



U.S. Fish and Wildlife Service

Environmental Assessment

Goodnoe Hills Wind Facility Eagle Incidental Take Permit

Prepared by

U.S. Fish and Wildlife Service
Migratory Birds and Habitat Program

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Abbreviations

Applicant	PacifiCorp
CET	Cumulative Effects Tool
CFR	Code of Federal Regulations
EA	Environmental Assessment
Eagle Act	Bald and Golden Eagle Protection Act
ECP	Eagle Conservation Plan
EFSC	Energy Facility Siting Council
EMU	Eagle Management Unit
LAP	Local Area Population
MW	Megawatts
NEPA	National Environmental Policy Act
PEIS	<i>Programmatic Environmental Impact Statement for the Eagle Rule Revision, December 2016</i>
Project	Goodnoe Hills Wind Facility
Service	U.S. Fish and Wildlife Service
WIRHS	Wildlife Incident Response and Handling System

Chapter 1.0 Introduction

1.1. Environmental Assessment Overview

We, the U.S. Fish and Wildlife Service (Service), are proposing to issue an eagle incidental take permit (eagle take permit) under the Bald and Golden Eagle Protection Act (Eagle Act) (16 United States Code [U.S.C.] §§ 668–668d and 50 Code of Federal Regulations [CFR] 22.26) for take of eagles that is incidental to otherwise lawful operation of the Goodnoe Hills Wind Facilities (Goodnoe Hills or Project). The Service’s proposal to issue an eagle take permit constitutes a discretionary Federal action that is subject to the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). This Environmental Assessment (EA) is tiered to the Final Programmatic Environmental Impact Statement for the Eagle Rule Revision (PEIS; USFWS 2016b). Our proposed action and preferred alternative is Alternative 2 – to issue a 30-year permit to the applicant based on their Eagle Conservation Plan (ECP; Appendix A) and other application materials. Two alternatives to the proposed action analyzed in this EA are to deny the issuance of the permit, also called the No Action Alternative (Alternative 1) and to issue a 30-year permit with additional requirements, above and beyond what is required to meet permit issuance criteria (Alternative 3). Denying the issuance of this eagle take permit (Alternative 1) would result in no requirement for monitoring, adaptive management, or compensatory mitigation to offset predicted impacts of the Project. Issuing a 30-year permit with additional requirements (Alternative 3) would provide greater benefit for eagles, but the additional measures are not required to meet permit issuance criteria or the Service’s population management objectives for either eagle species.

We received a completed application for a 30-year eagle take permit from PacifiCorp (PacifiCorp, or the Applicant) on April 17, 2020, requesting authorization of non-purposeful or “incidental” take of golden eagles and bald eagles under the Eagle Act for operational activities associated with the Project. The Applicant’s ECP (Appendix A) is the foundation of the permit application and is referenced frequently herein. The analyses in this EA consider the potential effects on the human environment under the two action alternatives as compared with the No Action Alternative.

1.2. Project Description

The Applicant owns and operates the Goodnoe Hills Wind Facility in Klickitat County, Washington, approximately 13 miles southeast from Goldendale, WA (Figures 1 and 2). The Project area encompasses approximately 4,179 acres of private land situated along the Columbia Hills ridgeline overlooking the Columbia River immediately to the south, Rock Creek canyon directly to the east, and mixed cropland and livestock grazing to the north and west. The Project was initially considered for development by Kenetech Windpower, Inc. in 1995. Northwest Regional Power, LLC, and Windtricity Ventures, LLC, later proposed a 100-MW wind facility consisting of 30-120 monopole turbines. The Project area was then targeted for development of the Hoctor Ridge and Imrie wind facilities. Pre-construction wildlife baseline surveys were

conducted in 2006 for these two facilities. PacifiCorp acquired the Project and construction began in 2007. The Project became operational in June 2008.

The Project comprises 47 wind turbines with a previous generating capacity of 94 megawatts (MW). PacifiCorp upgraded (i.e. repowered) the turbine nacelles and rotors on all 47 turbines in (December 2019) and is still operating at a generating capacity of 94 MW. This repower increased the rotor diameter of each turbine from 92.5 meters to 110 meters. This repowering increases the amount of hazardous area in the project and subsequently increases the risk to eagles and other avian species of colliding with turbine blades. In addition to the turbines, project facilities also include turbine foundations and pad-mounted transformers, a buried electrical energy collection system between turbines, one electrical substation, two permanent meteorological towers, a 230-kilovolt overhead transmission line, an onsite operation and maintenance facility, and access roads and crane pads for construction and maintenance of all wind turbine generators.

