuing programmatic eagle take permits in the 2011 "Draft Eagle Conservation Plan Guidance" (Draft ECPG) (USFWS 2011a). The Draft ECPG was updated and finalized in April 2013 (2013 ECPG). In addition, the USFWS published a draft Eagle Conservation Plan (ECP) and Environmental Assessment for the West Butte Wind Energy Project on January 3, 2012 (USFWS 2012b) and the Shiloh IV Wind Project on September 27, 2013(USFWS 2013).[1] These documents provide guidance on obtaining an eagle take permit and what measures wind energy companies can implement to address potential impacts to eagle from wind energy production.

1.3.4 Land Based Wind Energy Guidelines

In 2003, the USFWS published the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (2003 Guidelines).[2] The 2003 guidelines encourage the "wind energy industry to follow these guidelines and, in cooperation with the Service, to conduct scientific research to provide additional information on the impacts of wind energy development on wildlife." It also sets out a number of recommendations about how to site, develop, and operate wind facilities. The 2003 Guidelines also stated that

[1] 77 Fed. Reg. 129 (January 3, 2012); 78 Fed. Reg. 188 (September 27, 2013).

[2] 68 Fed. Reg. 41175 (July 10, 2003).

> Pre-development evaluations should be conducted by a team that includes Federal and/or State agency wildlife professionals with no vested interest (e.g., monetary or personal business gain) in the sites selected. Teams may also include academic and industry wildlife professionals as available. Any site evaluations conducted by teams that do not include Federal and/or State agency wildlife professionals will not be considered valid evaluations by the Service.

The USFWS also invited comments on the guidelines for two years. As a result of comments received during the first 8 months, which related to the voluntary and flexible nature of the guidelines, USFWS issued in 2004 *Instructions for Implementation of Service Voluntary Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (2004 Instructions). The 2004 Instructions emphasized the voluntary, flexible nature of the 2003 Guidelines: "The Interim Guidelines are ***not to be construed as rigid requirements***, which are applicable to every situation, nor should they be read literally."

At the close of the comment period and in response to uncertainties created by the 2003 Guidelines, including some 25 comments of record, USFWS formed a Federal Advisory Committee (FAC) in March 2007. The FAC was developed to advise FWS on the development of more permanent guidelines.[3] 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 2012 Guidelines on March 26, 2012 (USFWS 2012d).[4]

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 USFWS states that the 2012 Guidelines provide the "best practical approach for conserving species of concern" under the ESA, MBTA, and BGEPA. However, the USFWS is "aware that it will take time for Service staff and other personnel, including wind energy developers and their biologists, to develop expertise in the implementation of the [2012] Guidelines." Nonetheless, the USFWS encourages wind developers and operators "to use them as soon as possible after publication" to receive consideration during the enforcement process (*see above* Section 1.3.2 for more about enforcement).

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 mortality 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:

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[3] *See* 72 Fed. Reg. 11373 (March 13, 2007); 76 Fed. Reg. 9590 (Feb. 18, 2011).

[4] *See* 77 Fed. Reg. 17496 (March 26, 2012).

- 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.

Under Tier 5, developers and operators are advised to consider several options for evaluating advanced studies and conservation practices. Generally speaking, Tier 5 is appropriate where avoidance, minimization, and mitigation measures are not effective, where avian impacts are significant, where there is a potential for significant impact, or when experimental mitigation measures require further evaluation. For example, a developer or operator may opt to employ Tier 5 to:

- evaluate the effectiveness of a risk reduction measure before deciding to continue the measure permanently or whether to use the measure when implementing future phases of a project; or
- conduct a study on an experimental mitigation technique, such as differences in turbine cut-in speeds or other deterrence systems (e.g., sound, blade painting, etc.).

If applied at a facility, the USFWS recommends the developer or operator to communicate with the agency about Tier 5 studies and mitigation strategies, evaluate cumulative impacts on species of concern, and share results with the agency.

Since 2002, PacifiCorp has engaged with Oregon Department of Fish and Wildlife (ODFW) and USFWS regarding avian resources associated with wind facilities in Oregon (*see* Appendix B). 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 APP that have previously been accepted by the USFWS in APPs for other wind projects. In addition to measures recommended under the 2012 Guidelines, this APP 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 APP and discussed in greater detail in Section 1.11; 4.6; and an adaptive management program is discussed in Section 6.0.

1.3.5 Oregon Endangered Species Act

The Oregon Legislature passed an Endangered Species Act in 1987 that gave the Oregon Department of Agriculture (ODA) responsibility and jurisdiction over threatened and endangered plants and reaffirmed the ODFW responsibility for threatened and endangered fish and wildlife. Both agencies have entered in cooperative (Section 6) agreements with the USFWS for the purpose of carrying out research and conservation programs under the guidance of the federal Endangered Species Act. The ODFW maintains a list of threatened and endangered species under the authority of ORS 496.172 and a sensitive species list in accordance with OAR 635-100-0040. If there is the potential for "take" of a listed wildlife species then an Oregon ESA Incidental Take Permit is required. All federal take authorizations must be in place before a final Oregon permit will be issued. The ODFW district biologist should be contacted prior to applying for an ESA Incidental Take Permit to discuss recommendations and concerns.

1.4 Project History

The Project was constructed on private land owned by Waste Management Disposal Services of Oregon, Inc. The initial reconnaissance visit to the Project was conducted on April 18, 2003, and pre-construction wildlife surveys were conducted from August 27, 2004 to August 15, 2005 (Kronner et al. 2005). The Project (Phase I) as well as the Leaning Juniper II project (Phase II) were surveyed in 2004 and 2005 and were owned by PPM Energy (PPM). Both phases were included in the Condition Use Permitting (CUP), which was approved by the Gilliam County Planning Department on January 20, 2005. Upon approving PPM's initial CUP application, Gilliam County Planning Department conducted a formal public hearing on January 22, 2005, and opened a period for comment and appeal until February 7, 2005.

To accommodate the additional 200 MW wind generation from the Project and Leaning Juniper II, both of which would interconnect with the McNary-Santiam #2 transmission line, the Bonneville Power Association (BPA) increased ground clearance at four locations along the transmission line. BPA sought public involvement concerning the interconnection of the Project and Leaning Juniper II into the Federal Columbia River Transmission System beginning in mid-November 2004, and culminating in a Record of Decision in March 2005 affirming that the interconnection was within the scope of the Bonneville Power Environmental Impact Statement, in accordance within BPA's transmission access tariff, and in accordance with BPA's statutory authority to make available to all utilities any capacity in this system determined in excess to that required by the US (16 U.S.C. 838d).

On February 25, 2005, the Oregon Department of Environmental Quality (ODEQ) notified PPM that the National Pollutant Discharge Elimination System (NPDES) storm water discharge permit (12000-C) had been issued; the NPDES permit was renewed on July 15, 2005. On March 29, 2006, the ODEQ sent a transmittal letter to notify PPM of the termination of the NPDES permit 1200-C.

PPM applied for a CUP to mine, process, and stockpile aggregate (gravel permit), and a notice of public hearing regarding this CUP was published in the Gilliam County local newspaper on September 15, 2005, and again on September 22, 2005. On September 25, 2005, a CUP for the mining activity was issued to PPM, and a hearing was head on September 29, 2005, during which the CUP to mine, process, and stockpile aggregate was approved.

As part of the preparation for determining turbine locations and the pre-construction study plan PPM began requesting data on sensitive species and site information from the ODFW and Oregon Natural Heritage Information Center (ONHIC) in early 2003. In April 2003, ONHIC provided a letter that indicated historical Washington ground squirrel sites in the vicinity of the Project. A site reconnaissance survey in 2003 did not identify any indication of Washington ground squirrels. Both ODFW and USFWS were given the opportunity to provide comments on the baseline studies conducted for the Project. During baseline studies conducted in 2005, seven primary patches of Washington ground squirrel habitat were determined to be active. As a result, PPM submitted an incidental take permit application for the Project on February 13, 2006 and the ODFW approved the Washington ground squirrel incidental take permit for the Project on February 23, 2006. On January 20, 2006, ODFW sent a response to the Gilliam County Planning director in response PPMs zoning permit application (2005-04), notifying the county that all provisions of CUP conditions had been complied with to date. On January 23, 2006, the Gilliam County Planning Director acknowledged that the CUP 2004-05 conditions had been met. Zoning permit 2005-04 was issued for the Leaning Juniper Wind Energy Project on January 23, 2006.

On July 13, 2006, PPM Energy sent a request to the Gilliam County Planning Department to transfer of the CUP permit # 2004-05 dated September 29, 2005, and zoning permit 2005-04 dated January 23,

2006, to PacifiCorp in accordance with a transfer of Project ownership to occur on July 19, 2006. On August 14, 2006, the Gilliam County Planning Department notified PacifiCorp that the transfer of the CUP and zoning permit had been approved. On August 24, 2006, the ODFW notified PacifiCorp that the transfer of the Washington ground squirrel incidental take permit for the Project had been approved.

Project construction began in January 2006 and was completed in August 2006.

1.5 General Study Area

The 9,396-acre Project is approximately 3 miles southwest of the town of Arlington in Gilliam County, Oregon. The Project is located on private land owned by Waste Management Disposal Services of Oregon, Inc. The Project area extends approximately five miles wide and four miles north to south. The Project consists of 67 1.5-MW wind turbines with 77 m rotor diameter. The topography is considered rolling hills and elevations range from 700 to 1,300 feet above mean sea level. Output from the Project is delivered to the onsite substation adjacent to BPA's Jones Canyon substation, where it is stepped up to 230 kilovolts (kV) and interconnected to BPA McNary-Santiam #2 230-kV transmission line via the Jones Canyon Switching Station. The Project consists of 67 1.5-MW wind turbine generators with a 77 m rotor diameter. The Project is rated at a total of 100.5 MW.

The Project is located in a sparsely populated area that has been in agricultural use since at least the 1930s. The property is a mix of ranch and farmlands, and a county quarry and industrial park are also located in the Project area. Ranch and farmland is adjacent to the Project to the north, east, and west, and landfills are adjacent to the south. Currently, the predominant land uses are agriculture and ranching; cattle typically graze the pasturelands during the winter and hay is produced in summer. Based on the 2004 habitat mapping effort (*see* Section 2.1.1), land cover within the Project area is a mix of native and non-native vegetation on shallow to deep soils. On a landscape scale, these areas are typically referred to as "agricultural farm land" and "shrub-steppe". Dryland wheat was the most abundant habitat sub-type, followed by rabbitbrush-snakeweed-buckwheat/bunchgrass.

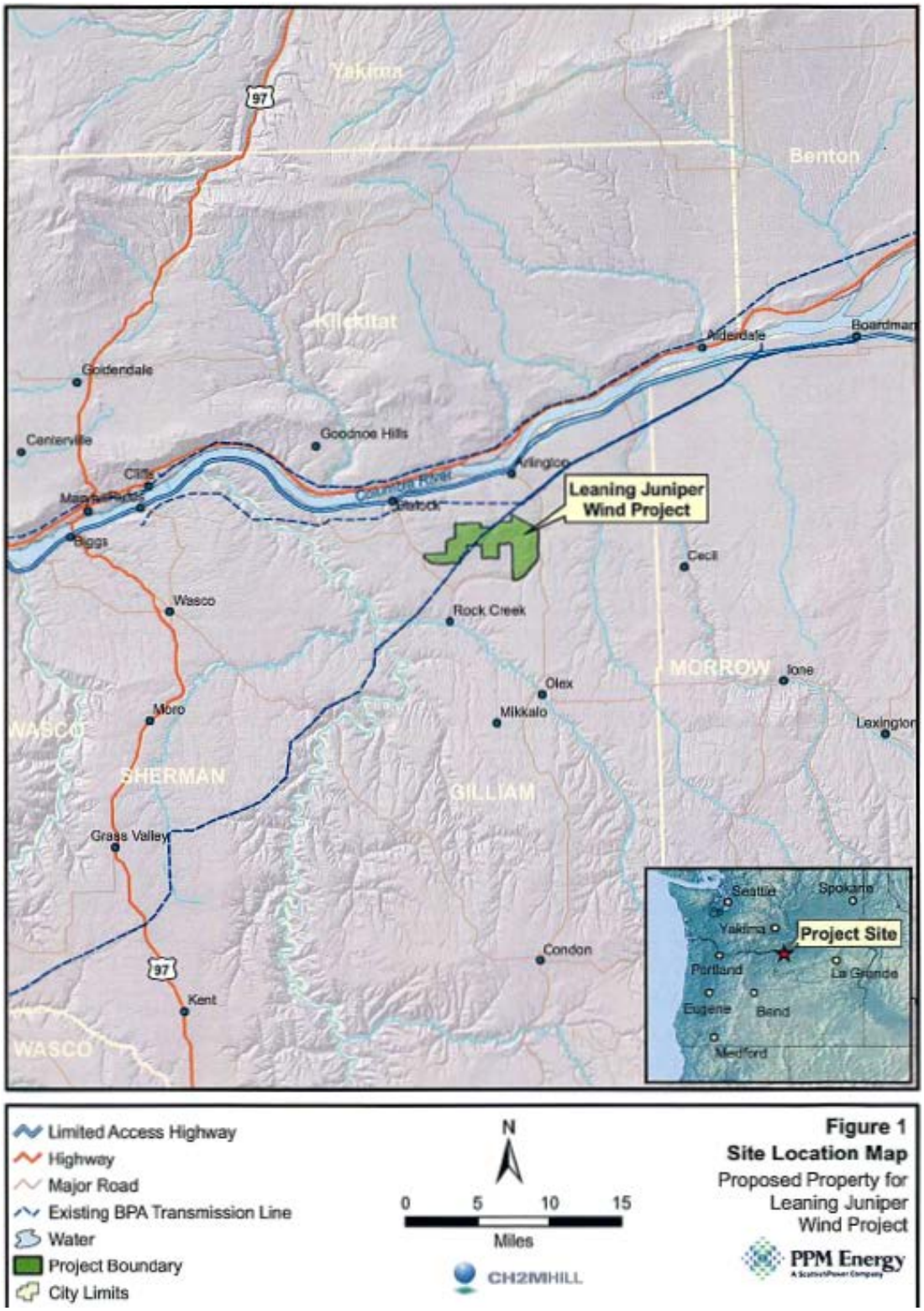

Figure 1. Location of the Leaning Juniper I Project, Gilliam County, Oregon.

1.6 Communications and Collection System

Generated electricity moves through an underground collection system to the Project collector substations. Both power and communication cables were buried in trenches at least four feet below the ground surface, and cables at roads were installed in conduits at least three feet below the surface. Overhead lines constructed for the Project, for ownership by PacifiCorp, incorporate Avian Power Line Interaction Committee (APLIC) recommendations (e.g., a minimum of 150 cm (60 in) of horizontal separation between energized and/or grounded parts and 100 cm (40 in) of vertical separation, insulation or covering of exposed energized or grounded parts (APLIC 2006).

An estimated 10.7 miles of underground collection system wiring was installed for the 67-turbine Project. By burying the majority of the collection system, the Project has minimized the potential for collision-related avian impacts associated with the collection system. Habitat loss/fragmentation was minimized by clearing and disturbing the minimum amount of habitat possible to install the lines and by allowing disturbed areas to re-vegetate to similarly adjoining conditions following construction.

1.7 Substations and O&M Facility

The collector substation for the Project is located adjacent to the BPA Jones Canyon switching station. The Project collector substation is owned by PacifiCorp and is operated in accordance with prudent industry practices, and is similar to other collector substations used in the region. The Project collector substation is surrounded by a graveled, fenced area with transformer and switching equipment and space to park vehicles. The 3,000 ft^2 O&M facility, which contains all necessary plumbing and electrical connections needed for typical operation of offices and a maintenance shop, is also within the Project site. Utilities such as electric service, water service, sewer service, telephone service, as well as access to a septic system, are required at the O&M facility.

1.8 Transmission Line

A short span of transmission line or “bus” connects the Project’s collector substation to the adjacent Jones Canyon switching station owned and operated by BPA. The BPA owned switching station provides the Project with access to BPA’s existing McNary-Santiam #2 230 kV transmission line. The bus line incorporates features suggested by the Avian Power Line Interaction Committee (APLIC 2006) to minimize electrocution-related avian mortalities. The 230 kV McNary-Santiam #2 transmission line is owned and operated by BPA, and is not covered by this APP.