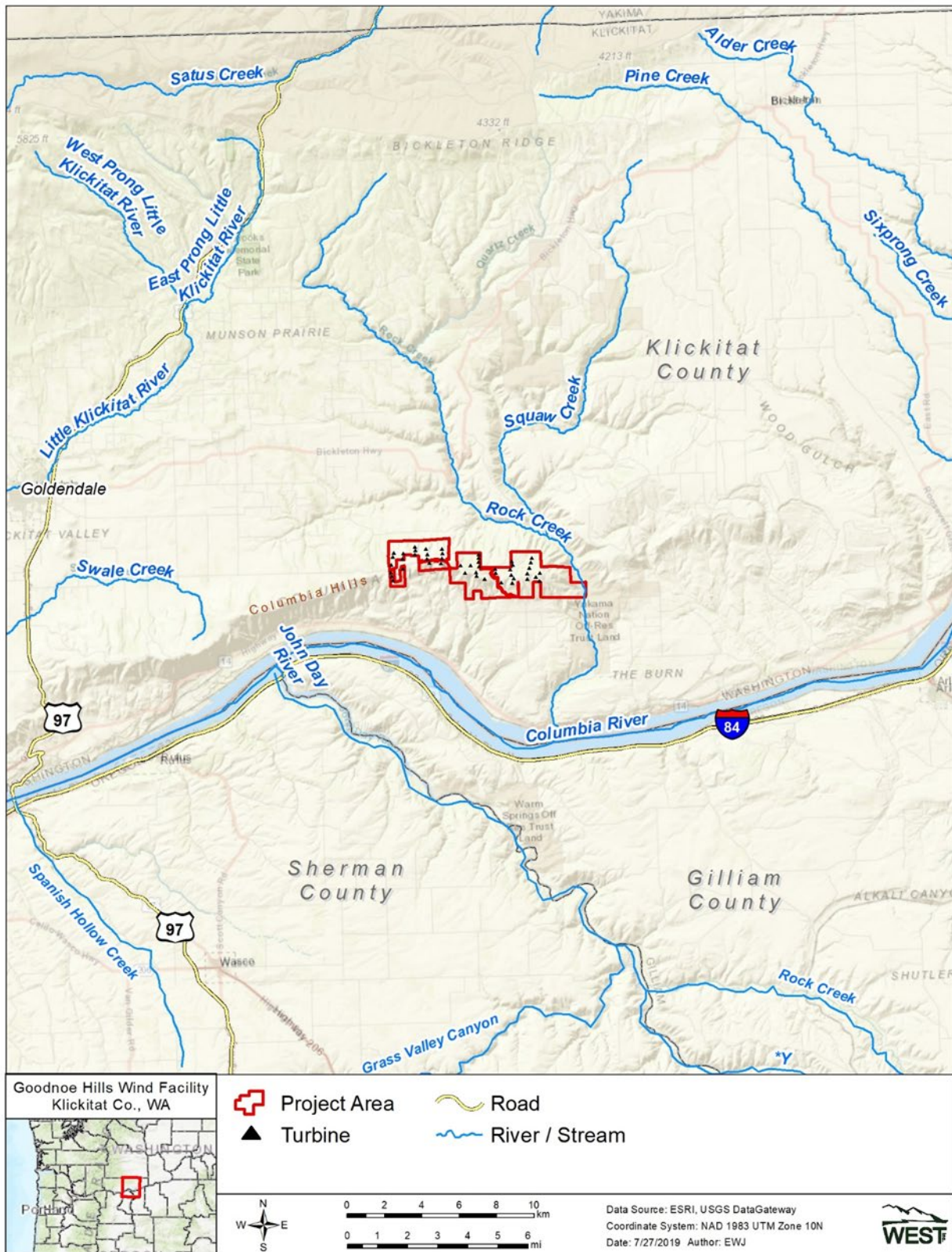


Figure 1. Goodnoe Hills Wind Project Location

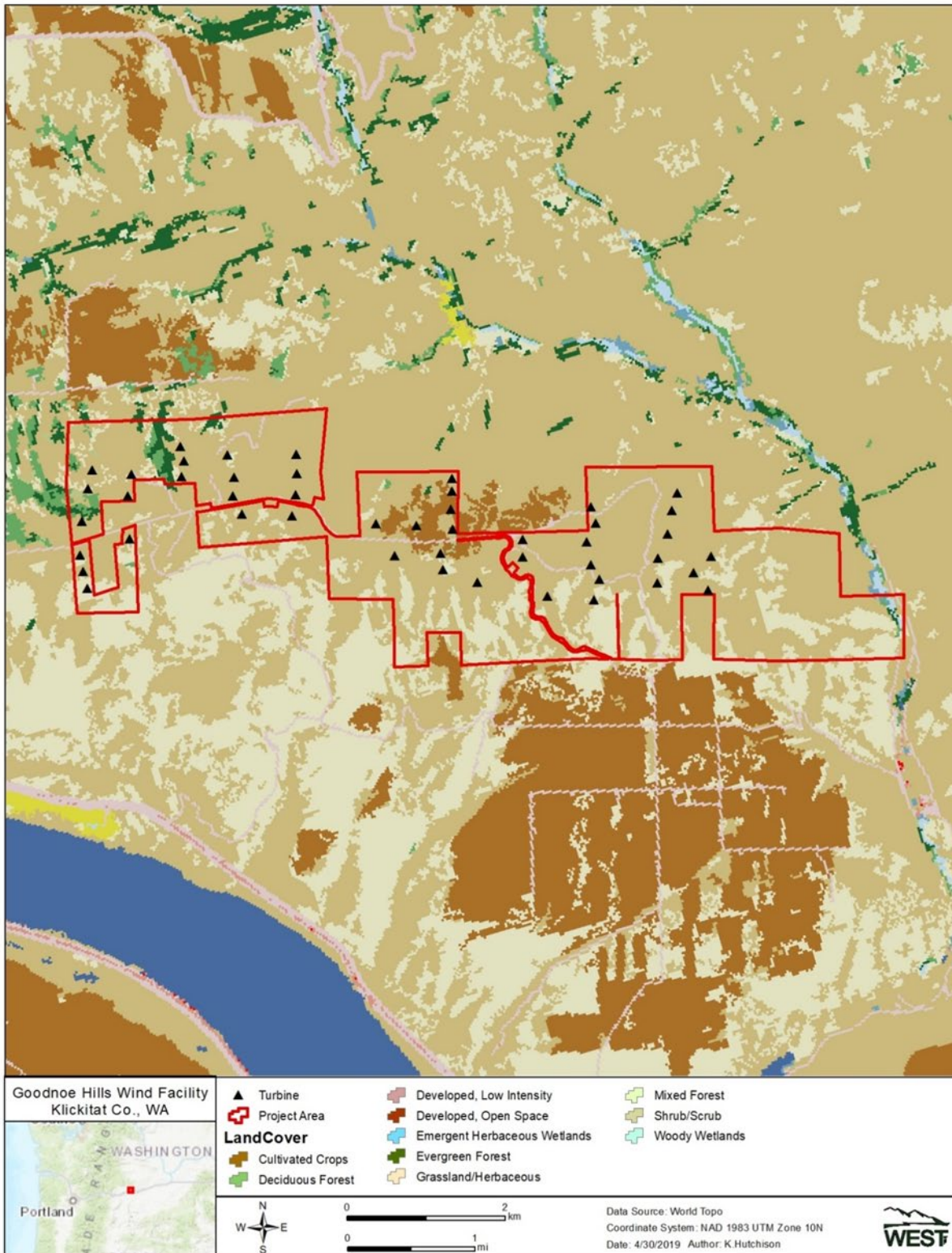


Figure 2. Land cover and land use at the Goodnoe Hills Wind Facility, Klickitat County, Washington.

1.2.1. AVOIDANCE AND MINIMIZATION MEASURES (SITING, DESIGN, AND CONSTRUCTION)

As described in the ECP, PacifiCorp developed and implemented measures during the construction of the Project to avoid and minimize adverse effects on eagles, other birds and bats, and their habitats. They were:

Siting/Design

- The Project was sited to minimize impacts to native habitat through the use of disturbed lands such as existing roadways, and locating the transmission line in close proximity to an existing highway.
- The Project used state-of-the-art turbine technology at the time of initial construction, 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.
- Pre-construction biological surveys and an avian risk assessment were conducted (Johnson et al. 2006a, 2006b; Enz and Bay 2010; Enz et al. 2011).
- Turbine locations were modified (i.e. turbines were excluded from the initial design) to avoid or minimize impacts to raptors. Turbines set back approximately 300 meters from any grade breaks, defined as an increase in slope to greater than 20%, of the ridge tops.
- 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 Service Guidelines (USFWS 2013).
- In accordance with the Service's Guidelines (USFWS 2013), each turbine was equipped with a low voltage, shielded light (white incandescent) with a motion sensor at the entrance door.

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.
- 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 Operation and Maintenance (O&M) and decommissioning activities are instructed not to cross riparian areas.
- Surface disturbance was limited to that 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.
- Construction activities were typically limited to daylight hours and all equipment was equipped with sound-control devices.
- At all times during construction, satisfactory spark arresters were required to be maintained on internal combustion engines. Effective exhaust mufflers were installed and properly maintained on all construction equipment.
- Equipment coming onsite was inspected for signs of noxious weeds.
- 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 outline in the Conditional Use Permit (CUP) conditions.
- Measures were implemented in compliance with the Project's construction storm water pollution prevention plans.
- Grassland/rangeland/Crop Reserve Program (CRP) land was protected on a 1 to 1 basis for permanent impacts and 0.1 acre protected for every 1 acre of temporary impact to comply with conditions set forth in the Klickitat County Planning Director's approval of the Project pursuant to the Energy Overlay Zone.
- 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.

1.2.2. ONGOING MINIMIZATION MEASURES AND BEST MANAGEMENT PRACTICES (OPERATION AND MAINTENANCE)

- In compliance with the CUP, a weed management control and response plan was developed in consultation with the Klickitat County Weed Control Board. PacifiCorp consulted with the Klickitat County Weed Control Board regarding appropriate seed mixes for reseeding efforts in areas temporarily disturbed during construction.
- 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 disturbed land cover types 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 in 2009 following construction to estimate and evaluate Project-related impacts. The results of monitoring studies, including standardized carcass searches, searcher efficiency trials, carcass persistence trials, and nest surveys, were provided to the Service and WDFW (ECP Appendix A).
- PacifiCorp employees receive training in WIRHS (Wildlife Incident Response and Handling System) 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 near the Project turbines and substation.
- 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 WDFW and/or the Service, 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.
- Equipment coming onsite is inspected for signs of noxious weeds.
- All hazardous waste generated during operations is disposed of in a manner specified by local and state regulations or by the manufacturer.

1.2.3. PREVIOUS COMPENSATORY MITIGATION

The Service has the authority to grant credit for voluntary power pole retrofits, completed previously, to meet the compensatory mitigation requirements of future eagle take permits (50 CFR 22.26(c)(1)(iii)(D)).

PacifiCorp proactively retrofitted 539 high risk power poles from 2016-2020 with funds from their wind energy project budget, with the intent of offsetting future authorized eagle take (Table 1). These voluntary retrofits were completed in anticipation of meeting compensatory mitigation requirements for an eagle take permit not yet granted for their wind projects. Retrofits that were part of this voluntary effort were above and beyond what PacifiCorp would have been able to do under their Avian Protection Plan (APP; a plan that describes PacifiCorp’s commitment to and actions towards reducing avian electrocution and collision risk at their infrastructure across their service area) and were in addition to what it had planned in its 5-year general retrofitting schedule. Retrofits were conducted in SW Wyoming, within the Service’s Pacific Flyway Eagle Management Unit (EMU) and did not involve any pole replacements. This collection of poles meets the definition of “high-risk” to eagles we have applied to this project.

Table 1. The number of poles proactively retrofitted per calendar year and longevity of retrofit.

Retrofit Longevity	2016	2017	2018	2020	TOTAL
10 years	10	10	335	34	389
30 years	0	0	5	145	150

The Service has determined that the proactive retrofitting of these 539 high-risk poles meets the regulatory standards for required compensatory mitigation (50 CFR 22.26(c)(1)(iii)(A-F), and concludes that credits contained therein are eligible to be utilized to meet compensatory mitigation requirements, should a permit be issued to PacifiCorp for the Project.