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

Once construction of the Project was completed, all disturbed areas were graded to their 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 agreed to with the Gilliam County Planning Department. The erosion control 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 except for the maintenance access pad and associated crane pad. Disturbed agricultural areas were replanted with dryland wheat and in non-agricultural areas native species were used in replanting to re-establish plant communities of most value to wildlife.

1.10 Operations, Maintenance, Decommissioning, and Restoration

PacifiCorp will perform O&M for the life of the Project, which is anticipated to be 30 years from the commission date. PacifiCorp and the turbine 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.

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 for ownership by PacifiCorp.

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, and on an as needed basis.

At the end of the Project's economic life, PacifiCorp will decommission the Project in accordance with the "Leaning Juniper I Decommissioning Plan" (PacifiCorp 2012). If required, PacifiCorp would reapply for new or amended permits to "re-power" turbines with new nacelles, towers, blades and/or other improvements based on new technology.

If the Project were to terminate 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 (i.e., steel infrastructure, electric generators, and copper).

In general, the decommissioning of the Project will include the removal or burial of footings and foundations to a level of three feet below the surface, 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 substation may not be removed if necessary 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.

Reclamation procedures will be based on site-specific requirements and techniques prescribed in the Project decommissioning plan. 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.

1.11 Avian Conservation Measures

Throughout Project development, conservation efforts were evaluated and adopted to aid in the protection of avian species (i.e., eagles, other raptors, and migratory birds). 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.

1.11.1 Site Selection and Project Design

Project siting was developed in coordination with ODFW and the Gilliam County Planning Department. PPM engineers designed the Project infrastructure plan, particularly turbine layouts, based on site-specific raptor nest and habitat quality survey results. Known raptor nests or suspected raptor nests were buffered during siting. Active nests were flagged and construction was minimized in those areas to the extent feasible. Turbine siting also avoided Washington ground squirrel habitat, and as Washington ground squirrels are prey for raptors, this measure contributes to the avoidance and minimization of potential impacts to raptors. In addition, the planned use and expansion of some existing roads was eliminated to minimize potential disturbance to nesting raptors.

In response to wildlife surveys and ODFW concerns, several site selection changes to the optimal layout occurred:

- 12 turbines were relocated to avoid occupied Washington ground squirrel habitat
- The use of some of the existing roads was eliminated and several roads were rerouted to avoid impacts to raptor nests, occupied Washington ground squirrel habitat and to locate the roads through wheat fields to the maximum extent possible.
- The planned construction staging area near turbine 70 was relocated to avoid placing it near a Washington ground squirrel colony.

While some of these efforts were targeted for Washington ground squirrel conservation, these measures also benefit raptors that may utilize ground squirrel colonies for foraging habitat.

The Project also incorporates state-of-the-art turbine technology, including unguyed, tubular towers and slow-rotating, upwind rotors. Further, overhead collection lines were used only where necessary to avoid impacts to a riparian area and steep slopes and all other collection lines were buried underground.

1.11.2 Construction

During Project construction, travel was restricted to designated roads, and Project personnel were advised regarding speed limits (20 mph on unpaved roads) to minimize dust and wildlife mortality due to vehicle collisions. Where feasible, construction equipment was not allowed in riparian areas, on steep slopes, or in other sensitive habitats. Best management practices (BMPs) were implemented to protect topsoil and adjacent resources and to minimize soil erosion.

An on-site manager was hired and construction contractors were required to designate a representative to oversee compliance during construction. This representative was responsible for ensuring compliance with protective measures and coordination in accordance with Gilliam County and other regulatory agencies. Further, a biologist was hired to visit the site before development and during construction to flag sensitive resource areas, monitor nesting birds, and oversee construction and permit compliance.

To avoid potential harm to avian species nests and eggs, all tree clearing activities were limited to the minimum necessary for Project construction. Biological monitors also flagged nest trees to minimize work in these areas to the extent feasible. In addition, the use of some existing roads (i.e., Jones Canyon Road, Juniper Canyon Road, and an existing road from the Waste Management Disposal Services of Oregon, Inc. office) was eliminated to avoid disturbing active raptor nests and in response to ODFW concerns. 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, thereby reestablishing habitat that could be used by avian species. Revegetation was done with native species, or with crop species in areas of agriculture, in accordance with the weed control plan approved by the Gilliam County Planning Department.

1.11.3 Operations and Maintenance

PacifiCorp performs regular maintenance on Project components. All normal maintenance activities for the Project typically occur within areas previously disturbed by construction. Heavy equipment utilized for road maintenance and snow plowing is inspected for fluid leaks and noxious weeds by site supervisors prior to work commencement. Ground disturbing activities may include the occasional need to access underground cable or communications lines. The Project and its transmission lines 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 for ownership by PacifiCorp.

1.11.4 Decommissioning and Restoration

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 seeded in consultation with county weed officials and the landowners and allowed to re-establish through natural succession, thereby restoring habitat over time for avian species.

1.11.5 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 monitor for the presence of bird carcasses at the Project in accordance with this APP to verify the effectiveness of the avoidance, minimization, and mitigation strategies incorporated in the Project operation and management. 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 ODFW and the Gilliam County Planning Department to avoid or minimize impacts to raptors, Washington ground squirrel, and to avoid fragmentation of intact shrub-steppe habitat. Specific measures taken include:

- Turbine siting and access roads considered the locations of active Washington ground squirrel colonies, raptor nests, and high-quality habitat
- Active raptor nests were flagged and construction was minimized in those areas to the extent feasible.
- With the exception of a short transmission or bus line connecting the Project's switching station to BPA's Jones Canyon switching station, the Project utilized an already existing BPA transmission line, reducing the potential impacts to nesting raptors that would be associated with the construction of a new transmission line
- An avian risk assessment and pre-construction surveys were conducted to evaluation habitat quality and distribution, Washington ground squirrel colony distribution, nesting raptors, overall avian and eagle use, and the use and distribution of other sensitive wildlife species
- 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 transmission lines
- Results of all monitoring activities, including mortality surveys and raptor nest surveys, have been provided in annual reports in 2007 and 2008 (Gritski et al. 2007, 2008). Reports for additional studies (e.g., buteo study and Washington ground squirrel studies) have also been presented to ODFW (Gritski 2010, Kolar and Bechard 2011, Downes 2013).

Surface Water, Soils, and Vegetation

- Appropriate storm water management practices that minimize attractions for birds were implemented. A Stormwater Protection and Prevention Plan (SWPPP) was prepared and implemented during construction 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.
- An Erosion and Sediment Control plan was implemented in accordance with the NPDES permit, and contractors were required to install erosion and siltation controls near riparian areas and other appropriate areas.
- Wind turbines and most ancillary facilities were built on uplands to avoid surface water features and designated floodplains. Riparian areas were avoided in the design and construction of the facility, and erosion and siltation controls were provided within 100 ft of all riparian areas during construction.
- 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 occurred 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 the original contour. Reclaimed areas were contoured, graded, and seeded as needed to promote successful re-vegetation, provide for proper drainage, and prevent erosion. Revegetation efforts used native plants suited to the area or crop plants in

disturbed agricultural areas and met the weed control plan requirements approved by Gilliam County.

- Equipment and vehicles were and will be 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.
- In consultation with a Gilliam County Department representative and the ODFW, a Conservation Easement of approximately 64 acres was established for the life of the Project. The protection of this land was used to offset permanent habitat loss and any potential loss of production.
- Construction or routine maintenance activities is 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 ODFW to collect the wildlife carcass in an effort to remove potential avian attractants from turbines areas. Appropriate owners are called to remove cattle 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 (20 mph on unpaved roads) 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 ODFW 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 when possible thus minimizing and avoiding 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 red pulsating lights are being utilized, 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.

Fencing

- Lockable gates were installed between the nearest wind turbine and all county and state-maintained highways. The collector substation is fenced for public safety. Existing public and private roads provide some public access to the Project; however, significant portions of the Project contain fencing utilized 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.
- Construction activities are performed using standard construction BMPs so as to minimize the potential for accidental spills of solid material, contaminants, debris, and other pollutants. Excavated material or other construction materials are not stockpiled or deposited near or on stream banks.
- No burning or burying of waste materials occurs at the Project. Post construction waste materials were removed from the construction area. All contaminated soil and construction debris is disposed of in approved landfills in accordance with appropriate environmental regulations.

Fire Protection

- Each turbine generator and pad-mounted transformer was constructed with a cleared pad around each base, with a minimum of 15 ft of non-flammable ground cover on all sides.
- The North Gilliam County Fire District was provided with an approved Site Plan indicating turbine identification numbers and location along with all other structures.
- 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

- A Revegetation plan was created in consultation with the Natural Resources Conservation Service in Condon, Oregon and the Gilliam County Weed Control Board and implemented at the Project.
- Certified weed-free straw mulches, certified weed-free hay bale barriers, silt fences, and water bars have been and 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.

Noise

- During construction, the Project made a concerted effort to schedule and complete phases of construction with a high potential of disturbing wildlife prior to the nesting season for sensitive raptor species. In addition, an on-site biological monitor was hired to monitor raptor use and nesting behaviors during site visits to quantify any potential loss of productivity.
- Wind turbines are operated so that noise created does not exceed allowable statistical noise levels in any one hour.
- Effective exhaust mufflers were and are installed and properly maintained on all construction equipment.
- PacifiCorp required construction contractors to comply with federal limits on truck noise. Construction activities took place mostly during daylights hours. PacifiCorp and its contractors adhered to a 20 mph speed limit on unpaved roads. Nighttime construction work is minimized.

2.0 *EXISTING ENVIRONMENT*

2.1 Overview

The Project is located in the Columbia Basin Ecoregion. The general landscape was formed by the Missoula floods and is primarily composed of flood deposited and subsequent wind re-deposited silts and loams. Soil types include Olex-Krebs, Warden-Sagehill, and Ritzville-Mikkalo. Vegetation in the Columbia Basin Ecoregion is characterized by steppe and shrub-steppe vegetation types that have typically been heavily modified by human activities associated with agricultural development and settlement. In general, shrub-steppe vegetation (where shrubs and bunchgrasses co-dominate) occurs in the middle of the Ecoregion, while steppe vegetation (where native bunchgrasses dominate) occurs around the eastern rim of the Ecoregion and is generally at higher elevations towards the Blue Mountains.

Historical land cover maps from the Oregon Gap Analysis Program (OGAP) place the Project within the 'Perennial Bunchgrass' land cover type. However, OGAP's Current Land Cover maps show the Project area to be primarily modified grassland, with inclusions of sagebrush-steppe cover types around the edges. In addition, some non-native grassland (mostly annuals), scattered juniper or other trees, a juniper/sagebrush woodland in a dry drainage, small patches of deciduous trees in portions of the Project, and a very large active landfill operation occur in the Project. There are a few basalt rim edges with sparse vegetation on the canyon edges.

Franklin and Dyrness (1988) also describe a number of plant associations that occur on lithosols (shallow soils) within the Columbia Basin and shrub-steppe areas. Daubenmire (1970) recognizes a variety of lithosolic plant associations. All are typically composed of a uniform layer of Sandberg's bluegrass (*Poa secunda*) over a crust of mosses and lichens, with a low shrub layer above. The primary difference in these communities is in the composition of the shrub layer.

2.1.1 Pre-construction Wildlife Habitat Mapping

Methods

Habitat within a one-mi buffer of leased lands associated with the Project was delineated into broad categories in the fall 2004. Methods were consistent with other habitat and plant association mapping conducted elsewhere in the Columbia Basin. A habitat map was prepared in November 2004 and updated in August 2005 to reflect the locations of Project turbines and infrastructure. In addition, an expanded legend describing the habitat types and sub-types was prepared, along with a list of wildlife species that may occur within each sub-type, as determined by suitable habitat types and structure, habitat quality, and the biologist's extensive experience with the habitat types in the Columbia Basin.

Results

Within the Project area, as in most of the steppe and shrub-steppe regions, numerous disturbance factors have modified many of the plant communities, ultimately resulting in plant communities that are kept at an early- to mid-seral stage of development. The Project Site is a mosaic of native and non-native vegetation on shallow to deep soils. On the large landscape scale, these areas are typically referred to as "agricultural farm land" and "shrub-steppe". During the fall of 2004, the Project area and a one-mile buffer (8,563 acres) were further separated into plant associations based on the current dominant and co-dominant plant species (Figure 2). It includes broad habitat types and sub-types. An expanded legend was prepared describing each and a brief list of wildlife species that may occur within each sub-type during the nesting/denning period or for some mammals, year-round was added. The general habitat types within study area, including vertebrate wildlife species typically associated with the sub-type, are described in Table 1.

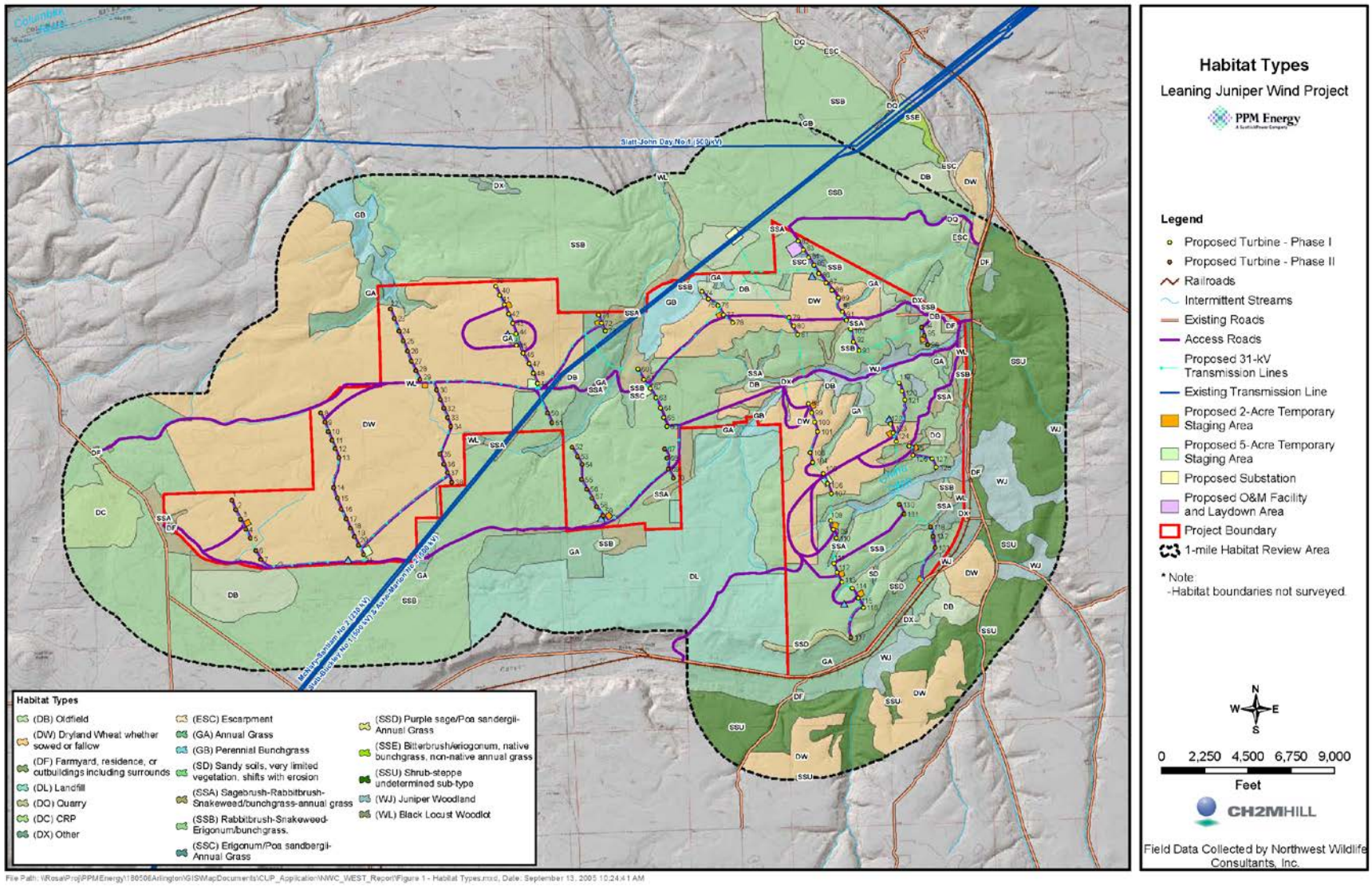

Figure2. Turbine locations proposed in 2005 at the Leaning Juniper I Project, Gilliam County, Oregon, in relation to habitat sub-types.

Table 1. Habitat types mapped in 2004 and 2005 at the Leaning Juniper I Project, Gilliam County, Oregon (Kronner et al. 2005).			
Primary Habitat Type (Mapping Code) General description	**Sub-Type**	**Sub-habitat Type Description**	**# Acres in Project Boundary**
Grassland (G) Native or non-native grasslands	**G-A**	Annual grass and/or weeds. Soil depth variable. May support Long-billed curlews (LBCU), Washington ground squirrel (WGS). Common species horned lark (HOLA) nesting habitat.	223
	G-B	Perennial bunchgrass. Shrubs if present, are an inconspicuous component. Soils generally medium to deep. WGS, white-tailed jackrabbit (WTJ), burrowing owl (BUOW). May also support other ground nesting grassland bird species such as savannah sparrow (SASP) and vesper sparrow (VESP). Common species - Western meadowlark (WEME) nesting habitat.	67
Shrub-Steppe (SS) "Semi-arid grassland characterized by grasses occurring in scattered bunches with other herbaceous vegetation and occasional woody species." Bedell, T. E. (Chairman), 1998. Glossary of terms used in Range Management-A definition of terms commonly used in Range Management. Glossary Update Task Group, Society for Range Management.	**SS-A**	Sagebrush-rabbitbrush-snakeweed/bunchgrass-annual grass. Soils medium to deep. This category appears to have potential value for shrub obligate species; Loggerhead shrike (LOSH). Also WGS and WTJ. Common species WEME.	180
	SS-B	Rabbitbrush-snakeweed-Eriogonum/bunchgrass, usually *Poa sandbergii*-annual grass. Most of these areas are formerly SS1 attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species. LBCU, WTJ, WGS. Common species HOLA, WEME.	1,057
	SS-C	Eriogonum/*Poa sandbergii*-annual grass. Significant bare ground used by short-horned lizard (SHL) as well as foraging birds like LBCU, LOSH, raptors.	7
	SS-D	Purple sage/*Poa sandbergii*-annual grass. Significant bare ground used by SHL, sagebrush lizard (SBL) as well as foraging birds like LBCU, LOSH, raptors.	13

Table 1. Habitat types mapped in 2004 and 2005 at the Leaning Juniper I Project, Gilliam County, Oregon (Kronner et al. 2005).			
Primary Habitat Type (Mapping Code) General description	**Sub-Type**	**Sub-habitat Type Description**	**# Acres in Project Boundary**
Woodland (W) Raptor, corvid and shrub obligate nesting habitat.	**W-J**	Woodland consisting of junipers. Open canopy. Usually in areas with significant sagebrush (big sage) and bare ground with conspicuous stands of trees. Nesting potential for ferruginous hawk (FEHA), Swainson's hawk (SWHA); LOSH foraging and nesting potential. Bare ground of value to SHL, SBL. Wintering habitat for American robins (AMRO), Townsend's solitaire (TOSA), waxwings (two species), and mountain bluebirds (MOBL).	79
	W-L	Woodlot consisting on non-native deciduous trees. Open canopy (trees not dense). Several to many trees in relatively small well defined areas. Depending on tree health and branch size, is nest site potential for SWHA, FEHA.	1
Developed (D)	**D-C**	Non-native grassland that may be enrolled in the CRP program. WTJ. Common species - WEME.	6
	D-B	Old-field. Previously cultivated, currently occupied by rabbitbrush/annual grasses and weeds. Common species - HOLA, WEME, may include savannah sparrow (SVSP).	68
	D-W	Dryland wheat. May be seeded or fallow. HOLA in winter when bare dirt or fallow.	1,447
	D-F	Farmyard, residence, or outbuildings including surrounds.	6
	D-L	Landfill, includes leachate pond at north end	463
	D-Q	Quarry.	6
	D-X	Other disturbed ground.	18
			D-Q
Sand Dune (SD) Sandy soils, very limited vegetation, shifts with erosion. SBL.			<1
Total (rounded			3,641

During the fall of 2004, areas that appeared to be potential nesting habitat for species of concern were mapped on field maps. The habitat features included juniper or black locust trees for nesting raptors; juniper with sagebrush and a shallow basalt cliff for raptors, loggerhead shrikes, and passerines; grasslands for long-billed curlew nesting; and black locust trees for raptor nesting/perching. Shallow rocky soils in grassland were noted because these sites do not provide habitat for burrowing owls. These areas typically have sparse vegetation and cover is very limited for ground-nesting birds. The field map highlighting deeper

soil sites with native vegetation cover was used to conduct an initial turbine and road micro-siting process with PPM Energy engineers and meteorologists. Experienced NWC wildlife biologists reviewed tentative turbine locations in the field. Based on these pre-survey site-specific reviews, the engineers were able to design a preliminary turbine string layout during the winter of 2004-2005 which took into consideration raptor nesting and habitat quality. This served as the basis for wildlife impact discussions and study protocol development with ODFW and USFWS during the winter of 2004-2005.

2.2 Pre-Construction Avian Use and Prey Surveys

The pre-construction avian use and habitat study was conducted in2004 and 2005 and included wildlife habitat mapping, avian use surveys, raptor nest surveys, a reconnaissance and formal survey for Washington ground squirrels, and special status wildlife surveys. . Pre-construction avian surveys were conducted to characterize the avian community and assess potential impacts. A summary of the pre-construction avian surveys is provided below and the entire final pre-construction wildlife baseline survey report is included in Appendix C (Kronner et al. 2005).

2.2.1 Fixed-Point Avian Use Surveys

Methods

Fixed point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). Six 800-m radius points were selected to survey representative habitats and topography of the study area (Figure 3). The six 800-m avian use plots provided coverage of 24.36% of the area within one km of turbines. All species of birds observed during surveys were recorded; additionally large bird observations were mapped. Surveys were conducted approximately weekly year-round, except in June, when surveys were conducted every two weeks. Fall was defined as August 27 – November 30, winter was December 1-March 15, spring was March 16 – May 31, and summer was defined as June 1 – August 15. Similar to a number of studies at other Wind Resource Areas throughout the U.S., point count duration was 20 minutes (e.g., Hoover and Morrison 2005, Smallwood et al. 2009, Strickland et al. 2011). A total of 97.67 hours of survey effort was conducted (30 hours in winter, 25.67 in fall, 22 in spring, and 20 in summer). Surveys were conducted during daylight hours and survey periods were varied to approximately cover all daylight hours during a season.

Table 2. Mean use, species richness (number of species per survey), total number of species, and number of surveys conducted by season and overall during fixed-point avian use surveys at the Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

Season	# Visits	Mean Use	#Species/Survey	# Species	# Surveys
Fall	13	19.615	2.538	25	77
Winter	15	47.244	2.433	20	90
Spring	11	11.758	3.424	23	66
Summer	10	6.750	2.083	17	60
Overall	49	23.684	2.612	42	293

Results

A total of 293 20-min fixed point avian use surveys were conducted during 49 visits (Table 2). A total of 10,303 birds were observations within 1,520 separate groups (Table 3). Forty-two unique species were observed (Table 1); however, two species composed approximately 50.2% of all observations: horned lark (*Eremophila alpestris*; 31.2%) and common raven (*Corvus corax*; 19.0%; Table 2). Unidentified gulls (17.4%) and unidentified passerines (12.5%) accounted for an additional 29.9% of observations. Each other species composed less than 8% of the observations, individually (Table 3).

Passerines were the most abundant bird type in all seasons (spring 8.68 birds/800-m plot/20-min survey, summer 5.52, fall 19.06, and winter 42.83) and accounted for at least 70% of all birds observed in each season (Table 4). Raptors/vultures were the second most abundant bird type in summer (1.07 birds/plot/survey) and fall (0.53), and waterbirds were the second most abundant in spring (1.79) and winter (4.17; Table 4). The highest overall use occurred in the winter (47.24 birds/plot/survey), followed by fall (19.62), spring (11.76), and summer (6.75; Table 4). Raptor use was highest in the summer (1.07 birds/plot/survey), followed by fall (0.53), spring (0.39), and winter (0.24). The raptor species with the highest use was Swainson's hawk in spring (0.106) and summer (0.517), while the American kestrel had the highest use among raptors in fall (0.221), and red-tailed hawks had the highest winter use among raptors (0.122; Table 5).

Overall, 25.35% of flying birds were initially observed within the rotor swept area (RSA), 73.61% were below the RSA, and 1.04% were flying above the RSA (Table 6). Most (77.43%) flying passerines were initially observed below the RSA. Most (64.54%) flying raptors were initially observed within the RSA, 28.69% were flying below the RSA, and 6.77% were observed flying above the RSA (Table 6). Raptor use was similar among points and ranged from 0.37 to 0.71 birds/20-min survey; Figure 4).

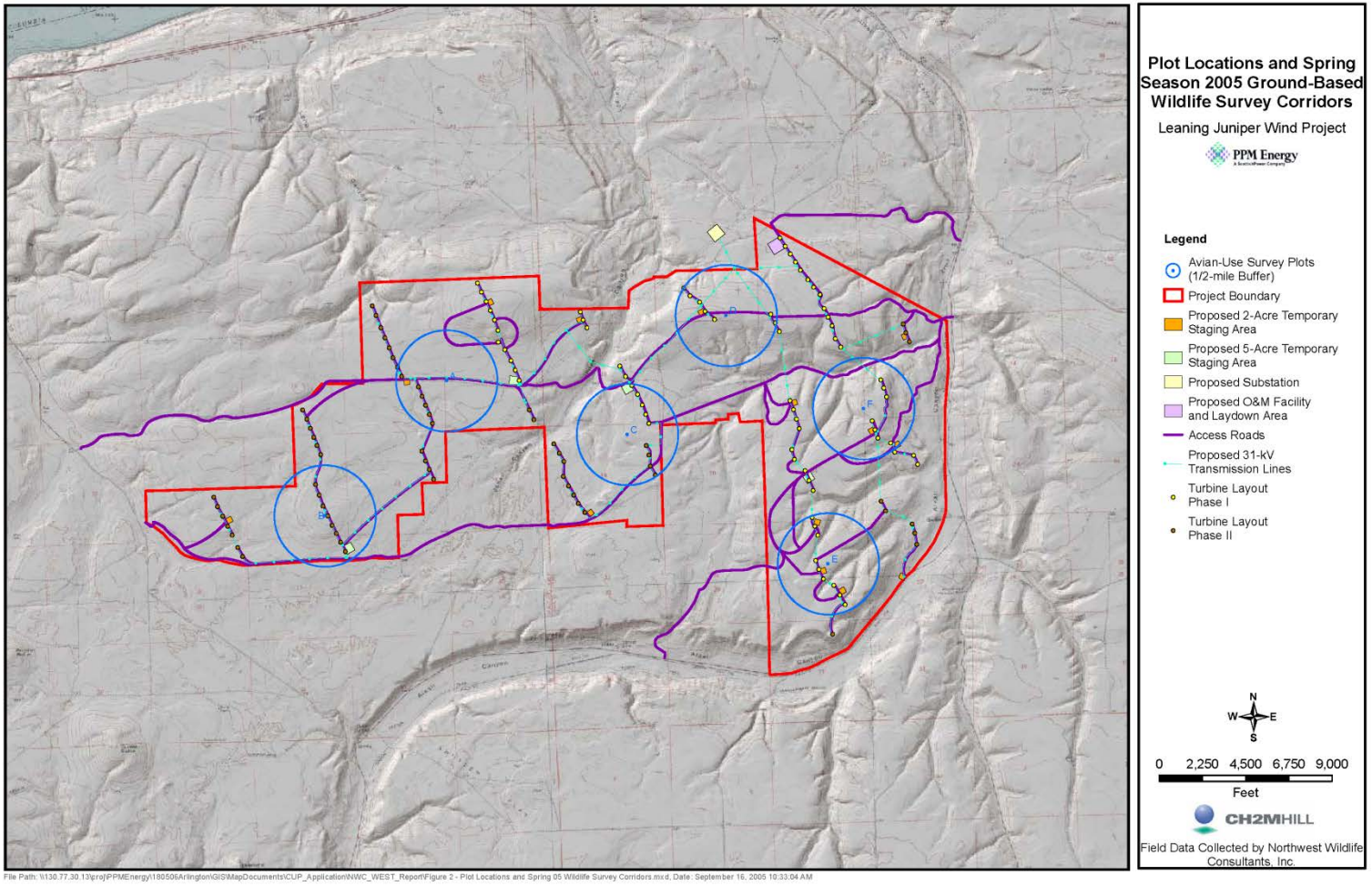

Figure 3. 2004-2005 fixed-point avian use survey plots at the Leaning Juniper I Project, Gilliam County, Oregon.

Table 3. Number of avian groups and individuals by species observed during fixed point avian use surveys at the Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.
Waterbirds/Waterfowl	**3**	**330**	**10**	**420**	**19**	**1750**	**3**	**57**	**35**	**2557**
ring-billed gull	0	0	0	0	2	12	0	0	2	12
unidentified gull	0	0	0	0	17	1738	3	57	20	1795
Canada goose	3	330	10	420	0	0	0	0	13	750
Shorebirds										
long-billed curlew	0	0	0	0	52	63	6	8	58	71
Raptors/Vultures	**45**	**50**	**41**	**44**	**70**	**126**	**105**	**130**	**261**	**350**
Accipiters	*2*	*2*	*1*	*1*	*1*	*1*	*0*	*0*	*4*	*4*
sharp-shinned hawk	2	2	1	1	0	0	0	0	3	3
unidentified accipiter	0	0	0	0	1	1	0	0	1	1
Buteos	*16*	*18*	*30*	*33*	*58*	*114*	*87*	*107*	*191*	*272*
Swainson's hawk	2	2	0	0	11	13	42	53	55	68
ferruginous hawk	1	3	1	1	12	12	8	8	22	24
red-tailed hawk	4	4	17	20	22	23	19	21	62	68
rough-legged hawk	4	4	4	4	2	2	0	0	10	10
unidentified buteo	5	5	8	8	11	64	18	25	42	102
Northern Harriers										
northern harrier	3	3	2	2	3	3	4	4	12	12
Eagles										
golden eagle	4	4	4	4	3	3	0	0	11	11
Falcons	*16*	*18*	*4*	*4*	*3*	*3*	*9*	*10*	*32*	*35*
American kestrel	15	17	2	2	2	2	8	9	27	30
merlin	0	0	0	0	1	1	0	0	1	1
prairie falcon	1	1	2	2	0	0	0	0	3	3
unidentified falcon	0	0	0	0	0	0	1	1	1	1

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.
Owls	*2*	*3*	*0*	*0*	*0*	*0*	*3*	*5*	*5*	*8*
burrowing owl	0	0	0	0	0	0	3	5	3	5
Short-eared owl	2	3	0	0	0	0	0	0	2	3
Other Raptors	*0*	*0*	*0*	*0*	*2*	*2*	*2*	*4*	*4*	*6*
osprey	0	0	0	0	0	0	1	2	1	2
unidentified raptor	0	0	0	0	2	2	1	2	3	4
Vultures										
turkey vulture	2	2	0	0	0	0	0	0	2	2
Passerines	**267**	**1543**	**390**	**4503**	**339**	**740**	**165**	**534**	**1161**	**7320**
American crow	1	1	0	0	1	1	0	0	2	2
American goldfinch	2	6	4	26	0	0	0	0	6	32
American pipit	4	12	2	8	2	9	0	0	8	29
American robin	0	0	1	1	0	0	0	0	1	1
barn swallow	1	5	0	0	2	3	0	0	3	8
black-billed magpie	2	4	3	3	0	0	4	5	9	12
cliff swallow	0	0	0	0	0	0	1	1	1	1
common raven	54	350	149	1082	84	284	45	240	332	1956
dark-eyed junco	1	1	0	0	0	0	0	0	1	1
European starling	2	75	4	385	4	82	0	0	10	542
grasshopper sparrow	0	0	0	0	1	1	0	0	1	1
horned lark	158	736	176	1966	162	253	91	256	587	3211
lark sparrow	0	0	1	1	0	0	0	0	1	1
mountain bluebird	0	0	3	6	0	0	0	0	3	6
mourning dove	0	0	0	0	0	0	1	1	1	1
northern shrike	0	0	2	2	0	0	0	0	2	2
savannah sparrow	0	0	0	0	2	2	0	0	2	2
unidentified passerine	21	283	17	992	0	0	4	8	42	1283
unidentified sparrow	2	4	0	0	0	0	0	0	2	4
western kingbird	0	0	0	0	3	3	1	1	4	4
western meadowlark	16	32	28	31	77	101	18	22	139	186