The 539 retrofitted poles offer a mitigation credit balance (avoided loss) of 251.93 Present Value Bird-Years (PV Bird-Years) if credits are applied in the calendar year 2021. This credit balance was calculated by considering the longevity of each retrofit and the date each retrofit was completed. These mitigation credits could be applied to partially or completely satisfy compensatory mitigation requirements for this, and/or other future, eagle take permits issued to PacifiCorp. The Service will ensure that any permits granted in association with pending and future PacifiCorp applications, and any subsequent periodic permit reviews, appropriately account for mitigation credits previously allocated against the 539 retrofitted poles, so that authorized take does not exceed available mitigation credits.

1.2.4. WILDLIFE INCIDENT REPORTING AND HANDLING

PacifiCorp developed a WIRHS to standardize the actions taken by Project personnel in response to wildlife incidents found within the project boundary. Under the WIRHS, Project field personnel are trained annually to identify and report to PacifiCorp avian and bat carcasses found during monthly turbine inspections. The Project’s Service Migratory Bird Special Purpose

Utility (SPUT) permit authorizes collection of avian remains if discovered at the project. WIRHS will continue to be implemented during Operations and Maintenance (O&M) of the Project regardless of the alternative we select.

1.2.5. REPORTING

As described in the ECP and required as a condition of their SPUT permit, PacifiCorp has committed to report all observed eagle injuries and fatalities to our Office of Law Enforcement, and notify the Migratory Bird Permit Office within 7 days. Reports of eagle take will include the date of the take, the condition of the eagle, the species, age, photographs, and any other pertinent details of the circumstances of the take (e.g., turbine location, wind conditions, etc.) using a standardized form. Reporting will continue to be implemented during O&M of the Project regardless of the alternative we select.

1.2.6. DECOMMISSIONING

Decommissioning is outside the scope of the action being evaluated. The Project will eventually reach a point where it is no longer economical to continue operation. Decommissioning or repowering of the Project may have impacts to the human environment. The specific details of a decommissioning or repowering effort at the Project are not known. However, this action is outside of PacifiCorp's take authorization request and would occur regardless of the alternative we select.

Chapter 2.0 Purpose and Need

2.1. Purposes and Need for Federal Action

The Federal action considered in this EA is the issuance of an eagle take permit (50 CFR 22.26) in response to a permit application submitted by PacifiCorp in accordance with the regulations implementing the Eagle Act (50 CFR Part 22). Upon receipt of a complete application, we are required by regulation to make a decision regarding issuance of an eagle take permit (50 CFR 13.21). This decision is a federal action. Our purposes are to ensure that our decision on the application is consistent with: a) the Eagle Act and implementing regulations (50 CFR 22.26), b) our general permit issuance criteria (50 CFR Part 13), and c) other legal authorities.

2.2. Decision to be Made

This EA evaluates three alternatives regarding issuance of a permit to authorize the take of golden eagles and bald eagles incidental to the operation of the Goodnoe Hills Wind Facility. In order to issue an eagle take permit, we must determine whether the activity meets the permit issuance criteria and requirements (50 CFR 13.21, 50 CFR 22.26), and is consistent with eagle incidental take permit regulation (50 CFR 22.26). Under federal regulation, upon receipt of a

complete permit application (as defined in 50 CFR 22.26(d)), the Service must issue the permit unless one or more of the following disqualifying factors exists, or one or more of the following determinations cannot be made.

2.2.1. DISQUALIFYING FACTORS (50 CFR 13.21):

- The applicant has been assessed a civil penalty or conviction related to the application activity;
- The applicant has failed to disclose material information required, or has made false statements as to any material fact, in connection with this application;
- The applicant has failed to demonstrate a valid justification for the permit and a showing of responsibility;
- The authorization requested potentially threatens a wildlife or plant population;
- The Director finds through further inquiry or investigation, or otherwise, that the applicant is not qualified;
- Failure to pay fees;
- Failure to submit timely, accurate, or valid reports

2.2.2. REQUIRED DETERMINATIONS (50 CFR 22.26(F)):

- The direct and indirect effects of the take and required mitigation, together with the cumulative effects of other permitted take and additional factors affecting the eagle populations within the EMU and the LAP, are compatible with the preservation of golden eagles and bald eagles;
- Take is necessary to protect an interest in a particular locality;
- Take is associated with, but not the purpose of, the activity;
- The applicant has applied all appropriate and practicable avoidance and minimization measures to reduce impacts to eagles;
- The applicant has applied all appropriate and practicable compensatory mitigation measures, when required, to compensate for remaining unavoidable impacts after all avoidance and minimization measures have been applied;
- Issuance of the permit does not preclude issuance of another permit necessary to protect an interest of higher priority;
- Issuance of the permit will not interfere with an ongoing civil or criminal action concerning unpermitted past eagle take at the project;
- Take is likely to occur based on the magnitude and nature of the impacts of the activity.

The permit tenure (i.e. length of time for which the permit is valid) will be selected by the Service as authorized under 50 CFR 22.26(h). The duration of a permit (can be up to 30 years) is selected based on the following criteria (50 CFR 22.26(h)):

- The duration of the proposed activities;
- The time period for which take will occur;
- The level of impacts to eagles; and

- The nature and extent of mitigation measures incorporated into the terms and conditions of the permit.

Eagle take permits issued for projects that are likely to take eagles over long and indeterminate periods of time (e.g. wind generation facilities) are issued for at least 5 years in duration.

2.3. Tiered EA

This EA tiers to the Service’s PEIS, December 2016 (USFWS 2016b). The PEIS analyzed five alternatives for updating eagle management objectives and permit regulations. In developing the PEIS, the Service anticipated that future project-specific actions would be able to tier to it and provided criteria that must be met for any tiered analysis to be consistent with it. The criteria are:

- Projects will not take eagles above the eagle management unit (EMU; defined in Section 2.5) take limit unless the take is offset by compensatory mitigation.
- The project will not result in cumulative authorized take within the local area population (LAP; defined in section 2.5) that exceeds 5%.
- If compensatory mitigation is required (bullet 1), it is implemented by methods that will offset all projected take, and for which the necessary metrics to calculate the achievement of that offset have been analyzed and established.

Based upon this project-specific analysis and application of the criteria provided in the PEIS, we have determined that tiering to the PEIS is appropriate and that an environmental assessment is the appropriate level of NEPA review. This EA incorporates the PEIS by reference.

2.4. Authorities and Statutory and Regulatory Framework

The Service has jurisdiction over a broad range of fish and wildlife resources. Service authorities are codified under multiple statutes that address management and conservation of natural resources from many perspectives including, but not limited to, the effects of land, water, and energy development on fish, wildlife, plants, and their habitats. One of those statutes administered by the Service is the Eagle Act (16 U.S.C. § 668 et seq.). Eagle Act regulations (50 CFR Part 22) include a provision to authorize the incidental take of golden eagles and bald eagles when certain conditions are met. The Service reviews applications and issues permits to applicants that meet all required issuance criteria.

The PEIS has a full list of authorities that apply to this action (PEIS Section 1.6, pages 7-12) which are incorporated by reference here.

Under the Endangered Species Act (ESA; 16 U.S.C. § 1531–1544) all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA, 16 U.S.C. § 1531(c)(1). Federal action agencies must consult with the Service under Section 7 of the ESA to ensure that “any action authorized, funded, or carried out by such an agency... is not likely to jeopardize the continued existence of

any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. Each agency shall use the best scientific and commercial data available.” 50 U.S.C. § 1536(a)(2). To that end, we evaluated the effects of permit issuance alternatives on listed threatened or endangered species and their designated critical habitat.

2.5. Scope of Analysis

This EA considers and analyzes the effects of three alternatives on the natural and human environment. The primary focus of the analysis is the effects of permit issuance on golden eagles and bald eagles. However, the EA also addresses the effects of permit issuance on other elements of the natural and human environment as appropriate (see Chapter 4).

PacifiCorp has requested authorization to take eagles incidental to the otherwise lawful operation of the 47 repowered wind turbines at the Goodnoe Hills Wind Facility. Their application did not request authorization for take at other project infrastructure (e.g. substations or power lines) associated with the Project, or from maintenance activities associated with that infrastructure. Our analysis is framed, therefore, by the estimated take at the wind turbines.