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.
white-crowned sparrow	2	32	0	0	1	1	0	0	3	33
yellow-rumped warbler	1	2	0	0	0	0	0	0	1	2
Upland Gamebirds										
ring-necked pheasant	0	0	0	0	2	2	0	0	2	2
Other Birds	**2**	**2**	**0**	**0**	**0**	**0**	**1**	**1**	**3**	**3**
northern flicker	1	1	0	0	0	0	0	0	1	1
unidentified hummingbird	0	0	0	0	0	0	1	1	1	1
unidentified woodpecker	1	1	0	0	0	0	0	0	1	1
Total	**317**	**1925**	**441**	**4967**	**482**	**2681**	**280**	**730**	**1520**	**10303**

Table4. Mean seasonal use (#/800-meter plot/20-min survey) for each avian group observed during the fixed-point avian use survey at the Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

	Mean Use #/20-minutes)			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.000	4.167	1.788	0.017
Shorebirds	0.000	0.000	0.864	0.133
Raptors/Vultures	0.528	0.244	0.394	1.067
Accipiters	0.026	0.011	0.000	0.000
Buteos	0.151	0.156	0.273	0.750
Northern Harrier	0.026	0.022	0.030	0.050
Eagles	0.026	0.022	0.045	0.000
Falcon	0.233	0.033	0.030	0.150
Owls	0.038	0.000	0.000	0.083
Other Raptors	0.000	0.000	0.015	0.033
Vultures	0.028	0.000	0.000	0.000
Passerines	19.062	42.833	8.682	5.517
Upland Gamebirds	0.000	0.000	0.030	0.000
Other birds	0.026	0.000	0.000	0.017
Overall	19.615	47.244	11.758	6.750
	% Group Composition (#/20-minutes)			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.00	8.82	15.21	0.25
Shorebirds	0.00	0.00	7.35	1.98
Raptors/Vultures	2.69	0.52	3.35	15.80
Accipiters	0.13	0.02	0.00	0.00
Buteos	0.77	0.33	2.32	11.11
Northern Harrier	0.13	0.05	0.26	0.74
Eagles	0.13	0.05	0.39	0.00
Falcon	1.19	0.07	0.26	2.22
Owls	0.20	0.00	0.00	1.23
Other Raptors	0.00	0.00	0.13	0.49
Vultures	0.14	0.00	0.00	0.00
Passerines	97.18	90.66	73.84	81.73
Upland Gamebirds	0.00	0.00	0.26	0.00
Other birds	0.13	0.00	0.00	0.25
Overall	100.00	100.00	100.00	100.00
	% Freq. of Occurrence			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.00	6.67	7.58	1.67
Shorebirds	0.00	0.00	36.36	6.67
Raptors/Vultures	34.10	18.89	33.33	58.33
Accipiters	2.56	1.11	0.00	0.00
Buteos	10.77	13.33	21.21	46.67
Northern Harrier	2.56	2.22	3.03	5.00
Eagles	2.56	1.11	4.55	0.00
Falcon	15.64	3.33	3.03	11.67
Owls	2.56	0.00	0.00	5.00
Other Raptors	0.00	0.00	1.52	1.67
Vultures	2.82	0.00	0.00	0.00
Passerines	94.62	98.89	100.00	75.00
Upland Gamebirds	0.00	0.00	3.03	0.00
Other birds	2.56	0.00	0.00	1.67

Table 5: Mean avian use and percent frequency by season during fixed-point avian use surveys at the Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

Fall			Winter		
Species	**Use**	**% Freq.**	**Species**	**Use**	**% Freq.**
horned lark	9.464	92.05	horned lark	21.844	84.44
common raven	3.926	54.10	unidentified passerine	11.022	18.89
unidentified passerine	3.441	23.33	common raven	7.433	72.22
European starling	0.962	2.56	Canada goose	4.167	6.67
western meadowlark	0.410	19.23	European starling	1.667	1.11
white-crowned sparrow	0.410	2.56	western meadowlark	0.344	20.00
American kestrel	0.221	14.36	American goldfinch	0.289	4.44
American pipit	0.154	5.13	red-tailed hawk	0.122	11.11
American goldfinch	0.077	2.56	American pipit	0.089	2.22
barn swallow	0.064	1.28	mountain bluebird	0.067	3.33
black-billed magpie	0.051	2.56	black-billed magpie	0.033	3.33
unidentified sparrow	0.051	2.56	American kestrel	0.022	2.22
ferruginous hawk	0.046	1.54	golden eagle	0.022	1.11
rough-legged hawk	0.038	2.56	northern harrier	0.022	2.22
short-eared owl	0.038	2.56	northern shrike	0.022	2.22
Swainson's hawk	0.028	2.82	rough-legged hawk	0.022	2.22
turkey vulture	0.028	2.82	American robin	0.011	1.11
golden eagle	0.026	2.56	ferruginous hawk	0.011	1.11
northern harrier	0.026	2.56	lark sparrow	0.011	1.11
sharp-shinned hawk	0.026	2.56	prairie falcon	0.011	1.11
unidentified buteo	0.026	2.56	sharp-shinned hawk	0.011	1.11
yellow-rumped warbler	0.026	1.28			
American crow	0.013	1.28			
dark-eyed junco	0.013	1.28			
northern flicker	0.013	1.28			
prairie falcon	0.013	1.28			
red-tailed hawk	0.013	1.28			
unidentified woodpecker	0.013	1.28			
Spring			**Summer**		
horned lark	3.833	95.45	horned lark	4.267	68.33
common raven	2.076	60.61	common raven	0.733	21.67
unidentified gull	1.606	6.06	Swainson's hawk	0.517	33.33
western meadowlark	1.530	78.79	western meadowlark	0.367	23.33
European starling	0.939	4.55	American kestrel	0.133	10.00
long-billed curlew	0.864	36.36	long-billed curlew	0.133	6.67
ring-billed gull	0.182	3.03	ferruginous hawk	0.117	8.33
American pipit	0.136	3.03	red-tailed hawk	0.117	8.33
Swainson's hawk	0.106	7.58	burrowing owl	0.083	5.00
red-tailed hawk	0.091	9.09	unidentified passerine	0.067	3.33
ferruginous hawk	0.061	6.06	northern harrier	0.050	5.00
barn swallow	0.045	3.03	black-billed magpie	0.033	3.33
golden eagle	0.045	4.55	osprey	0.033	1.67
western kingbird	0.045	4.55	cliff swallow	0.017	1.67
northern harrier	0.030	3.03	mourning dove	0.017	1.67
ring-necked pheasant	0.030	3.03	unidentified falcon	0.017	1.67
savannah sparrow	0.030	3.03	unidentified gull	0.017	1.67
American crow	0.015	1.52	unidentified hummingbird	0.017	1.67
American kestrel	0.015	1.52	western kingbird	0.017	1.67
grasshopper sparrow	0.015	1.52			
merlin	0.015	1.52			
rough-legged hawk	0.015	1.52			
unidentified raptor	0.015	1.52			

Table 6. Flight height characteristics by avian group during fixed-point bird use surveys at the Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

Group	# Flocks flying	# Birds flying	Mean Flight height (m)	% Birds flying	Relation to rotor-swept height		
					Below	Within	Above
Waterbirds/Waterfowl	31	2327	57.58	91.01	69.06	29.82	1.12
Shorebirds	33	43	16.51	60.56	81.40	18.60	0.00
Raptors/Vultures	220	251	50.51	71.71	28.69	64.54	6.77
Accipiters	4	4	52.75	100.00	25.00	75.00	0.00
Buteos	158	183	59.75	67.28	15.85	75.96	8.20
Northern Harrier	12	12	20.92	100.00	75.00	25.00	0.00
Eagles	9	9	52.00	81.82	22.22	77.78	0.00
Falcon	28	31	19.80	88.57	74.19	25.81	0.00
Owls	3	4	0.60	50.00	100.00	0.00	0.00
Other Raptors	4	6	50.50	100.00	50.00	16.67	33.33
Vultures	2	2	17.50	100.00	50.00	50.00	0.00
Passerines	802	5679	15.86	77.58	77.43	21.82	0.76
Upland Gamebirds	0	0	N/A	0.00	N/A	N/A	N/A
Other birds	3	3	31.00	100.00	33.33	66.67	0.00
Overall	1089	8303	24.04	80.59	73.61	25.35	1.04

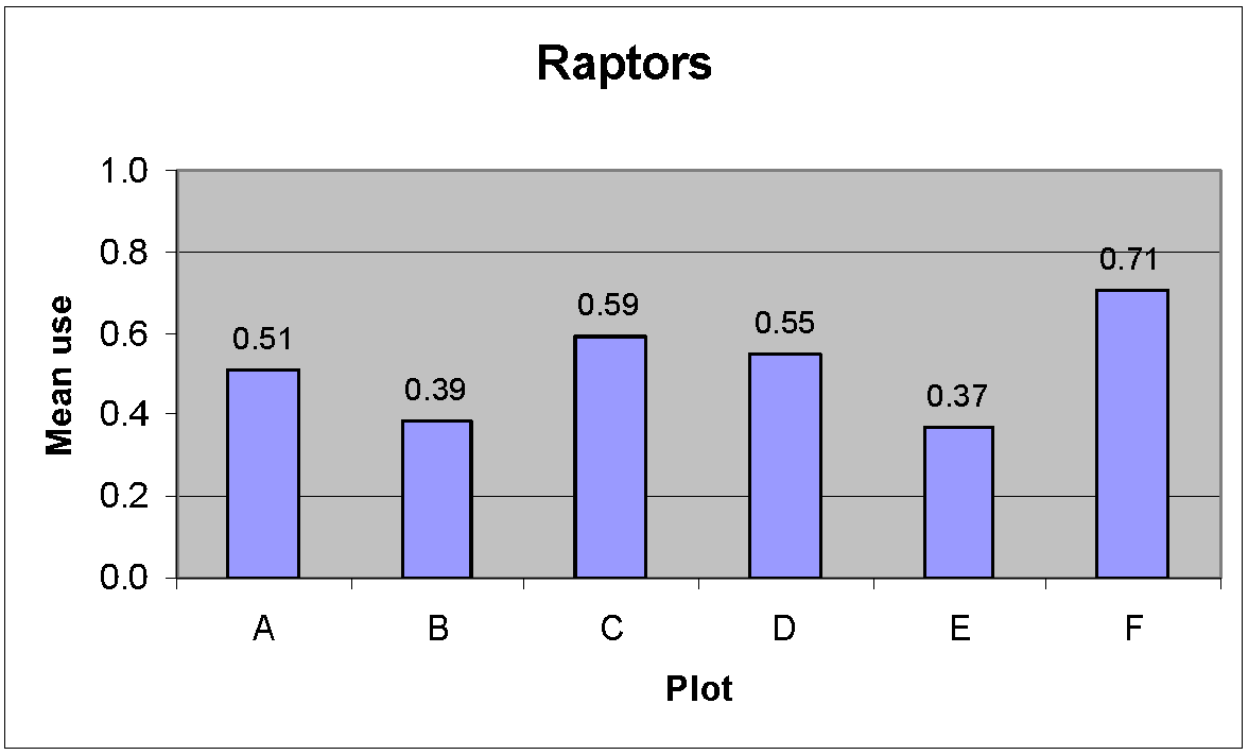

Figure 4: Raptor use at each fixed-point avian use survey plot during fixed-point avian use surveys at Leaning Juniper I Project, Gilliam County, Oregon (August 27, 2004 - August 15, 2005).

2.2.2 Raptor Nest Surveys

Methods

One aerial raptor nest survey was conducted, and several juniper trees and basalt cliffs were checked for nest during the transect surveys for sensitive species. Raptor nest surveys were conducted once from May 1 through June 8, 2005, throughout the Project and a surrounding two-mile buffer of proposed turbine strings. Universal Transverse Mercator (UTM) coordinates, nesting substrate, and current status (i.e., inactive, active, incubating, young in nest) were recorded for each nest located.

Results

Twenty-five active and 22 inactive nests were located within 2 miles of the Project area. Eleven of the active nests were occupied by Swainson's hawks, 10 were red-tailed hawk nests, two were ferruginous hawk nests, one was a great-horned owl nest, and one was a prairie falcon nest (Figure 5).

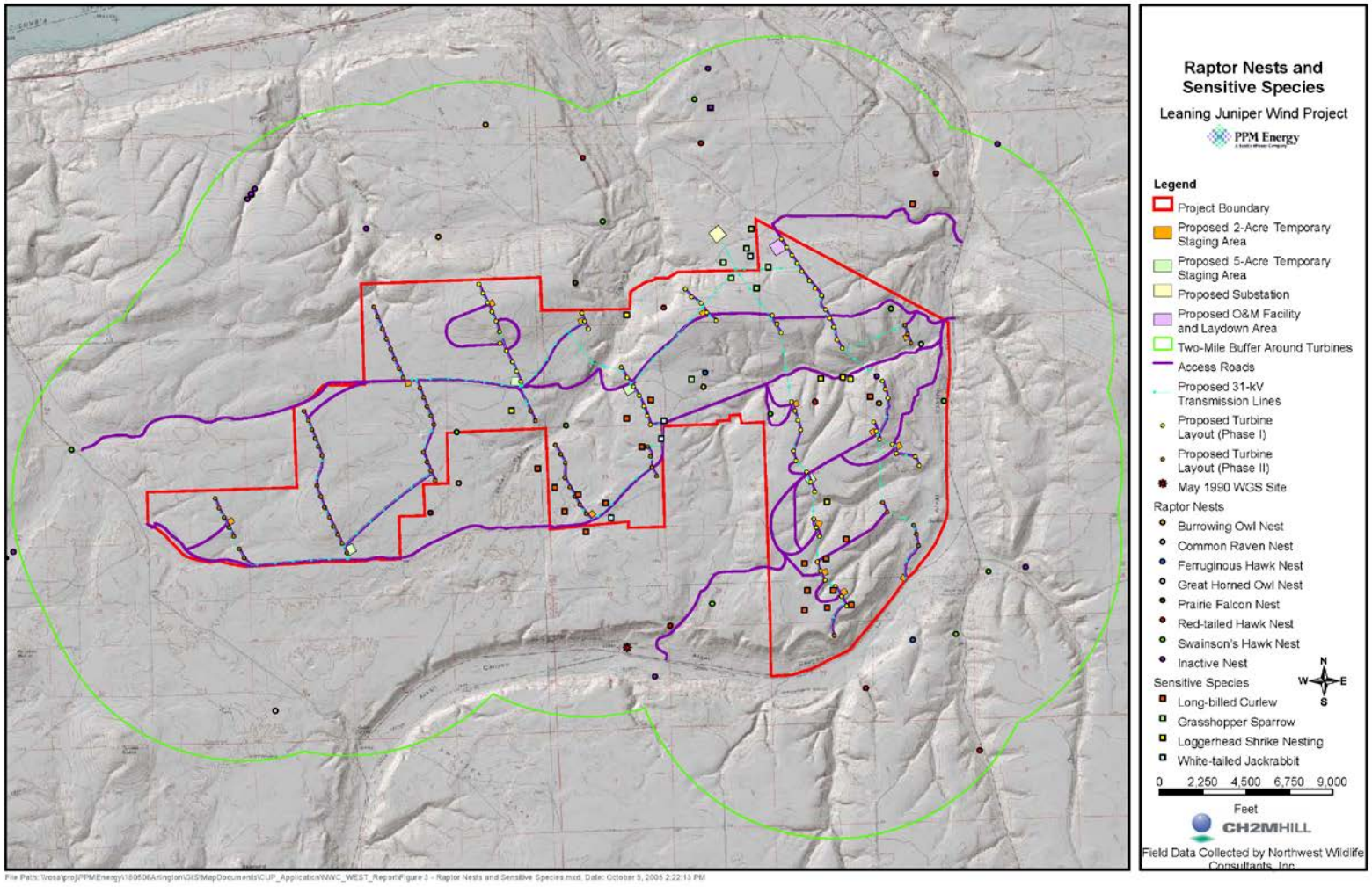

Figure 5. Location of raptor nests and sensitive species located in 2005 at the Leaning Juniper I Project, Gilliam County, Oregon.