2.5.1 GEOGRAPHIC EXTENT

The analysis of effects on golden eagles and bald eagles for each alternative is conducted at two geographic scales (USFWS 2016b). The Service uses these scales to evaluate potential impacts to eagle populations.

1. **Eagle management unit (EMU)** – The EMU is the largest geographic scale over which permitted take is regulated to meet our management objective (USFWS 2016b). EMUs for both species are defined, with some modifications, by the four administrative flyways used by State and Federal agencies to administer migratory bird resources: the Atlantic, Mississippi, Central, and Pacific flyways. For bald eagles, the Pacific Flyway is divided into three EMUs: southwest (south of 40 degrees N latitude), mid-latitude (north of 40 degrees to the Canadian border), and Alaska. For golden eagles, the Mississippi and Atlantic flyways are combined as one EMU. (USFWS 2016b). For bald eagles in this analysis, we are evaluating effects in the Pacific Flyway, mid-latitude EMU. For golden eagles in this analysis, we are evaluating effects in the Pacific Flyway EMU.
2. **Local area population (LAP)** – The LAP is the population of eagles within a set distance from the Project footprint. This distance is different for each species and is based on each species’ natal-dispersal distance. Details on the selection of these distances can be found in USFWS (2016b). The distances assigned for each species are 138 km (86 miles) for bald eagles and 175 km (109 miles) for golden eagles. Thus, for bald eagles in this analysis, the LAP area is the area within 86 miles of the project footprint. For golden eagles in this analysis, the LAP area is the area within 109 miles of the project footprint.

The geographic scope of the analysis of effects on other resources addressed in this EA (see Chapter 4) is based on what is biologically meaningful for each resource in the context of the potential effects from O&M activities and implementation of mitigation and conservation measures.

2.6. Tribal Trust Coordination

Twenty-eight federally recognized Indian Tribes (Table 2), because of their proximity to the Project, might have interests that could be affected by this permit decision. We sent letters to these Tribes on January 13, 2020, to inform them about the eagle take permit application, and to provide them the opportunity to review the application and consult on the potential issuance of an eagle take permit. Thus far, no Tribes have requested consultation with us regarding the Project's eagle take permit application. We also invited these Tribes to review and comment on this EA.

Table 2. Tribes contacted for comment on the Service permit decision.

Tribe	Tribe
Burns Paiute Tribe Coeur d'Alene Tribe	Puyallup Tribe
Coeur d'Alene Tribe	Quinault Indian Nation
Confederated Tribes of the Grand Ronde Community of Oregon	Sauk-Suiattle Indian Tribe
Confederated Tribes of the Chehalis Reservation	Shoalwater Bay Tribe
Confederated Tribes of the Colville Reservation	Shoshone-Bannock Tribes
Confederated Tribes of the Siletz Indians of Oregon	Skokomish Tribe
Confederated Tribes of the Umatilla Indian Reservation	Spokane Tribe of Indians
Confederated Tribes of the Warm Springs Reservation, Tribal Council	Squaxin Island Tribe
Cowlitz Indian Tribe	Snoqualmie Tribe
Jamestown S'Klallam Tribe	Stillaguamish Tribe of Indians
Muckleshoot Tribe	Suquamish Tribe
Nez Perce Tribe	Swinomish Indian Tribal Community
Nisqually Indian Tribe	Tulalip Tribes
Port Gamble S'Klallam Tribe	Yakama Nation

2.7. Public Participation

We posted this EA for 30 days, requesting comment on the content and scope of the analysis in the EA, available at: <https://www.fws.gov/pacific/migratorybirds/library/wpanalyses.html>. At the same time, we solicited comment by direct email from multiple parties potentially interested in this topic. We received one written comment from the Yakama Nation.

COMMENT: The Yakama Nation encouraged the Service and PacifiCorp to “...strive to do better and afford eagles the additional protection measures they would receive if Alternative 3 was selected.” The Tribe further pointed out that Alternative 3 would provide more protection for eagles by requiring additional turbine curtailment and additional compensatory mitigation when compared to Alternative 2.

RESPONSE: As the Yakama Nation points out, analysis in this EA concludes that Alternative 3 would likely result in reduced impacts to eagles and increased compensatory mitigation when compared to Alternative 2. Specifically, Alternative 3 would provide increased benefits to eagles by requiring turbine curtailment to reduce estimated fatalities by 10% and offsetting take at an elevated ratio of 2:1. However this EA also illustrates that Alternative 2 is likely to meet the Service’s population management objectives and permit issuance criteria. Therefore, the additional measures provided in Alternative 3 are not required to meet permit issuance criteria or the Service’s population management objectives for either eagle species.

Chapter 3.0 Alternatives

3.1. Introduction

This chapter describes alternatives to our proposed action and alternatives that were considered but eliminated from detailed analysis. We evaluate each alternative for its ability to meet the regulations governing permit issuance, and impacts to the environment, including eagles, described herein.

3.2. Key Elements of Alternatives

We analyze two action alternatives in this EA. The primary elements of each alternative are: a) predicted eagle take, b) avoidance and minimization measures (including BMPs), c) required compensatory mitigation, d) post-construction fatality monitoring, e) reporting, and f) adaptive management. A summary of some of these elements for each alternatives is provided in Table 3, and detailed descriptions of the alternatives are provided in Section 3.3.

Table 3. Key components of the alternatives.

	Alternative 1 - No Action, Deny Permit	Alternative 2 - Issue 30-Year Permit Based on ECP	Alternative 3 - Issue 30-Year Permit with Additional Eagle Conservation Measures
Predicted Annual Take	3.01 golden eagles and 3.01 bald eagles	3.01 golden eagles and 3.01 bald eagles	2.70 golden eagles and 2.70 bald eagles, based on add'l hrs of curtailment as required under avoidance and minimization measures
Predicted 30-yr Take	91 golden eagles and 91 bald eagles	91 golden eagles and 91 bald eagles	81 golden eagle and 81 bald eagles
Predicted Annual Take requiring mitigation¹	N/A	0.88 golden eagles and 0.88 bald eagles	0.79 golden eagles and 0.79 bald eagles, based on add'l hrs of curtailment as required under avoidance and minimization measures
Predicted 30-yr Take requiring mitigation¹	N/A	27 golden eagles and 27 bald eagles	24 golden eagles and 24 bald eagles
Take offset ratio	N/A	1.2:1	2:1
Take that needs to be offset during first 5 years² (annual rate)	None	4.5 golden eagles (27 total GOEAs divided by the # of 5-year periods in the permit tenure)	4 golden eagles (24 total GOEAs divided by the # of 5-year periods in the permit tenure)
Take Debit (in PV Bird-Years) that needs to be offset during the first 5 and 30 years (at listed ratio)	None	52.07 / 222.82 PV bird-years at 1.2:1 ratio (see Appendix C)	77.12 / 330.10 PV bird-years at 2:1 ratio (see Appendix C)
Amount of mitigation typically needed to offset take over the life of the project³	None	309 to 996 high-risk pole retrofits, depending on retrofit longevity and mitigation schedule OR another offsetting measure approved by the Service	458 to 1,476 high-risk pole retrofits, depending on retrofit longevity and mitigation schedule OR another offsetting measure approved by the Service
Avoidance and Minimization Measures	None/Minimal	See Section 3.3.2.1	Same as Alt 2, plus curtail the turbines 17,544 turbine-hours per year in order to achieve a 10% reduction in

	Alternative 1 - No Action, Deny Permit	Alternative 2 - Issue 30-Year Permit Based on ECP	Alternative 3 - Issue 30-Year Permit with Additional Eagle Conservation Measures
			predicted fatalities of golden eagles and bald eagles over the permit tenure
Fatality Monitoring	Incidental observations only	Achieve an average site-wide probability of detection over every 5-year term of ≥ 0.35	Same as Alt 2
Adaptive Management	N/A	Adaptive management-triggered conservation measures, including: a. Perform updraft modelling to identify specific turbines with the highest collision risk under a suite of wind conditions, or perform another measure not listed here if agreed upon by the Service. b. Use of a curtailment system	Same as Alt 2, with modified triggers based on reduced fatality estimates
<p>¹Compensatory Mitigation is only required for golden eagle take estimated from the hazardous area added during the repowering process at all 47 turbines, which occurred after publication of the 2009 rule.</p> <p>²The applicant will likely elect to provide compensatory mitigation for the first five years only and adjust its fatality prediction at each 5-year permit review. This may change the total number of eagles that need to be offset during subsequent 5-year review periods, but the direction and extent of such a change is not known at this time.</p> <p>³Assumes retrofits are completed by the end of the calendar year following permit issuance and/or by the end of the calendar year following each 5-year administrative check-in.</p>			