2.2.3 Washington Ground Squirrel Surveys

Methods

The survey area for Washington ground squirrels included a 1,000 ft buffer surrounding the March 2005 proposed layout.. The first survey was conducted between March 1 and March 23 and the second survey was conducted between March 29 and April 11. Parallel transects spaced 164 to 220 feet apart were walked twice within these corridors, excluding cropland and unsuitable habitat. Experienced surveyors meandered along the transect routes looking for sign of use (e.g., burrow entrance holes and droppings) while looking ahead for squirrels and listening for their diagnostic calls. Suspected (droppings located) and confirmed-use (animal detected) locations were recorded in hand-held GPS (Global Positioning System) units. Approximately 3,037 acres of grassland and shrub-steppe habitats within the leased land were surveyed and approximately 705 acres adjacent to the leased land were surveyed.

The second survey occurred when Washington ground squirrels were at their peak seasonal activity. Confirmed Washington ground squirrel locations were mapped by walking through the site in tighter meandering transects until lack of any sign was noted or until the surveyor reached the outside of the 1,000-foot survey corridor. Later season observations (detections noted during other types of field surveys) were also plotted. GPS coordinates were taken for the furthest outside Washington ground squirrel hole, or where the animal was seen or heard calling, and entered in the wildlife GIS (Geographic Information System) files. The confirmed areas were enclosed in polygons and each site was further described (e.g., soil and habitat type, overall density, and colony size).

Results

Seven primary patches of Washington ground squirrel habitat were located and ranged from 3 to 74 acres in size (within the 1,000 ft survey buffer), although some active sites extended outside the 1,000 ft buffer (Figure 6). Four of the 7 patches were closest to the Project facilities and the other nearer to Leaning Juniper II facilities. Patches mostly occurred in areas mapped as shrub-steppe and were further typed as having a vegetative cover of rabbitbrush-snakeweed-buckwheat/bunchgrass (SSB), with one small patch in grassland habitat (GA). The sites generally contained low, open shrub cover, and a few species of buckwheat, Sandberg's bluegrass, and non-native cheatgrass (Table 7). Based on pre-construction surveys, an estimated 249 acres (245 acres in SSB and 4 in GA) of occupied Washington ground squirrel habitat occurred within the Project.

Table 7. Washington ground squirrel (WGS) colony characteristics of the patches of occupied WGS habitat within Leaning Juniper I Project, Gilliam County, Oregon, during 2005 pre-construction surveys.

WGS Colony #	Soils	Mapped Habitat (late 2004)	Overall Density	Colony Size and Acres (rounded)	General Notes	Near Turbines
1	23B, 56B	SSB	Dense	Large, 74 ac		No, east of Phase I 61-66
2	23B	SSB	Dense	Small to Medium, 11 ac		Phase I 91-92
3	32B, 40B	SSB	Dense	Large, 48 ac		Phase I 119-122
4		SSB	Dense	Large, a-e combined=~101 ac	Extensive – probably is larger than surveyed data shows. Probably connects to Colony 1	
a	23B	SSB	Low Density	Small, 9 ac		Phase II 67
b	23B	SSB	Medium Density	Medium, 15 ac		Phase II 67-69
c	14B, 23B	SSB	Dense	Large, 44 ac	Was probably more extensive to the south in prior years. Probably is more extensive in the area not leased (not surveyed) than shown	Phase II 70
d	23B	SSB	Dense	Large, 25 ac		No, east of Phase II 54-56
e	23 B, 23C	SSB	Dense	Small, 8 ac	Connected to **d** but a noticeable gap in-between	Phase II 57-58
5	23C, 23D, 33E	SSB	Dense	Small, 8 ac		Phase I 118 and 131
6	14D	GA	Very Low	Very Small, 4 ac (May have been just a few individuals)		No, south of Phase I 133
7	56B	SSB	Very Low (1 individual)	Very Small, 3 ac		No, west of Phase II 112 and 113

Estimated size based on general observations
Small = 10 to 30 individuals
Medium = 30 to 40 individuals

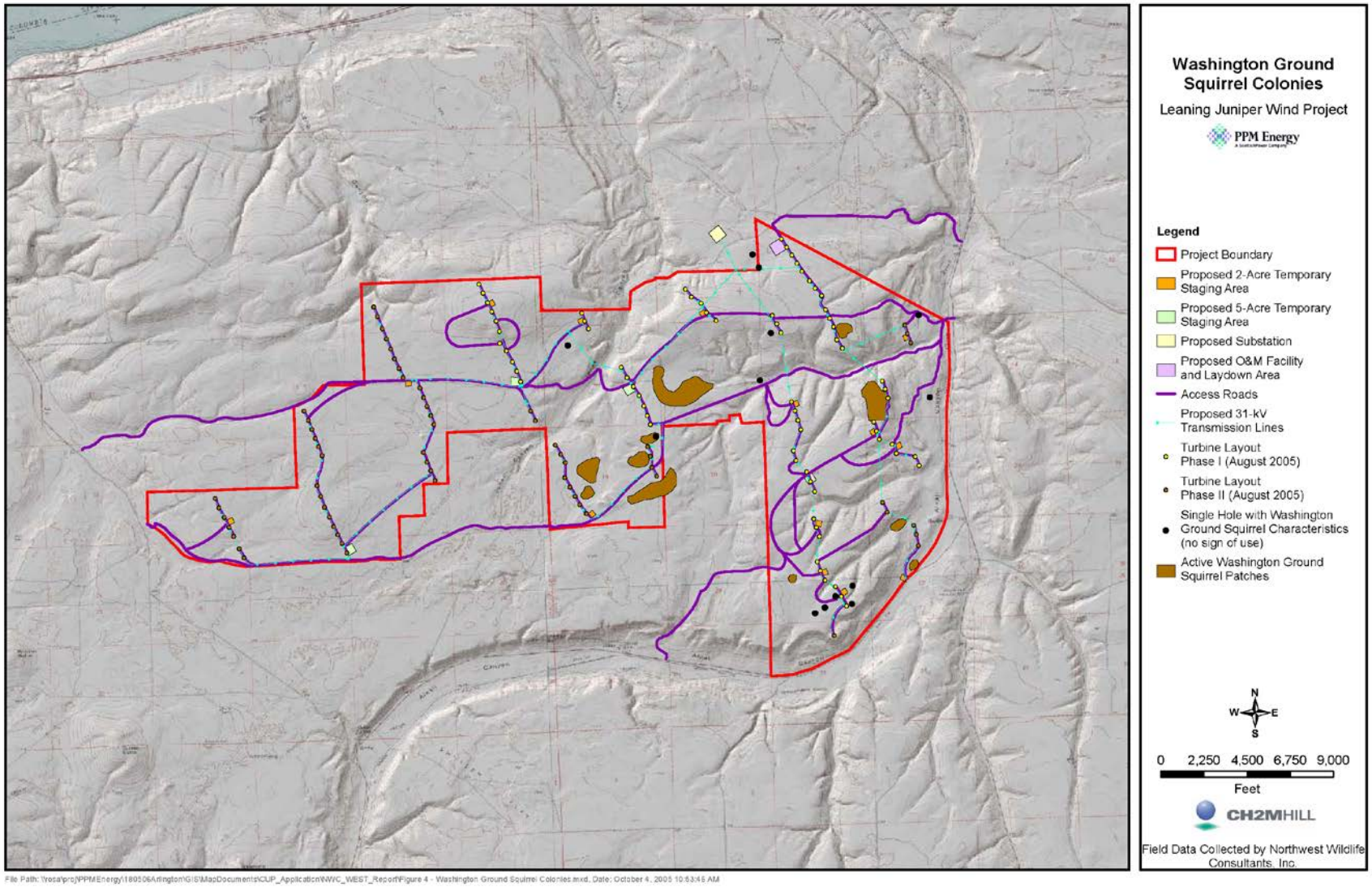

Figure 6. Washington ground squirrel colonies located during the 2005 baseline surveys at the Leaning Juniper I Project, Gilliam County, Oregon.

2.2.4 Other Special Status Wildlife Surveys

Methods

Six special-status wildlife species were expected to occur during the spring/early summer breeding season in the habitats at the Project: long-billed curlew (*Numenius americanus*), grasshopper sparrow (*Ammodramus savannarum*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanus ludovicianus*), sagebrush lizard (*Sceloporus arenicolus*), and white-tailed jackrabbit (*Lepus townsendii*). Methods and results for surveying the non-avian species are detailed in Kronner et al. 2005 (Appendix D).

Methods to confirm presence by these six species were developed by NWC using the extensive experience backgrounds of the staff and suggested methods in the Oregon Methodology Manual (ODFW 1994); protocols were prepared and approved by ODFW. Surveys for other sensitive wildlife surveys were conducted in conjunction with the Washington ground squirrel surveys (Appendix D). The Washington ground squirrel surveys were conducted at a time when some, but not all, sensitive-status wildlife species had returned for nesting; therefore, a third survey was conducted through the same survey corridors as the first two surveys but only within 400 feet of the Project facility.

The special-status wildlife species surveys were conducted April 25 through May 4 and a later survey was conducted in June at a few small areas for lizards. Surveys typically were conducted during the morning hours and when conditions were optimal (no or low wind, mild temperatures). When planning the survey schedules, surveyors determined which sites had moderate or high potential for supporting sagebrush lizards and those sites were surveyed mid to late morning or early afternoon when lizards would be more active. Throughout the survey period, areas suspected of supporting burrowing owls were more closely examined. Surveyors recorded all wildlife seen or heard during each survey.

Results

Loggerhead shrikes were found in areas with mature sagebrush cover in juniper woodlands, and occasionally at isolated juniper trees. Several nests were found in sagebrush and juniper trees. Nest success seemed to be moderate to high as many young birds were observed. Loggerhead shrikes were also detected incidentally, while observers were in-transit for other studies conducted in 2005.

One active burrowing owl nest and one other detection were documented during the nesting season. One bird was observed during the early fall in 2004, away from the area where nesting occurred the following spring. The bird could have nested outside of the surveyed corridors or could have been a transient/migrant from outside the Project boundary. No burrowing owls were observed during the winter season.

The long-billed curlew was frequently observed and heard in the open low shrub/grassland and gentle terrain in the southeast and central portions of the Project. Long-billed curlew locations were mapped by behavior while the species was present at the site (mid-March through June). Three nests were located and plotted, which were located near areas used during the pre-nesting staging period (e.g., upon arrival in March). A few long-billed curlews were documented during walking transects (early March) and also during fixed-point avian use surveys (Table 3).

Grasshopper sparrow, a ground-nesting grassland bird, was primarily observed the far north central end of the Project area in open, low shrub habitat (rabbitbrush/grasslands). Territorial males and a few

females were typically heard more frequently than observed. Density within the Project survey corridors was considered low, likely due to the lack of sufficient grassland structure for nesting cover.

2.2.5 Pre-Construction Avian Survey Conclusions

Regardless of plot size, passerines were the most abundant bird type recorded during the fixed-point avian use surveys, followed by waterbirds, and raptors. Raptor use was considered low and had similar raptor use to the Nine Canyon Project in Washington (0.3 raptors/800-m plot/20-min survey) and the Klondike I facility in Oregon (0.5 raptors/plot/survey). Swainson's hawk was the most commonly observed raptor species in spring and summer, while American kestrels were the most commonly observed raptor in fall, and red-tailed hawks were the most common raptor in winter. Eleven golden eagles were observed during baseline studies (4 in both the fall and winter, 3 in the spring, and none in the summer. No bald eagles were observed during the pre-construction surveys. Twenty-five active raptor nests were found during pre-construction surveys, with the majority being Swainson's hawk nests. Due to the low raptor use and low number of turbines, the Project was expected to have relatively low levels of raptor mortality.

2.3 Threatened and Endangered Avian Species

No ESA listed threatened or endangered avian species have the potential to occur in Gilliam County, Oregon; however, five avian species of concern identified by the Oregon USFWS Office have the potential to occur (USFWS 2013). Two federally listed species of concern were observed while conducting the pre-construction surveys: ferruginous hawk and burrowing owl (Kronner et al. 2005).

Six species listed as USFWS Birds of Conservation Concern (BCC) in the Great Basin Bird Conservation Region (BCR) were recorded during baseline wildlife studies (USFWS 2008); however, abundance was only available for those seen during fixed-point avian use surveys. Long-billed curlew was the most commonly observed BCC species (58 observations), and this species was documented nesting and staging in the Project area. Twenty-two ferruginous hawk observations were recorded during fixed-point surveys, and two ferruginous hawk nests were documented in the study area. Eleven golden eagle observations were recorded during fixed point surveys. Sage thrasher and loggerhead shrike use of the Project was also documented, though neither species was recorded during fixed-point bird use surveys (Kronner et al. 2005; Appendix C).

No Oregon state-listed threatened or endangered avian species were observed during baseline surveys (ODFW 2012). The ODFW also maintains a list of threatened, endangered and sensitive species by Ecoregion (ORBIC 2013). Four vulnerable sensitive species were observed during baseline surveys: grasshopper sparrow, Swainson's hawk, loggerhead shrike, and long-billed curlew. Two critical sensitive species were observed: burrowing owl and ferruginous hawk (Kronner et al. 2005; Appendix C).

2.4 Bald and Golden Eagles

Both bald and golden eagles are known to occur in the vicinity of the Project. Golden eagles are present periodically in spring, fall, and winter, and bald eagles may infrequently pass through the Project area. Discussion of bald and golden eagle observations and use of the Project are provided below.

2.4.1 Bald Eagle

- Bald eagles were not seen during baseline surveys at the Project.

- Nearest known nest is over 47 miles from Project

2.4.2 Golden Eagle

- Eleven golden eagles were observed during fixed-point avian use surveys in fall, winter, and spring
- Golden eagles were observed at survey plots C, D, E, and F
- No golden eagle nests were observed during raptor nest surveys
- Golden eagles are known to nest within five to six miles of the Project.
- Golden eagles were observed during ground-based wildlife surveys between March 3 and July 10, 2005

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. The data from the 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 could result in impacts to birds and other wildlife. Impacts from construction activities could include the destruction of nests, eggs, or young, as well as collisions with vehicles and construction equipment. To minimize the potential for the destruction of nests, eggs, and young, clearing of trees was avoided and minimized during Project construction.

To avoid and minimize mortality associated with vehicle collisions or other construction-related activities, Project personnel were advised regarding speed limits on roads (20 mph on unpaved roads). In addition, all supervisory construction personnel were instructed on the protection of wildlife resources including: (1) federal and state laws regarding plants and wildlife, including their collection and removal; and (2) the importance of these resources and the purpose and necessity of protecting them. This information was disseminated through the contractor hierarchy to ensure that all appropriate workers were aware of the correct procedures and responsibility to report wildlife incidences. 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 3, Erickson et al. 2001, 2002, 2005).

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. 2005
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. Based on the pre-construction avian use surveys, avian use of the Project was not high relative to other projects in open habitats (Kronner et al. 2005). Raptor use at the Project area (0.52 raptors/plot/20-min survey) was similar to other wind projects in the vicinity (i.e., Klondike and Vansycle Wind Projects; Kronner et al. 2005). Raptor mortality rates among wind energy facilities in Oregon and Washington have ranged from zero to 0.47 raptor carcasses/MW/year (Table 9).

Table 9. The all bird and raptor mortality rates (carcasses/megawatt [MW]/year) based on post-construction monitoring studies in Oregon and Washington.

Project Name	All Bird Mortality Rate	Raptor Mortality Rate	Reference
Leaning Juniper I, OR	**6.66**	**0.16**	**Gritski et al. 2008**
Windy Flats, WA	8.45	0.04	Enz et al. 2011
Biglow Canyon, OR (Phase II; 2009/2010)	5.53	0.14	Enk et al. 2011
White Creek, WA (2007-2011)	4.05	0.47	Downes and Gristki 2012
Tuolumne (Windy Point I), WA	3.2	0.29	Enz and Bay 2010
Stateline, OR/WA (2002)	3.17	0.09	Erickson et al. 2004
Klondike II, OR	3.14	0.06	NWC and WEST 2007
Klondike III (Phase I), OR	3.02	0.15	Gritski et al. 2010
Hopkins Ridge, WA (2008)	2.99	0.07	Young et al. 2009
Harvest Wind, WA (2010-2012)	2.94	0.23	Downes and Gristki 2012
Nine Canyon, WA	2.76	0.03	Erickson et al. 2003

Table 9. The all bird and raptor mortality rates (carcasses/megawatt [MW]/year) based on post-construction monitoring studies in Oregon and Washington.