3.3. Alternatives Analyzed in Detail in this EA

3.3.1. ALTERNATIVE 1: DENY THE PERMIT APPLICATION (NO ACTION)

Under this alternative, we would not issue an eagle take permit. Eagle take permits may be denied if (1) the application does not meet one or more of the issuance criteria described in Section 2.2.1 and 2.2.2, or (2) the risk of eagle mortality from operating the wind turbines is so low that a permit is not warranted. This alternative is reasonable to consider, as the Service is required by regulation to determine if an application meets issuance criteria and denying a permit pursuant to PacifiCorp’s permit application is a potential decision. Based on communications with the applicant, we expect that, if the Service denied the permit request, the

Project would continue to operate under its current operational plan as described above in Chapter 1 without authorization under the Eagle Act to incidentally take eagles. PacifiCorp would not be required by permit to implement the measures outlined under Alternatives 2 or 3 and in the ECP. Any incidental eagle take would be subject to any action deemed appropriate by the Service's Office of Law Enforcement and the U.S. Department of Justice.

3.3.1.1. Avoidance and Minimization Measures and Best Management Practices

Under Alternative 1, PacifiCorp would not be required to implement avoidance and minimization measures during operations and maintenance of the Project. Any avoidance and minimization measures that are undertaken under this alternative are at the discretion of PacifiCorp, and the Service would likely be unaware of the measures selected or when they are implemented.

3.3.1.2. Compensatory Mitigation

Under Alternative 1, PacifiCorp would not be required to provide compensatory mitigation or mitigation credits to offset eagle fatalities to make the predicted take consistent with the Eagle Act preservation standard (50 CFR Part 22).

3.3.1.3. Fatality Monitoring

Under Alternative 1, PacifiCorp would likely continue to incidentally find eagle fatalities throughout the life of the project as described in the ECP; however, eagle remains would only be found incidental to other project-related activities. PacifiCorp would follow the WIRHS process as described in their ECP. No additional fatality monitoring would be required under this alternative.

3.3.1.4. Adaptive Management

Under Alternative 1, PacifiCorp would not be required to follow an adaptive management plan that would require a conservation measure to be implemented or more fatality monitoring to occur should fatality rates be higher than expected. PacifiCorp has stated that they may implement conservation measures in an adaptive management framework as described in their Avian Protection Plan (Appendix A of the ECP); however, the Service will be unaware of the measures selected or when they are implemented.

3.3.2. ALTERNATIVE 2: ISSUE 30-YEAR PERMIT BASED ON THE EAGLE CONSERVATION PLAN

Under Alternative 2, the Service would issue a 30-year eagle take permit authorizing the incidental take of 91 golden eagles and 91 bald eagles associated with the Goodnoe Hills Wind Facility, pursuant to 50 CFR 22.26. When the Service finds an application meets issuance criteria (Section 2.1), a permit must be issued, and the Service must make a number of determinations regarding the permit conditions. One required determination is the permit duration. An alternative that analyzes a permit with a 30-year duration is reasonable to consider, as the applicant requested a permit duration of 30 years. Additionally, the expected life of the Project is approximately 30 years and the Service has the legal authority to issue a permit up to 30 years; therefore, a 30-year permit covers as much of the expected life of the Project as

possible by regulation. Finally, a permit with a 30-year duration allows for the greatest length of guaranteed (i.e. required by permit) benefit to eagles through greater upfront avoidance and minimization, compensatory mitigation, and fatality monitoring. Under Alternative 2, the Service predicts incidental take over a 30-year period for the Project would be 91 golden eagles (3.01 per year) and 91 bald eagles (3.01 per year). The permit authorization would be for this level of incidental take, with associated conditions, as allowed and required by regulation (Table 3). Under this Alternative, compensatory mitigation for this Project (originally built in 2007 prior to our 2009 rule) would only be required for the proportion of total take resulting from the repowering of the Project (Table 3). The Service predicts that the incidental take over a 30-year period associated only with the repowering of the Project would be 27 golden eagles (0.88 per year) and 27 bald eagles (0.88 per year).

The Collision Risk Model (CRM) described in our ECP Guidance (USFWS 2013) was used to predict the number of annual eagle fatalities resulting from operation of the Project. The CRM predicts eagle fatalities in a Bayesian framework using eagle exposure, hazardous area, and daylight operational hours (USFWS 2013). The details of our eagle fatality estimate are provided in Appendix B.

The 30-year permit under Alternative 2 would incorporate as permit conditions the avoidance and minimization measures, monitoring, and compensatory mitigation listed in this section.

3.3.2.1. Avoidance and Minimization Measures

1. Maintenance vehicle movement is restricted to pre-designated access, Project personnel or contractor-required access, or public roads. Where feasible, use existing roads and previously disturbed areas during construction, operation, and maintenance to minimize impacts to native habitat.
2. Project personnel are required to drive 25mph or less on non-public Project roads, be alert for wildlife, and use additional caution in low-visibility conditions when driving any vehicle.
3. The permittee will use spark arrestors on any power equipment (ATVs, chainsaws, and other such equipment) and will maintain fire extinguishers in all onsite service vehicles.
4. Any garbage/waste observed will be collected and disposed of in an appropriate trash receptacle securely protected from wildlife.
5. Any new transmission infrastructure will be constructed and maintained to meet the most recent APLIC suggested practices (currently 2006) for reducing electrocution risk to birds.
6. If applicable, avian diverters will be maintained on all guy wires/lines of all existing or any new temporary meteorological (MET) towers.

7. At least once every three years, the permittee will hold a training that provides instruction to employees (and any contractors working on site) on avoiding harassment and disturbance of eagles within the Project Footprint, how to record incidental observations of avian carcasses, and how to properly handle dead or injured birds or bats if observed.
8. If project operations occur on land not owned by the permittee, the permittee must inform landowners on what to do if they discover a dead bird or eagle. Any landowners collecting birds on your behalf must be designated as a subpermittee.
9. Permittee will remove any dead medium- and large-sized animals (i.e. squirrel or larger) found and dispose of it at least beyond line-of-sight of Project infrastructure, or at a designated disposal site such as a landfill. To increase the chances of locating animal carcasses, the permittee will: a) look for animal carcasses while travelling within the Project Footprint. All carcasses identified must be reported to the site manager within 8 hours and removed from the site as soon as possible but not to exceed 5 days of discovery, and b) look for eagles, vultures, or other scavenging birds that are consistently present and/or consistently circling (e.g. in a kettle) in one area. Any animal behavior that suggests a carcass may be present in the project footprint will be reported to the site manager within 8 hours and the vicinity of the behavior will be searched within 24 hours. Any carcasses found must be removed from the site as soon as possible but not to exceed 5 days of discovery.
10. Natural material (e.g. rock piles, woody debris) and tall vegetation (i.e. tall forbs, grass, weeds) will be removed/maintained beneath turbines and on the associated access pad and roads to reduce shelter and forage for small mammals.
11. Waste materials and non-purposeful debris stored outside will be minimized at the Project to reduce shelter and forage for small mammals in the project footprint.
12. When applicable, install underground collection lines to minimize eagle collision and electrocution risk associated with aboveground lines. Any aboveground lines must be constructed in compliance with APLIC (2006) suggested practices.
13. Snow management on private roads within the Project will include strategic plowing to promote wildlife movement (i.e. putting gaps in snow banks that encourages animals to leave the road) to reduce potential collisions between wildlife and vehicles.

3.3.2.2. *Compensatory Mitigation*

Under Alternative 2, consistent with the Eagle Act preservation standard, PacifiCorp would be required to provide compensatory mitigation for golden eagle fatalities by implementing the mitigation strategy identified below or by applying mitigation credits as described in Section 1.2.3 for previously completed retrofits of poles.

As described in more detail in the PEIS (USFWS 2016b), the Service has set a preservation standard under the Eagle Act. This standard requires the Service to manage golden eagles and bald eagles to maintain stable or increasing breeding populations of both species. To achieve this standard, the Service established take thresholds for golden eagles and bald eagles at the EMU scale. Eagle fatalities caused by activities in place prior to September 11, 2009, are accounted for in the baseline conditions that were analyzed in the PEIS and used to set EMU thresholds. As such, any permitted take at projects that were operational prior to September 11, 2009, does not need to be deducted from the EMU take thresholds. Conversely, permitted take at projects that were operational after September 11, 2009, must be deducted from EMU take thresholds in order for the Service to adhere to our eagle preservation standard. Similarly, permitted take associated with increases in hazardous area from repowering of wind projects or project expansions that occurred on or after September 11, 2009 must also be deducted from the EMU take thresholds. Presently, take thresholds for golden eagles have been set at zero, thus, every golden eagle take that is authorized by the Service, that is occurring at a project not operational prior to September 11, 2009, needs to be offset via compensatory mitigation at a mitigation:fatality ratio of 1.2:1 (USFWS 2016b; eagles conserved:eagles authorized). This compensatory mitigation must occur within the EMU.

Under Alternative 2, bald eagle take is predicted to be within the EMU take threshold; thus, no compensatory mitigation would be required for bald eagles. However, golden eagle take associated with an increase in hazardous area from repowering of the Project is expected to be inconsistent with our preservation standard under the Eagle Act and, thus, would need to be offset with compensatory mitigation at a ratio of 1.2:1. Take offsets can be achieved using a variety of mitigation strategies, as long as the strategy selected is known to reduce eagle mortality from an existing source or will increase the carrying capacity in the EMU. Additionally, the Service must be able to quantify the eagles saved from any selected mitigation method (see Section 2.3), and approve the assumptions made when estimating eagles saved. One mitigation strategy that meets the above criteria is power pole retrofitting, abiding by the APLIC's Suggested Practices (2006), to reduce the risk of eagle electrocution. By retrofitting existing power poles on the landscape that pose a high risk of electrocution to eagles, eagles can be saved from an existing source of mortality and, thus, required offsets can be achieved.

The total number of high-risk poles we would require be retrofitted depends on the retrofit longevity (i.e. the length of time the retrofit will remain consistent with APLIC (2006) Suggested Practices). Retrofit longevities often fall between 10 years and 30 years depending on the type and quality of the retrofit. For example, re-framing (i.e. permanently increasing the distance between conductors and/or grounding points so that no insulating covers are needed) or removing poles is a long-term way to bring high-risk power poles into compliance with APLIC (2006) Suggested Practices without needing maintenance, and generally receives credit for 30-year retrofit longevity. Conversely, applying insulating covers (i.e. covers made of non-conducting material placed over conductors or grounded hardware) is a temporary way to bring high-risk poles into compliance with APLIC (2006) Suggested Practices. Without scheduled maintenance, these insulating covers, if sized properly and installed correctly, are thought to last about 10 years; thus, these retrofits generally receive credit for 10-year retrofit longevity.

The total number of high-risk poles we would require also depends on the date by which these retrofits would be completed. Under Alternative 2, we would require that any new retrofits be completed by January 31, 2023, prior to the beginning of the 2023 breeding season. Retrofits must be “additional” to whatever the owning company had plans to retrofit (i.e. not already scheduled for retrofitting or replacement) in the foreseeable future and must be located within the golden eagle Pacific Flyway EMU. Alternatively, PacifiCorp can request credit for compensatory mitigation efforts that were previously completed and approved by the Service (Section 1.2.3).

Under Alternative 2, PacifiCorp could provide compensatory mitigation on a variety of different methods or schedules. Three are presented here as the most realistic methods or schedules, and to depict a range of pole retrofit estimates that could occur under this Alternative if compensatory mitigation credits are not applied (see Table 3):

- 1) PacifiCorp can elect to provide all compensatory mitigation for the entire 30-year permit term up front to offset the take of 27 golden eagles predicted to result from the increase in hazardous area associated with the repowering of the project. If they choose this option, PacifiCorp would be required to provide 309 to 710 retrofits depending on the longevity of retrofits and whether or not an in-lieu fee¹ power pole retrofit program is used.
- 2) PacifiCorp can elect to provide compensatory mitigation for the first 5 years of predicted take to offset the take of golden eagles predicted to result from the increase in hazardous area associated with the repowering of the project. To offset the predicted take of 4.5 golden eagles over these first 5 years, PacifiCorp would need to retrofit 166 high risk poles with a 10-year retrofit longevity, 73 high risk poles with a 30-year retrofit longevity, or 75 high risk poles through a Service-approved in-lieu fee program. PacifiCorp would then be required to provide additional compensatory mitigation at 5-year intervals for the remainder of the permit tenure (there are 6 total 5-year intervals during a 30-year permit). Compensatory mitigation requirements for future 5-year intervals will be determined at the end of each previous 5-year period and will be calculated using fatality estimates from post-permit fatality monitoring, updated fatality predictions, and any excess compensatory mitigation provided in the previous 5-year permit review periods. Without future eagle fatality information, we cannot predict the total amount of compensatory mitigation required beyond the first 5-year period under this mitigation schedule. However, we can assume that fatality predictions do not change over time. Given this assumption, PacifiCorp would continue to be required to offset the take of 4.5 golden eagle mortalities every 5 years through the subsequent 5 permit periods. To do this, PacifiCorp would need to perform a total of 438 to 996 retrofits over the 30-year permit tenure depending on the longevity of retrofits and whether or not an in-lieu fee program is used.

¹ An in-lieu fee program is a Service-approved program that allows an applicant/permittee the opportunity to provide funds to a 3rd party as payment for the subsequent arrangement and completion of compensatory mitigation that meets the Service's requirements, as allowed under 50 CFR 22.26(c)(1)(iv).

Under Alternative 2, if PacifiCorp elects to provide compensatory mitigation in 5-year intervals, the total amount of compensatory mitigation they provide may change every 5 years, but will not fall short of offsetting the take authorized on the permit at a ratio of 1.2:1.

Table 4. High-risk power poles that will be retrofitted over the life of the Project under Alternative 2 by a range of retrofit completion schedules and retrofit longevitys.

Mitigation Completion Schedule	<i>High-risk power pole retrofits required over the permit tenure by retrofit longevity</i>
Incremental mitigation at 5-year intervals for the life of the project. Mitigate for first 5 years of predicted take before beginning of 2023 breeding season ¹ . Complete the same amount of mitigation in 5-year increments over the 30-year permit tenure until required offset is achieved.	10-yr: 996
	30-yr: 438
	<i>In-Lieu Fee Program: 450</i>
Mitigate for all 30 years of predicted take before beginning of 2023 breeding season.	10-yr: 710
	30-yr: 309
	<i>In-Lieu Fee Program: 319</i>

¹ We anticipate that mitigation done through the in-lieu fee program will not be completed until approximately 2 years from the date of permit issuance; thus will not be implemented until prior to the 2024 breeding season.

- 3) PacifiCorp can also elect to apply compensatory mitigation credits described and approved in Section 1.2.3. The retrofit longevitys vary by retrofitted pole (from 10 to 30 years), so it is not possible to determine the exact number of poles that would be used to offset take for this permit. However, we can say that a mitigation credit of 52.07 PV Bird-Years would need to be applied to cover the compensatory mitigation requirement for the first 5 years of the permit tenure. Alternatively, a mitigation credit of 222.82 PV Bird-Years would need to be applied to cover the compensatory mitigation requirement for the 30 year permit tenure. As described in Section 1.2.3, Pacificorp has achieved a mitigation credit balance of 251.93 PV Bird-Years, which is greater than the 222.82 required for the 30 year permit tenure. Should at least 52.07 PV Bird-Years remain in the balance described above, those could be applied to the compensatory mitigation requirement for this permit.

Regardless of the method/schedule above, to ensure that selected poles are among the highest risk poles on the landscape, we would require first that the applicant identify one or more areas or circuits in high-quality golden eagle habitat and in the EMU where take will be occurring. Once an area or circuit is identified we would require that, for the first 5-year permit period,

power poles within that area or circuit be assigned a risk score (RRI) as described in Dwyer et al. (2014). The applicant should select the highest risk poles in the identified area for retrofitting (determined prior to retrofitting), according to their RRI score, and would be required to select poles that achieved an average RRI score of at least 0.4.