Project Name	All Bird Mortality Rate	Raptor Mortality Rate	Reference
Stateline, OR/WA (2003)	2.68	0.09	Erickson et al. 2004
Biglow Canyon, OR (Phase II; 2010/2011)	2.68	0.03	Enk et al. 2012
Klondike IIIa (Phase II), OR	2.61	0.06	Gritski et al. 2011
Combine Hills, OR (Phase I; 04/05)	2.56	0	Young et al. 2006
Big Horn, WA	2.54	0.11	Kronner et al. 2008
Biglow Canyon, OR (Phase I; 2009)	2.47	0	Enk et al. 2010
Combine Hills, OR (2011)	2.33	0.05	Enz et al. 2012
Biglow Canyon, OR (Phase III; 2010/2011)	2.28	0.05	Enk et al. 2012
Hay Canyon, OR	2.21	0	Gritski and Kronner 2010a
Elkhorn, OR (2010)	1.95	0.08	Enk et al. 2011
Pebble Springs, OR	1.93	0.04	Gritski and Kronner 2010b
Biglow Canyon, OR (Phase I; 2008)	1.76	0.03	Jeffrey et al. 2009
Wild Horse, WA	1.55	0.09	Erickson et al. 2008
Goodnoe, WA	1.4	0.17	URS 2010a
Vantage, WA	1.27	0.29	Ventus Environmental Solutions 2012
Hopkins Ridge, WA (2006)	1.23	0.14	Young et al. 2007
Stateline, OR/WA (2006)	1.23	0.11	Erickson et al. 2007
Kittitas Valley, WA (2011-2012)	1.06	0.09	Stantec 2012
Klondike, OR	0.95	0	Johnson et al. 2003b
Vansycle, OR	0.95	0	Erickson et al. 2000
Elkhorn, OR (2008)	0.64	0.06	Jeffery et al. 2009
Marengo I, WA (2009/2010)	0.27	0	URS 2010b
Marengo II, WA (2009/2010)	0.16	0.05	URS 2010c

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.

The likelihood of mass mortality at the towers is considered low given the typical flight heights of nocturnal migrants in comparison to the towers.

During the early stages of Project development, the ODFW and USFWS expressed an interest in ensuring that potential post-construction impacts to birds would be monitored. PacifiCorp contracted the development and implementation of a two-year post-construction monitoring study at the Project to assess the level of project impacts to birds and bats (i.e., high, moderate, low) relative to other projects. This intensive monitoring was conducted at the Project for two years (see section 4.3 below) and reported to the USFWS and ODFW through a Technical Advisory Committee (TAC).

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 67-turbine Project resulted in the removal of approximately 64 acres of habitat. The primary habitat lost was dryland agriculture. 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 2011c). Any disturbance associated with third parties exercising their subsurface rights is not included in this APP.

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.

Although construction and operation of the wind energy facility may displace some groups of birds, the Project was largely sited in previously disturbed lands. In addition, design of the Project was modified to

avoid fragmentation of intact shrub-step habitat. Therefore, it is unlikely that displacement of birds would result in any population level impacts. In addition, no available evidence demonstrates that construction of the Project resulted in a reduction in population level survival or fecundity rates for eagles.

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 two-year post-construction monitoring and reporting program to estimate and evaluate Project impacts. The program follows the protocol presented in the wildlife monitoring plan document, which outlines the protocols to monitor wildlife impacts and the measures to meet compliance requirements during operations of the Project. Post-construction avian monitoring efforts included standardized carcass searches, raptor nest monitoring, and Washington ground squirrel monitoring. Summaries of the post-construction surveys along with comparisons to pre-construction risk assessments are included below. The final-post construction monitoring reports are included in Appendix D. These reports were provided to the TAC, which included representatives of ODFW and USFWS.

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 E). Bird carcasses may be retained and provided to USFWS in accordance with applicable agency policies or federal permits assuming permits are secured.

4.1 Standardized Avian Carcass Searches – August 24, 2006 – July 15, 2008

Two years (August 24, 2006 – July 15, 2008) of post-construction monitoring has been completed at the Project to assess avian mortalities discovered at the Project and raptor nesting activity. Results of the monitoring efforts have been 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 plots; 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. The adjusted mortality estimate was calculated using data from both years, combined. Carcasses found within search plot were included in the mortality 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 mortality 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 within the grassland and shrub-steppe/grassland mix vegetation types 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.

Thirty-four of the 67 turbines were surveyed over the two years of study, with half the turbines (17 turbines) searched during each year (Figure 7). A 204-meter square search plot was centered on each turbine and searched using a systematic design with a random start. Standardized carcass surveys occurred each set of 17 turbines for one year, and all 17 turbines were searched once every 4-week (28-day) period in winter (November through mid-March) and summer (June through mid-August) and once every two weeks (14 days) in fall (mid-August through November) and spring (mid-March through June) in their respective search year. A total of 76 carcasses (40 large birds and 36 small birds) were placed for searcher efficiency trials in Year 1 and 156 carcasses (78 large birds and 78 small birds) were placed in Year 2. Forty bird carcasses (20 large birds and 20 small birds) were placed for carcass removal trials during each year of surveys for a total of 80 carcasses (40 in each size class).

4.1.2 Results

Thirty bird carcasses were located during the first year of standardized searches (August 24, 2006 – August 12, 2007). None of the 30 carcasses were raptors; however, one short-eared owl (*Asio flammeus*) was found. Three bird carcasses were found incidentally, including two raptor species: Swainson's hawk and ferruginous hawk. Eighty percent of the large bird trial carcasses and 62.2% of the small bird trial carcasses were detected during searcher efficiency trials. Based on scavenger trial data pooled from both years of study, the mean removal time was 19.5 days for large birds and 10.3 days for small birds.

During the second year of standardized searches (August 27, 2007 – July 15, 2008), 24 bird carcasses were found. Of the 24 carcasses, three raptors were found: American kestrel, Swainson's hawk, and an unidentified buteo. A red-tailed hawk was also found incidentally. Fifty-six percent of the large bird trial carcasses and 37% of the small bird trial carcasses were detected during searcher efficiency trials. Based on scavenger trial data pooled from both years of study, the mean removal time was 40.61 days for large birds and 10.33 days for small birds.

Adjusted mortality estimates were calculated by taxonomic group and included data from both years of survey. The adjusted mortality estimate for all birds combined was 9.99/turbine/year (6.66/MW/year). Passerines had the highest adjusted mortality estimate, with 9.13 passerine mortalities/turbine/year (6.09 mortalities/MW/year). The adjusted raptor mortality estimate (including owls) was 0.32/turbine/year (0.21/MW/year).

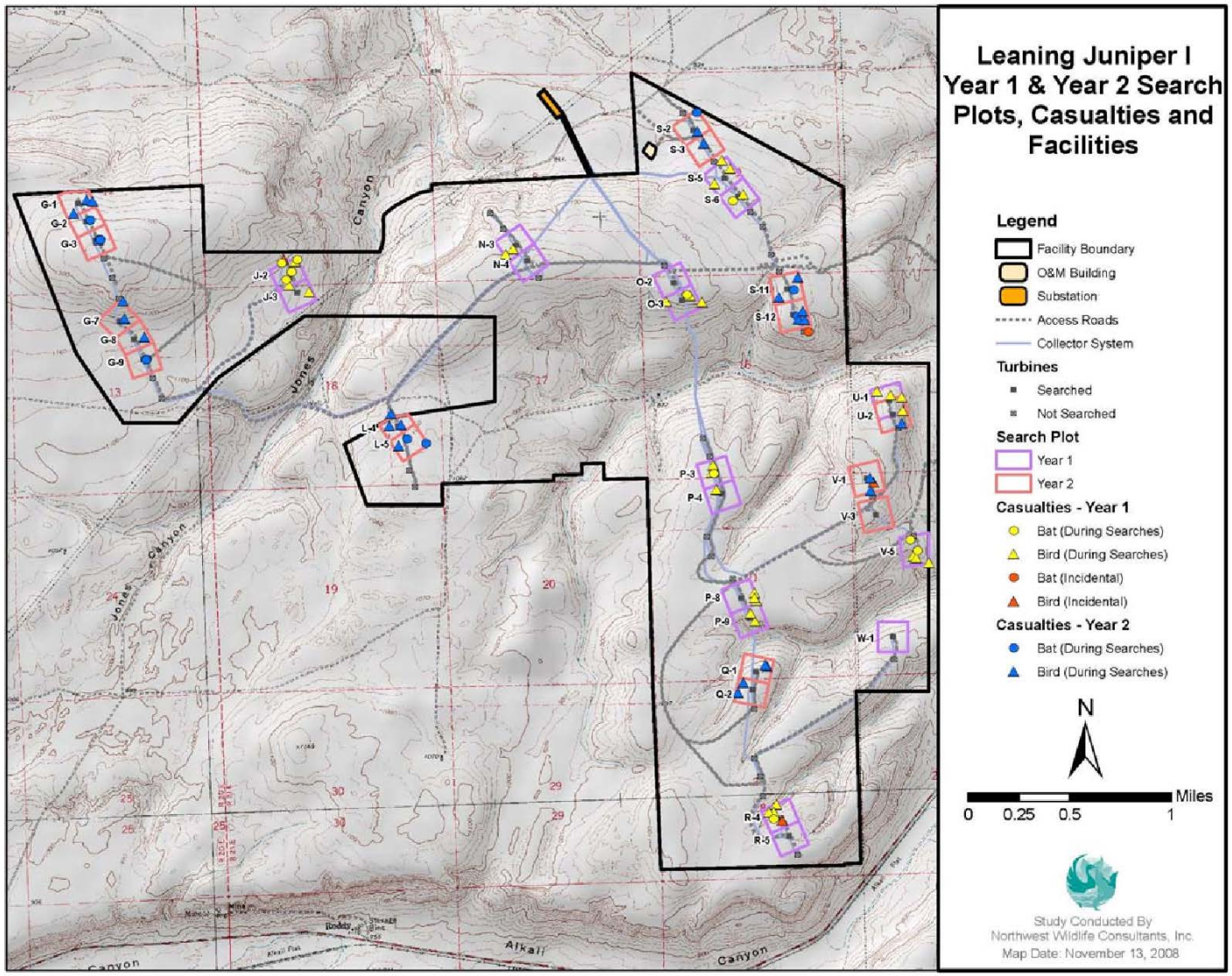

Figure 7. Search plots and casualties found during the 2006-2008 mortality searches at the Leaning Juniper I Project, Gilliam County, Oregon.

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." There are many publicly available post-construction studies in the Pacific Northwest. For these studies, owls were not included in the diurnal raptor estimates; therefore, the raptor carcass rate at the Project was adjusted to exclude owl carcasses, resulting in an adjusted diurnal raptor carcass rate of 0.16 raptor carcasses/MW/year. The adjusted diurnal raptor carcass rate is at the lower end of the range of raptor carcass rates reported from studies in Oregon and Washington (zero to 0.47 raptor carcasses/MW/year; Table 8; Figure 8).

The estimated raptor carcass rate was not quantified in the pre-construction assessment (Kronner et al. 2005; Appendix D), but was expected to be low and similar to other wind energy facilities. As predicted, the raptor carcass rate at the Project was similar to other projects with low raptor carcass rates.

For all bird species combined, the estimated annual bird carcass rate at the Project was 6.66 bird carcasses/MW/year (Appendix D). The all bird rates estimated for the Project were within the range of other studies in Oregon and Washington, which ranged from 0.16 to 8.45 bird carcasses/MW/year (Table 8). Similar estimates for all birds combined are available for 50 other wind energy facilities/studies across western North America (Figure 9). The estimated carcass rate for all birds at the Project is within the range of estimates from other wind energy facilities/studies, with similar data.

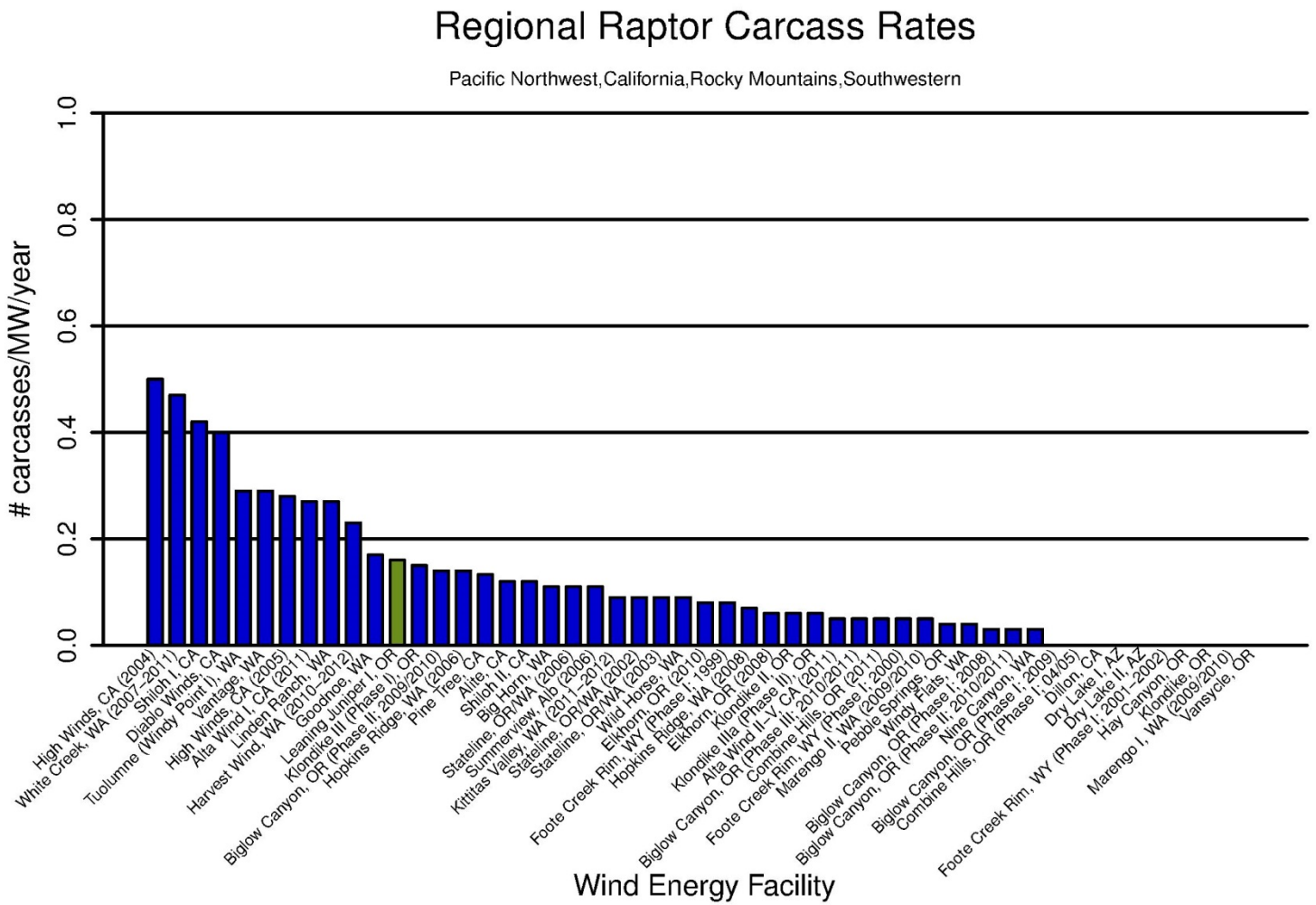

Figure 8. Raptor carcass rates (number of raptors carcasses per megawatt per year) from comparable and publicly-available studies at wind energy facilities in western North America. The 2006-2008 estimated carcass rate for the Leaning Juniper I Project, Gilliam County, Oregon is highlighted in green.