For retrofitting to be considered complete, we would require that all selected poles be retrofitted to be consistent with APLIC (2006) Suggested Practices. If PacifiCorp elects to provide mitigation in 5-year increments as described above, we would consider the best available information in evaluating and updating the criteria used to identify high-risk poles during subsequent 5-year review periods. The exact number of high-risk poles, the location of those poles, the type of retrofit to be performed, and the anticipated longevity of that retrofit must be approved, in writing, by the Service for the poles to count towards the compensatory mitigation requirement.

In order for future retrofitted poles to count toward the compensatory mitigation requirement, PacifiCorp would be required to receive Service approval of the retrofit plan prior to conducting the retrofit work. To receive Service approval, PacifiCorp would be required to submit a Pre-Retrofit Summary Report that includes information on the location of poles, RRI score of each pole, a description of the retrofit proposed for each pole, the expected retrofit longevity. Additionally, PacifiCorp has agreed to provide a summary of the potential effects to cultural resources and endangered species, including any direct and indirect impacts resulting from any proposed pole replacements. Based on the information provided, the Service may undertake additional NEPA, NHPA, or ESA-related related analyses as necessary.

3.3.2.3. *Compensatory Mitigation – Other Strategies*

PacifiCorp or the Service may request an amendment to the compensatory mitigation plan to offset take of golden eagles using a method other than power pole retrofits. The permittee may request the amendment by submitting a full written justification and supporting information (50 CFR 13.23, 50 CFR 22.26(c)(1)(iv)). The Service also has the authority to modify the strategy (or strategies) used to offset take under federal regulation 50 CFR 22.26(c)(8). The regulation identifies requirements for compensatory mitigation (50 CFR 22.26(c)(1)(iii)).

Other compensatory mitigation strategies may include conservation banking, in-lieu fee programs, and other third-party mitigation projects or arrangements that have been pre-approved by the Service. Alternatively, other permittee-responsible mitigation strategies to offset eagle take, such as lead abatement or roadside carcass removal, may be approved on a permit-specific basis provided the permittee submits verifiable documentation sufficient to demonstrate that the requirements listed above have been met and the alternative means of compensatory mitigation will offset the permitted take to the degree that is compatible with the preservation of eagles.

The Service may use existing peer-reviewed research and other scientifically rigorous studies, and may consult with topical experts as necessary in reviewing the documentation submitted by the Project.

3.3.2.4. *Fatality Monitoring*

Under Alternative 2, PacifiCorp would be required to implement a post-permit fatality monitoring program, including formalized searches for eagle remains, searcher efficiency trials, and carcass persistence trials. This monitoring effort would need to achieve a minimum average probability of detection² of 35%, as determined by the Service, across every 5-year review period. In all of the 30 permit years, PacifiCorp would be required to perform some level of fatality monitoring that could, when combined with results from bias trials, be used to derive a fatality estimate for that year.

PacifiCorp would also be required to implement bias trials, including searcher efficiency and carcass persistence trials for one full year during each 5-year review period for each unique carcass search method employed, stratified by each of four seasons. Searcher efficiency trials would be conducted for every unique carcass search method used, even when carcasses only have a chance to be observed opportunistically, during normal project operations and maintenance. If the carcass search method does not change during a 5-year period, searcher efficiency trials would be conducted for at least one year during each 5-year period.

Searcher efficiency trials would use twenty surrogate carcasses per season, placed at randomly selected turbines and at random locations within each search plot. Carcass persistence trials would use ten surrogate carcasses per season placed at randomly selected turbines or at random locations within the project footprint or similar nearby habitat. PacifiCorp would use raptor carcasses as surrogates when possible. When the required sample size cannot be obtained, other surrogates may be used. These trials would last for a duration of at least 90 days per season.

Additionally, as required by regulation, at least one year of searches for eagle remains and all bias trials would be conducted in each 5-year administrative permit period by a qualified, independent third party. This third party would be required to provide all data from their monitoring efforts, including an annual summary report, directly to the Migratory Bird Permit Office prior to (or at the same time as) it being reported to the permittee.

As illustrated in Table 5, progressively more rigorous fatality monitoring may be warranted under Alternative 2, depending on the number of eagle fatalities observed during post-permit fatality monitoring.

3.3.2.5. *Adaptive Management*

The CRM conservatively predicts the collision of 91 golden eagles and 91 bald eagles with Project turbines over the 30-year permit term (Table 2). If realized take at the Project is on track to be lower than this conservative prediction, no adaptive management action is needed under this Alternative. However, if monitoring shows, using triggers defined below, that realized take is on track to be greater than predicted, or the Service estimates that realized take is

² The probability of detection for a particular carcass search method can be calculated/estimated in the Evidence of Absence software (<https://pubs.er.usgs.gov/publication/ds881>) using actual (or hypothetical) site-specific data to account for Searcher Efficiency and Carcass Persistence.

nearing authorized levels, PacifiCorp would be required to implement a conservation measure described to adaptively manage the Project to reduce take before permitted take is exceeded.

Under Alternative 2, PacifiCorp would be required to implement the following adaptive management plan. Triggers 1-4 refer to and will be reached as a result of eagle remains found, not estimates of fatalities. Trigger 5 addresses if the minimum fatality monitoring requirement is not met. Trigger 6 addresses if a new eagle nest site is found near project turbines. The adaptive management measures associated with each trigger are designed to require Enhanced Fatality Monitoring efforts (i.e. achievement of an average site-wide probability of detection of 0.5 over the next 5 years) and other measures with each successive trigger if tripped (Column 6). If a trigger is activated resulting in the initiation of Enhanced Monitoring, then there is no return to previous triggers. Simply put, upon permit issuance, Columns 1 and 2 define the applicable triggers. If adaptive management requires Enhanced Fatality Monitoring, the applicable triggers become those listed in Columns 3 through 5, depending on how many 5-year evaluation periods have required Enhanced Fatality Monitoring. Upon activation of a trigger, any measure will only be required for the subsequent 5-year review period, at which point, the measure can be discontinued and baseline fatality monitoring can resume (i.e., to reach an average site-wide probability of detection of > 0.35), unless another trigger has been achieved. Since Trigger 6 is not tripped by the discovery of eagle remains, it remains constant regardless of how much monitoring has been performed.

Table 5. Stepwise adaptive management for eagle take at the Goodnoe Hills Wind Project under Alternative 2.

Column 1	2	3	4	5	6
	Baseline Fatality Monitoring required (Sec 3.3.3.2)	After 5 Yrs of Enhanced Fatality Monitoring	After 10 Yrs Enhanced Fatality Monitoring	After 15+ Yrs Enhanced Fatality Monitoring	Adaptive Management Measure
Trigger 1	≥ 8 golden eagle remains found in first 5 years OR ≥ 8 bald eagle remains found in first 5 years OR ≥ 11 golden eagle remains found in first 10 years OR ≥ 11 bald eagle remains found in first 10 years	≥ 13 golden eagle remains found in first 10 years OR ≥ 13 bald eagle remains found in first 10 years			<p>At the beginning of the next 5-year review period (as defined in 50 CFR 22.26(c)(7)(iii)), implement both of the following:</p> <ul style="list-style-type: none"> a) Conduct a detailed desktop analysis of existing data for patterns in fatalities (i.e. location, age, timing, etc.) to determine if high risk areas might be apparent. Submit results of this analysis and any conclusions to the Service within 90 days of meeting this trigger. b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year Review period).
Trigger 2	≥ 12 golden eagle remains found in first 10 years OR ≥ 12 bald eagle remains found in first 10 years OR ≥ 17 golden eagle remains found in first 15 years OR	≥ 14 golden eagle remains found in first 10 years OR ≥ 14 bald eagle remains found in first 10 years OR ≥ 19 golden eagle remains found in first 15 years OR	≥ 21 golden eagle remains found in first 15 years OR ≥ 21 bald eagle remains found in first 15 years		<p>At the beginning of the next 5-year review period, implement both of the following:</p> <ul style="list-style-type: none"> a) Either: 1) Test a conservation measure designed to reduce the number of eagles exposed to collision risk (i.e. test a deterrent), to minimize the likelihood of future take. The measure will be installed on at least 5 turbines and its effectiveness tested. Effectiveness study design must be approved by the Service, OR 2) implement another measure as agreed upon in writing during consultation with the Service. b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average