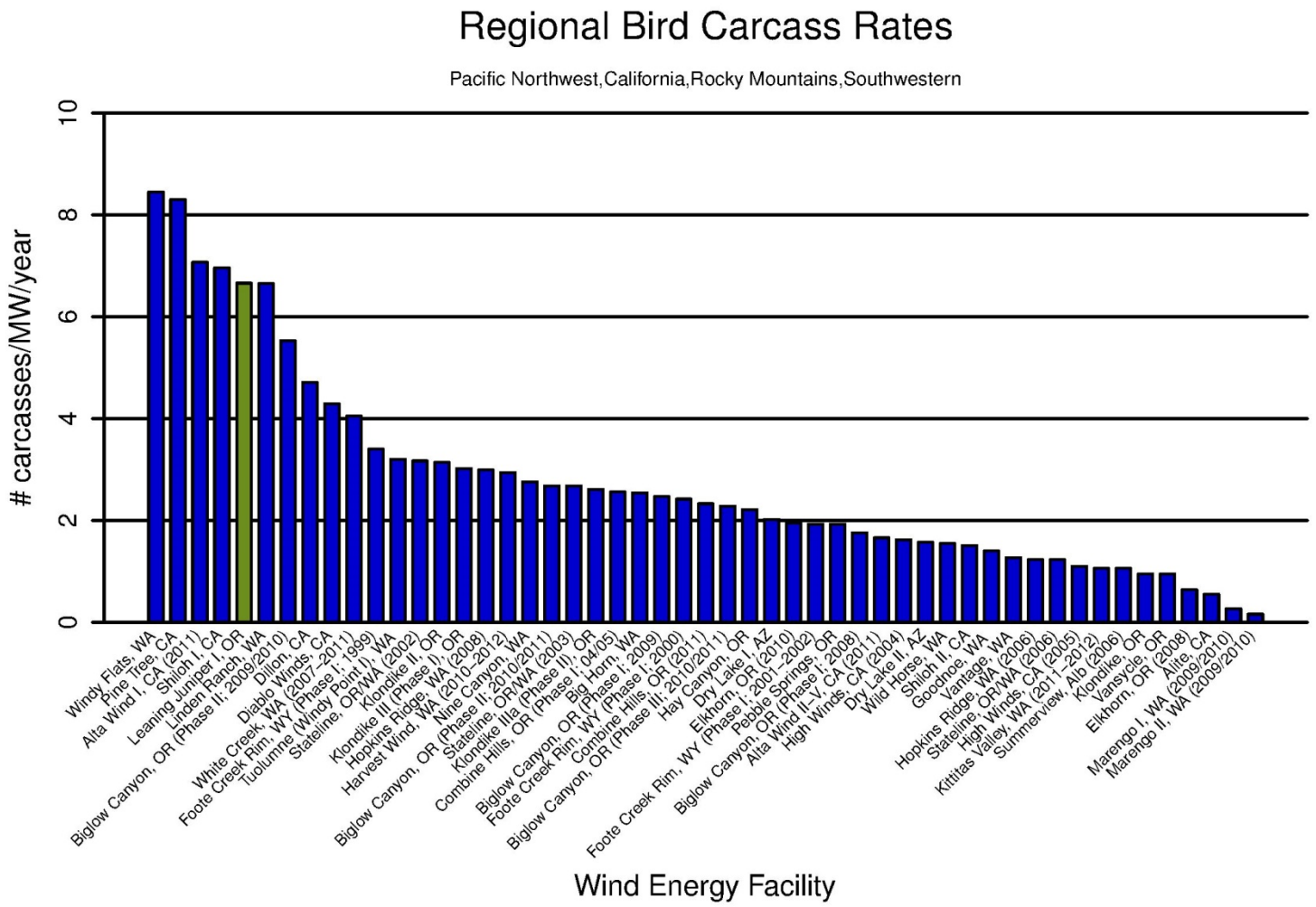

Figure 9. All bird carcass rates (number of bird carcasses per megawatt per year) from comparable and publicly-available studies at wind energy facilities in western North America. The estimated bird carcass rate for the Leaning Juniper I Project, Gilliam County, Oregon, is highlighted in green.

4.1.4 Eagle Carcasses

No eagle carcasses were found during the two years of standardized carcass searches.

4.2 Raptor Nest Monitoring

Raptor nest monitoring included an aerial raptor nest survey in 2007, ground-based surveys and monitoring in 2007 and 2008, and raptor banding in 2007 and 2008.

4.2.1 Aerial Nest Survey and Ground-based Surveys and Monitoring

Methods

Aerial raptor nest surveys were conducted within the Project and a 2-mile buffer on May 5, 10, and 19, 2007. Potential nesting habitat (e.g., trees, power lines, and rock formations) and historic nest sites were surveyed via helicopter. Historic nest sites were visited, and transects were flow to search potential nesting habitat. Universal Transverse Mercator (UTM) coordinates were recorded for each nest, as well as nest status (i.e., active, inactive, unknown). Nest status was determined using visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash, or observation data from the ground surveys

Ground-based efforts were concentrated on ferruginous or Swainson's hawk nests within 0.5 mi (0.8 km) of turbines. The purpose of the ground-based monitoring was to determine status and species of nests and monitoring was conducted from a suitable distance to minimize disturbance of nesting raptors. Active nests were monitoring to determine the number of successfully fledged young.

Results

In 2007, 12 Swainson's hawk, 10 red-tailed hawk, three ferruginous hawk, one American kestrel, one prairie falcon, and one great horned owl nests was observed (Figure 10). Six of the 12 Swainson's hawk active in 2007 were also active in 2005, and one nest that was active in 2005 was inactive in 2007. Two of the three ferruginous hawk nests found in 2007 were active in 2005.

4.2.2 Raptor Banding

Methods

Species targeted for banding were ferruginous hawk and Swainson's hawks; however, no active Swainson's hawk nests were found within the Project during the banding period. Ferruginous hawk nestlings were banded on June 5, 2008, and June 10, 2008,

Results

Six ferruginous hawk chicks were banded at two nests, and one ferruginous hawk chick was banded in 2008. No reports of banded birds were known on or outside the Project as of the final two-year post-construction monitoring report (Gritski et al. 2008; Appendix D).

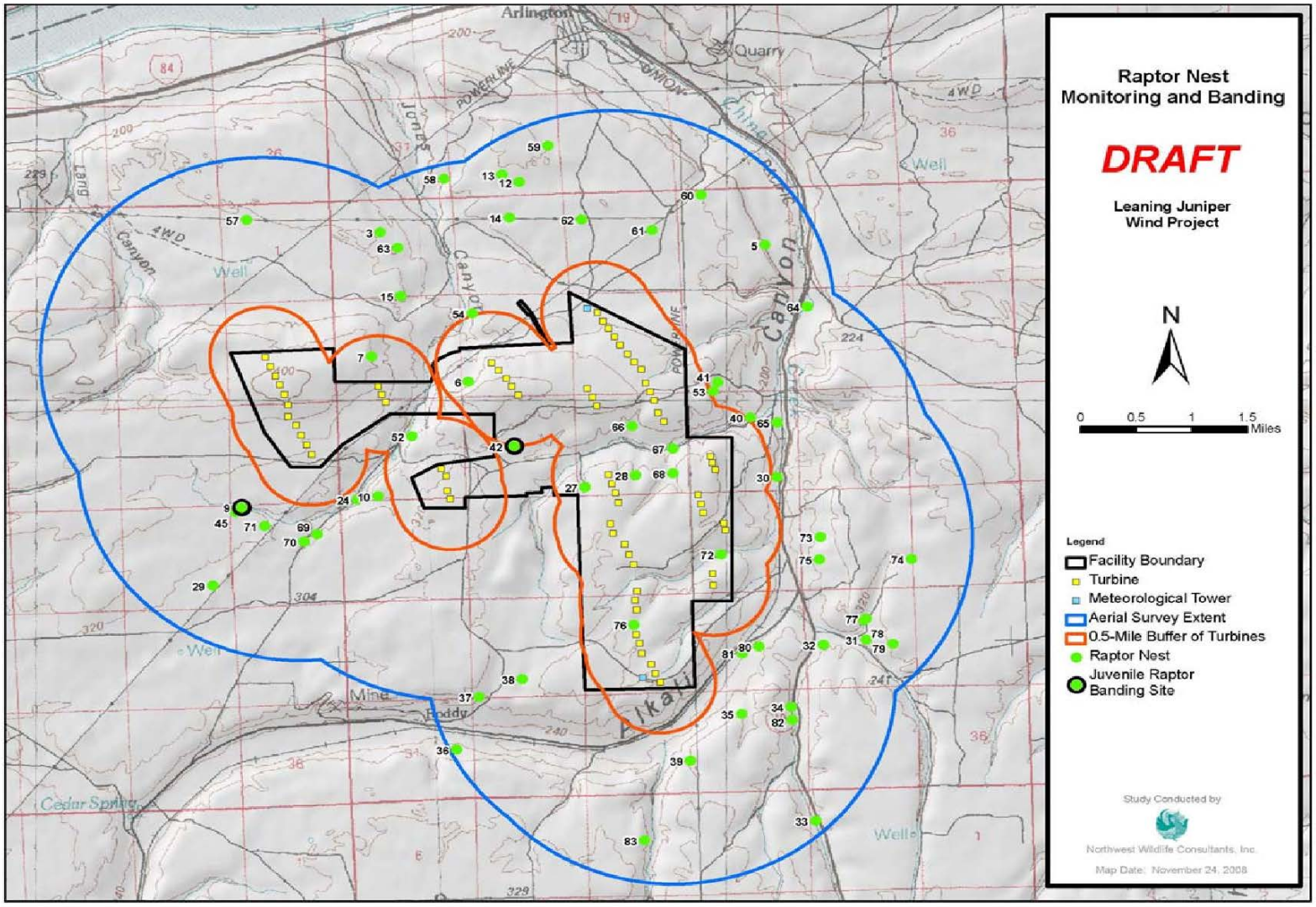

Figure 10. Raptor nests and banding sites during the 2007 and 2008 post-construction surveys at the Leaning Juniper I Project, Gilliam County, Oregon.

4.2.3 Conclusions

The number of active raptor nests in the survey area was similar between 2005 and 2007, and the species composition of nesting raptors between years was also similar. Based on nest monitoring in conjunction with mortality monitoring, Gritski et al. (2008) posits that the two Swainson's hawks and the ferruginous hawk found at the Project were nesting individuals. Nest 76 was a Swainson's hawk nest discovered in 2007 and was located between the "Q" and "R" strings. While no eggs were found in the nest, adult Swainson's hawks persisted in the immediate area and were seen flying through the rotor swept areas of turbines (rotating and stationary). One Swainson's hawk carcass was found on August 7, 2007, at turbine R-4 and another at nearby turbine Q-2 on August 13, 2007. Gritski et al. suggests it seems probable that these Swainson's hawk carcasses were the birds associated with nest #76. After discovery of a ferruginous hawk carcass on April 30, 2007, at turbine V1, the nearest active ferruginous hawk nest (#30) was confirmed to be active in June 2007. Nest 30 on had only one adult when it was confirmed, and Gritski et al. suggested that nest #30 may have been the nest of the ferruginous hawk found in April. While these are plausible suggestions, the carcasses and adults using the area were not banded; therefore, it cannot be known whether the casualties were associated with the nests.

4.3 Buteo Fledgling Mortality Study

4.3.1 Methods

The Project was involved in a two year study at wind energy projects in the Columbia Plateau Ecoregion (CPE) to assess fledging mortality for three buteo species: Swainson's hawk, ferruginous hawk, and red-tailed hawks (Figure 11). All ferruginous hawk, Swainson's hawk, and red-tailed hawk nests surrounding the study sites were monitored until success was determined, then chicks were radio marked to follow the chicks' movements through fledging and dispersal from natal areas. Ferruginous hawk and Swainson's hawk were chosen due to their federal and state status listings of concern, and red-tailed hawk was chosen as a surrogate species due to the low number of ferruginous hawks.

4.3.2 Results

A total of 10 ferruginous hawk chicks, 27 red-tailed hawk chicks, and 23 Swainson's hawk chicks were radio marked. Thirteen mortalities of radio-marked individuals occurred. Three of 10 ferruginous hawks (30%) mortalities occurred, five of 25 red-tailed hawks (two red-tailed hawk transmitter failure occurred; 20%), and five of 23 Swainson's hawk mortalities (22%). Three mortalities occurred before the nestlings fully fledged. Most mortality was the result of depredation, and other sources of mortality included drowned, siblicide, and unknown natural causes. No mortalities were the result of collision with turbines.

The length of post-fledging periods, defined as the period from the fledging date to the last day the juvenile was located in the natal area, was calculated for all individuals that survived to dispersal. It was assumed the juvenile had reached independence during the post-fledging period. Ferruginous hawks had the shortest post-fledging period (20.8 days; SE=3.3), followed by Swainson's hawk (26.6 days, SE=1.14), and red-tailed hawks (31.6 days; SE=2.9).

4.3.3 Conclusions

No evidence indicated that juvenile hawks in nests closer to newer-generation wind turbines were at greater risk of mortality than those in nests further from turbines or other activity associated with wind development. All mortalities were found within 1.9 km of a turbine; however, no mortalities were directly attributed to turbines or other infrastructure. The high dispersal rate away from turbines and the study area may indicate potential indirect impacts.

4.4 Ongoing Monitoring

A PacifiCorp biologist performs selective turbine monitoring on a monthly basis at the Project year-round. Addtionally, year-round for the life of the Project, PacifiCorp contractors and staff will report, using WIRHS protocols, any avian carcasses found during daily routine maintenance activities.

5.0 *ADAPTIVE MANAGEMENT*

The 2012 Guidelines direct developers and operators to evaluate the probability of significant adverse impact when assessing measures to avoid, minimize, and mitigate impacts. After the two years of standardized monitoring was complete, PacifiCorp and the TAC evaluated the impacts of the Project and determined that additional ongoing raptor nest monitoring was warranted but, no further carcass search studies have been conducted beyond the operational WIRHS system (discussed in Section 4.4. above). Section 5.0 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.

5.1 Adaptive Management Plan

PacifiCorp is currently unaware of a model APP 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 APP 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 and 5 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, as warranted, based 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 discovered bird mortalities that could trigger the need for adaptive management (e.g., weather events or other considerations correlating with carcass rates). Combined, this APP provides a framework for assessing if the adaptive management triggers as defined below have been reached.

5.1.1 Mitigation for MBTA Species (non-eagles)

Upon completion of the two-year standardized post-construction monitoring, PacifiCorp compared the identified carcass rate for all birds to the pre-construction risk assessments as well as to other projects. To date, the identified carcass rates were within the pre-construction predictions and were within the range of estimates reported for other wind energy projects. Under the adaptive management framework set out in this APP, if monitoring determines that the carcass rate 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 mortalities were within the range of predicted risk. Under this scenario, the 2012 Guidelines (USFWS 2012d) recommend that no further monitoring or mitigation should be needed for all birds. If the number of migratory bird carcasses discovered 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

5.1.2 Mitigation for Eagles

No eagle carcasses have been discovered within the Project; however, upon discovery of a bald or golden eagle carcass at the Project, the following actions will 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 one business day after the discovery of the carcass.
3. PacifiCorp will, if requested by USFWS, meet and confer with the USFWS to help determine the circumstances under which the carcass was discovered.

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.

5.1.3 Advanced Conservation Practices for Eagles and other Raptors

In addition to the above actions, PacifiCorp will implement the advanced conservation practice (ACP). These measures are designed to provide ongoing conservation and benefits to eagles, with the goal of enhancing eagle populations, but these measures 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. Depending upon the carcass observed, PacifiCorp contacts applicable carcass owners to request permission before relocating or disposing of carcasses.

5.2 2. Reporting

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

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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 E. Buteo Fledgling Mortality Study Report

Appendix F. Washington Ground Squirrel Monitoring Reports

Appendix B

Analysis of the Repowering of the Leaning Juniper Wind Facility

TECHNICAL MEMORANDUM

Date: January 9, 2018

To: Travis Brown, Pacific Power

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

Subject: Analysis of the Repowering of the Leaning Juniper Wind Facility

INTRODUCTION

Pacific Power owns and operates the 67 turbine (100.5 Megawatt [MW]) Leaning Juniper Wind Facility (Project) in Gillian County, Oregon. The Project has been in commercial operations since September 2006. 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 up to a 91 meter (m) rotor diameter, while the current rotor diameter is 77 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. (WEST) 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 August 24, 2006 to July 15, 2008 by Northwest Wildlife Consultants, Inc. (NWC 2008). The objective of the study was to evaluate avian and bat mortality related to the regular operation of the 67 wind turbines at the Project. During the study, 17 wind turbines were surveyed approximately 18 times per year, and 30 birds and 10 bat fatalities were found on the survey plots in the first year of monitoring. In the second year of monitoring, 24 bird fatalities and 10 bat fatalities were found on survey plots.

The adjusted all bird fatality estimate was 9.99 birds/turbine/year (670 birds total per year) and the adjusted bat fatality estimate was 2.97 bats/turbine/year (200 bats total per year). Approximately 91% 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 40%. Under this proportional increase, the predicted fatality rate for the new turbine blades is 13.83 birds/turbine/year (927 birds total per year) and 4.51 bats/turbine/year (278 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 2006 through 2008 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 2006 through 2008 monitoring was 6.60 birds/MW/year and the estimated fatality rate for bats was 1.98 bats/MW/year. The predicted fatality rate for birds for the new turbine blades was 9.22 birds/MW/year and the predicted fatality rate for bats was 2.77 bats/MW/year.

The estimated impacts to bats from the 2006 through 2008 study at the Project fall within the range of fatalities rates that are publicly available from 35 other wind energy facilities in Washington and Oregon, while bird fatality rates fell just outside of the range (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.

The estimated impacts from the 2006 through 2008 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 2006 and 2008 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 North America. Estimates from the 2006 to 2008 study are likely biased high as it appears that fatalities missed on the first search and found on subsequent searches were included in the analysis; however, the estimator used in the analysis assumes that searchers had only one opportunity to find carcasses (Huso 2010).

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). Applying the increase in turbine diameter proportional to the estimated fatalities, a predicted 927 bird fatalities and 278 bat fatalities will occur at the Project per year. These predictions are within the range with fatality rates for birds and bats within the public projects.

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, 91% 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 278 bat fatalities at the Project, it is unlikely that operations of this facility with larger turbine blades will result in significant impacts to bat populations.

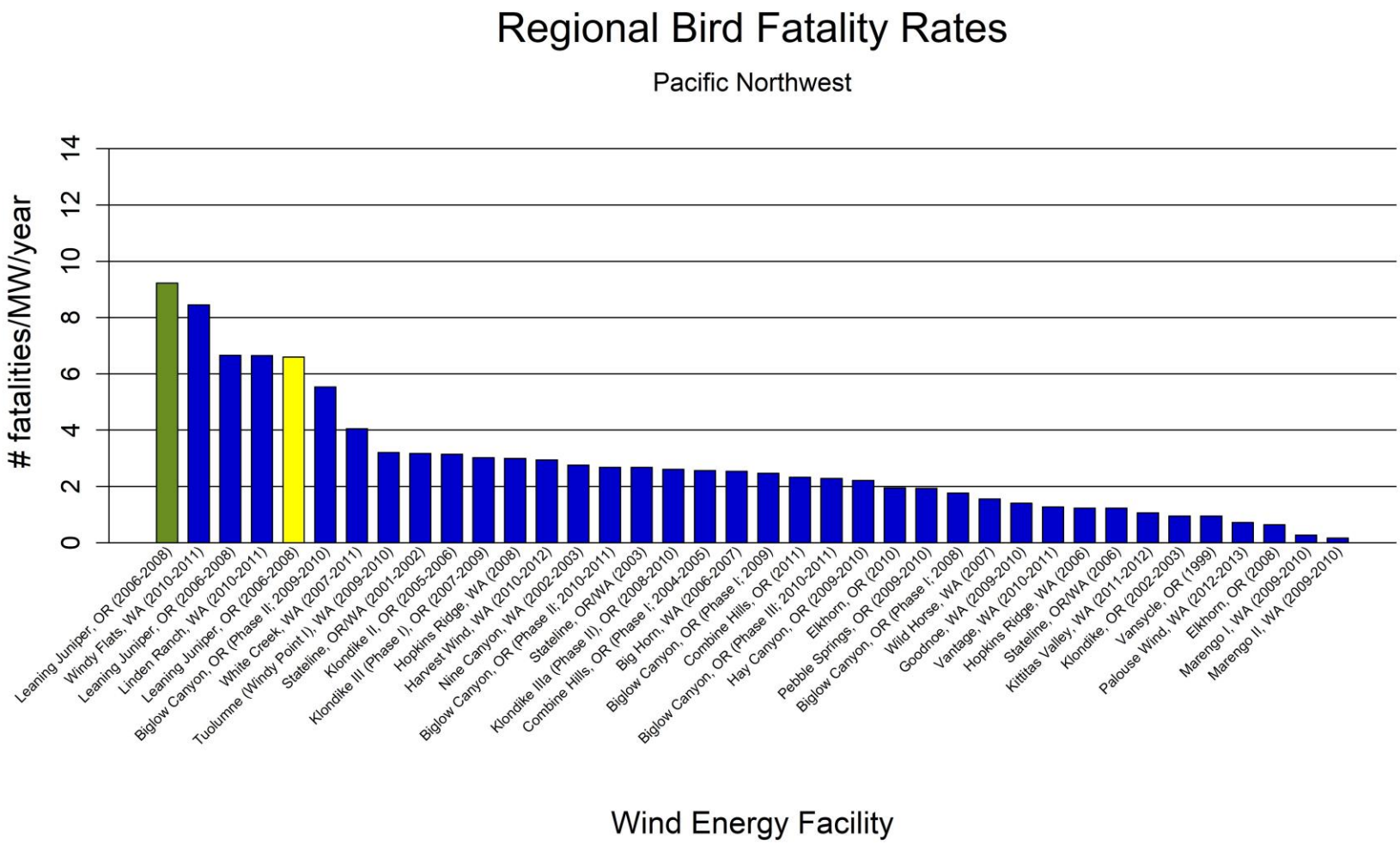

Figure 1. Fatality rates for all birds (number of birds per MW per year) from publicly-available wind energy facilities in Oregon and Washington (blue bars). The yellow bar represents the estimated annual fatality rate and the green bar represents the predicted fatality rate with larger turbine blades.

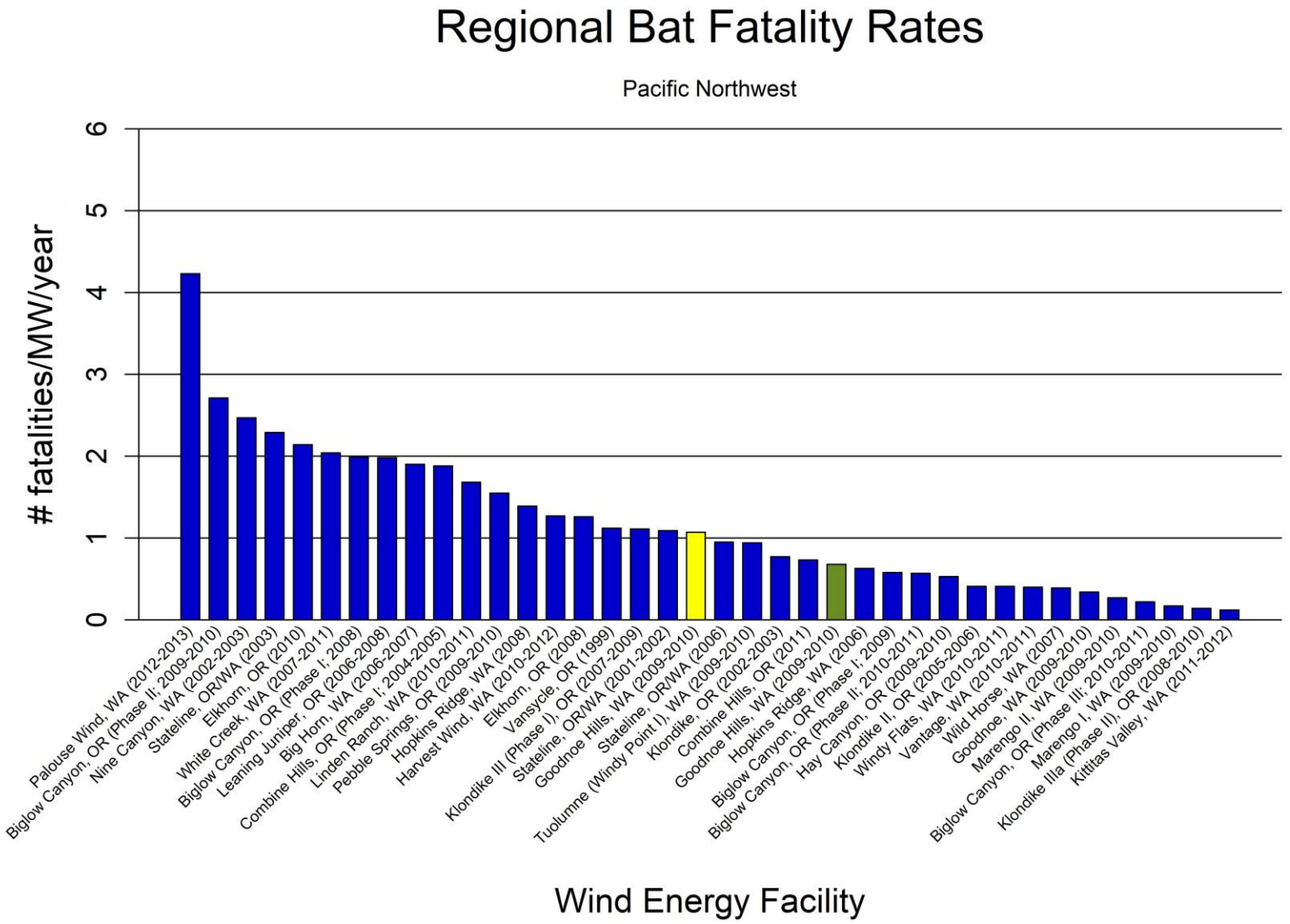

Figure 2. Fatality rates for bats (number of bats per MW per year) from publicly-available wind energy facilities in Oregon and Washington (blue bars). The yellow bar represents the estimated annual fatality rate and the green bar represents the predicted fatality rate with larger turbine blades..

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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
Diablo Winds, CA (2005-2007)	4.29	California	WEST 2006, 2008

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
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
Montezuma II, CA (2012-2013)	1.08	California	Harvey & Associates 2013
Moraine II, MN (2009)	5.59	Midwest	Derby et al. 2010f

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
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
Stetson Mountain I, ME (2011)	1.18	Northeastern	Normandeau Associates 2011
Stetson Mountain I, ME (2013)	6.95	Northeastern	Stantec 2014

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 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

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
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
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

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 III (Phase I), OR (2007-2009)	1.11	Pacific Northwest	Gritski et al. 2010
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

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 ND1 (Minot), ND (2011)	1.39	Midwest	Derby et al. 2012d
PrairieWinds SD1, SD (2011-2012)	1.23	Midwest	Derby et al. 2012c
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 C

Leaning Juniper Wildlife Incident Reporting and Handling System

PacifiCorp Wind Energy Sites – Oregon and Washington

Wildlife Incident Reporting and Handling System (WIRHS)

PACIFICORP
A BERKSHIRE HATHAWAY ENERGY COMPANY

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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 Wind 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 wind project personnel in response to wildlife incidents found in the wind 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 Wind 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 wind site. The WIRHS is designed to provide a means of recording and collecting avian and bat mortality discoveries found in the wind 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 wind 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 Wind 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 wind 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 wind 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 wind 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 wind 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 wind 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: _____

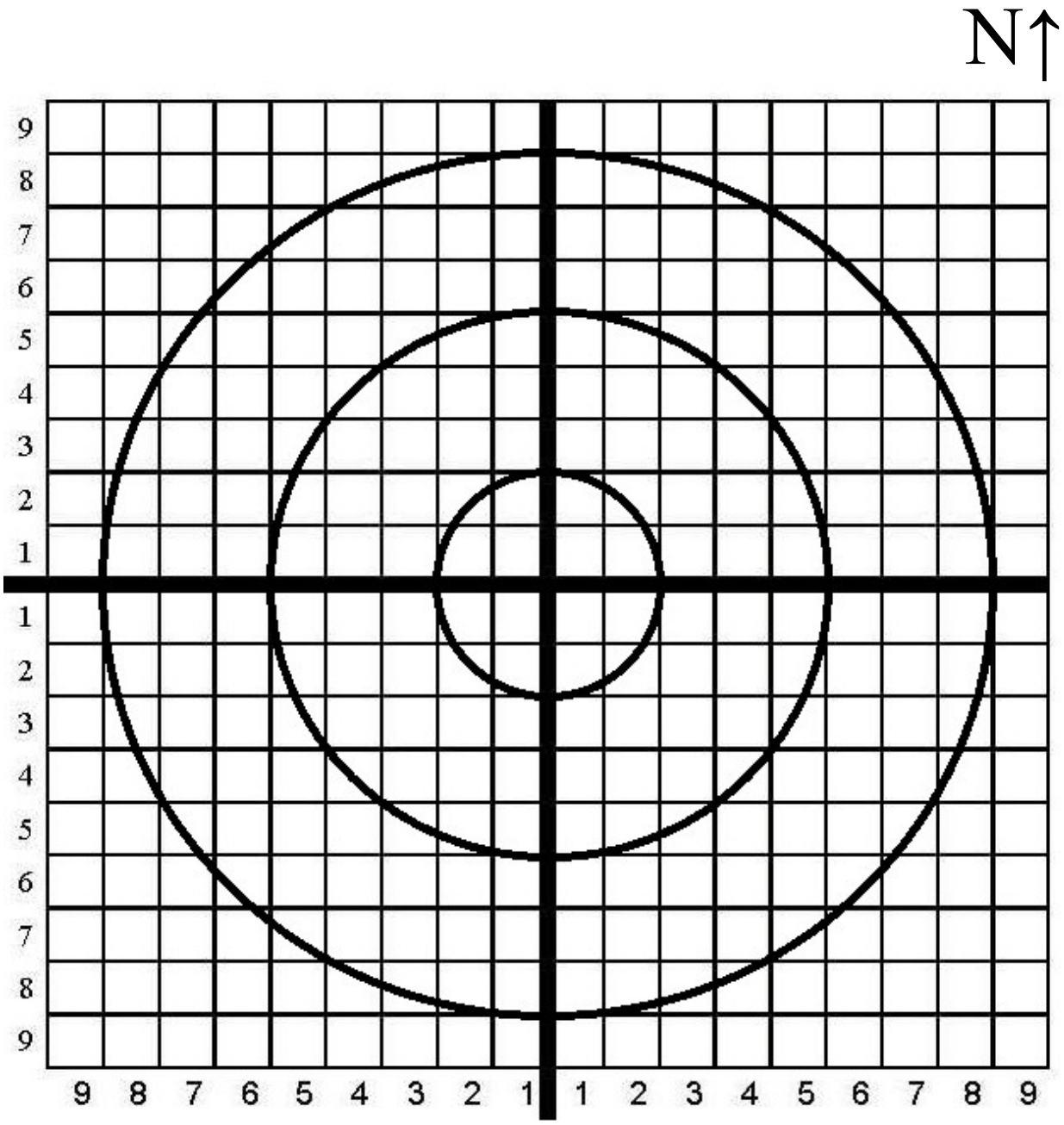
Contact Phone Number: _____ Date: _____ Time: _____

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"
1800 Vantage Highway
Ellensburg, WA 98926
Office: (509) 925-2833

Attachment B: Project Personnel Listing and Contact Information

LEANING JUNIPER (OREGON)

PacifiCorp

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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:

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
Diane Petrula
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"
Selah, WA
Home: (509) 945-7334

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

Attachment B: Project Personnel Listing and Contact Information

MARENGO I/II (WASHINGTON)

PacifiCorp

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or

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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
Tom Schirm
Office: (509) 382-1266
schirtbs@dfw.wa.gov

County (Columbia):

Richard Hendricksen
Office: (509) 382-4676
ccplan@bmi.lnet

Agencies

U.S. Fish and Wildlife Service
Diane Petrula
Special Agent, Office of Law Enforcement
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14852 NE 95th Street
Redmond, Washington 98052

Wildlife Rehabilitation Center

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

Marcia Flamm
"Raptor House Rehab Center"
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 D: Wildlife Incident Reporting Facility Log

_____ WIND 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
15-001									
15-002									
15-003									
15-004									
15-005									
15-006									
15-007									
15-008									
15-009									
15-010									
15-011									
15-012									
15-013									
15-014									
15-015									
15-016									
15-017									
15-018									
15-019									
15-020									

NOTE: CS = scheduled carcass search, INCID = incidental find.

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 be 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 additionality 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 summary documents will be provided to U.S. Fish and Wildlife Service staff to review for each respective project.