	≥ 17 bald eagle remains found in first 15 years	≥ 19 bald eagle remains found in first 15 years			site-wide probability of detection of 0.5 over the subsequent 5-year Review period).
Trigger 3	<p>≥ 22 golden eagle remains found in first 20 years OR ≥ 22 bald eagle remains found in first 20 years</p>	<p>≥ 24 golden eagle remains found in first 20 years OR ≥ 24 bald eagle remains found in first 20 years</p>	<p>≥ 25 golden eagle remains found in first 20 years OR ≥ 25 bald eagle remains found in first 20 years</p>	<p>≥ 26 golden eagle remains found in first 20 years OR ≥ 26 bald eagle remains found in first 20 years</p>	<p>At the beginning of the next 5-year review period, implement both of the following:</p> <ul style="list-style-type: none"> a) Test a conservation measure designed to reduce the source of collision risk (e.g. curtail turbines), such as installation and use of an artificial intelligence-driven curtailment system or implementation of biomonitoring to manually curtail turbines. The effectiveness of this measure must be tested, with the study design approved by the Service. Alternatively, perform another measure not listed here if agreed upon by the Service. This Alternative measure might be the continuation of the measures described under Trigger 3, if it has been previously implemented and proven effective in consultation with the Service. b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period). <p><i>Note: if Trigger 3 is met simultaneous to meeting a previous Trigger (i.e. if Trigger 3 is met for the first time at the same time that Trigger 1 or 2 is met for the first time), the measures listed under Trigger 3 will be required, but the implementation of measures under previous triggers will be at the discretion of the permittee.</i></p>
Trigger 4	<p>≥ 27 golden eagle remains found in first 25 years OR</p>	<p>≥ 29 golden eagle remains found in first 25 years OR</p>	<p>≥ 30 golden eagle remains found in first 25 years OR</p>	<p>≥ 31 golden eagle remains found in first 25 years OR</p>	<p>Immediately upon meeting this trigger, implement both of the following:</p> <ul style="list-style-type: none"> a) If technology has been employed as a result of previous triggers, either: 1) alter programming/implementation of those technologies

	≥ 27 bald eagle remains found in first 25 years	≥ 29 bald eagle remains found in first 25 years	≥ 30 bald eagle remains found in first 25 years	≥ 31 bald eagle remains found in first 25 years	<p>to improve their effectiveness, OR 2) employ onsite biological monitors during daylight hours who will observe eagles in the vicinity of operating turbines and order turbine shut-downs in response to eagle presence. The effectiveness of this measure must be tested, with the study design approved by the Service, OR 3) implement another measure as agreed upon in writing during consultation with the Service.</p> <p>b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period).</p> <p><i>Note: if Trigger 4 is met simultaneous to meeting a previous Trigger (i.e. if Trigger 4 is met for the first time at the same time that Trigger 1, 2, or 3 is met for the first time), the measures listed under Trigger 4 will be required, but the implementation of measures under previous triggers will be at the discretion of the permittee.</i></p>
Trigger 5	<p>An average site-wide probability of detection of 0.35 is not achieved in any 5-year period during the permit tenure, as determined by the Service. OR Enhanced monitoring, if required through adaptive management, does not achieve an average site-wide probability of detection of 0.5 during the required 5-year period, as determined by the Service. OR If searcher efficiency rates are not quantifiable, through bias trials, for every search method in every year of the 5-year period, as determined by the Migratory Bird Permit Office.</p>				<p>At the beginning of the next 5-year review period, Perform Enhanced Fatality Monitoring (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period).</p>
Trigger 6	<p>A new golden eagle nest is discovered within 1 mile of any project turbine OR A new bald eagle nest is discovered within 0.5 miles of any project turbine</p>				<p>Upon meeting this trigger, implement all of the following:</p> <p>a) Immediately report the discovery of the new nest to the Service and discuss, in consultation with the Service, the potential impacts of project-related activities, if any, on the nesting eagles, and whether temporary or permanent nest take may be appropriate.</p>

		<p>b) Effective immediately, do not conduct activities that are not in response to a safety emergency (50 CFR 22.3) or essential turbine maintenance if the activities 1) will occur within 1 mile of an in-use golden eagle nest during the nesting season (Jan 1 to Aug 31) and is within line-of-sight of the nest, 2) will occur within 0.5 miles of an in-use golden eagle nest during the nesting season (Jan 1 to Aug 31), or 3) will occur within 660 feet of an in-use bald eagle nest during the nesting season (Jan 1 to Aug 31). This restriction must remain in place until coordination with the Service occurs while minimizing the risk of nest disturbance. This may include implementation of practical measures to avoid nest disturbance, or the issuance of a nest disturbance permit (50 CFR 22.26) if no practical avoidance measures can be implemented.</p> <p>c) Monitor the nest status twice annually to determine if it is in-use and if it was successful. If in-use, monitor the eagle activity surrounding the nest once every 10 years (in a year when the nest is in-use) to determine if the territory or home-range associated with the nest is likely to overlap the project footprint. At a minimum, this would entail conducting one point count for one full day (sunrise to sunset) every week for the duration of the breeding season (from the date the nest is determined to be in-use until Aug 31) or as long as the nest remains in-use during that season. The survey would be performed at a strategically placed point to determine if and how frequently one or both adults and/or fledglings (if applicable) are entering the project footprint and how often this may be occurring. In addition, if the nest produces nestlings, those nestlings must be banded with federal (USGS) aluminum bands if it is safe to do so. Another method(s) could be used to satisfy this requirement but must be approved by the Service prior to implementation.</p>
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3.3.2.6. *5-Year Reviews*

Under Alternative 2, the Service would undertake an administrative permit review at least once every 5 years throughout the permit tenure, in accordance with 50 CFR 22.26(c)(7)(iii). In aid of that review, the permittee would compile, and submit to the Service, eagle fatality data and other pertinent information that is specific to the project at least 90 days prior to each review meeting. This information includes a summary of the number of total operational daylight hours at the project (at each turbine or summed across all turbines) each year since permit issuance, or since the last 5-year review, including how those hours were estimated. The data supplied to the Service will be used to inform the Service's collision risk estimates for the subsequent 5-year period. In addition to the site-specific data provided, the Service would also use other best available information when re-evaluating predicted take at each 5-year review.

The term "5-year review period" refers to each 5-year period during the permit term between the administrative permit reviews. Over a 30-year permit, there will be 6 such periods (e.g. permit years 1-5, 6-10, 11-15, 16-20, 21-25, and 26-30).

3.3.3. ALTERNATIVE 3: ISSUE 30-YEAR EAGLE TAKE PERMIT WITH ADDITIONAL CONSERVATION MEASURES

Under Alternative 3, the Service would issue a 30-year eagle take permit authorizing the incidental take of 81 golden eagles (2.7 per year) and 81 bald eagles (2.7 per year) associated with the Goodnoe Hills Wind Facility pursuant to 50 CFR 22.26 (Table 2). Under Alternative 3, PacifiCorp would implement additional conservation measures to benefit eagles beyond those measures required under Alternative 2 for the 30-year permit term, including the additional curtailment of turbines in order to further reduce predicted eagle fatalities, and an increase in the ratio of compensatory mitigation to predicted take for golden eagles.

3.3.3.1. *Avoidance and Minimization Measures*

The 30-year permit would incorporate as permit conditions the avoidance and minimization measures described under Alternative 2. In addition, PacifiCorp would curtail turbines for a total of 17,544.1 daylight hours per year in order to achieve a 10% reduction in both predicted golden eagle fatalities and predicted bald eagle fatalities over the permit tenure. The implementation of this measure would reduce the estimated take associated with the repowering of the Project in comparison to Alternative 2.

3.3.3.2. *Compensatory Mitigation – Power Pole Retrofits*

Under Alternative 3, PacifiCorp would provide compensatory mitigation for the golden eagle take authorized by implementing the mitigation strategy described under Alternative 2 with an elevated take offset ratio of 2:1, exceeding the Eagle Act preservation standard (50 CFR 22.26(c)(1)(i)). The increased take offset ratio would increase the number of pole retrofits required to offset take of golden eagles at the Project during the permit tenure; however, this increase is buffered slightly by a decrease in the fatality prediction as a result of the required turbine curtailment in comparison to Alternative 2.

Because the original Project was constructed and operational prior to September 11, 2009, the Applicant would only be required to offset the take of golden eagles attributable to the repowering of the Project. No compensatory mitigation would be required for bald eagles under Alternative 3. While take at the Project under Alternative 3 is predicted to be 2.70 golden eagles and 2.70 bald eagles per year (see Appendix B), or 81 golden eagles and 81 bald eagles during the 30-year permit term, take associated with the repowering of the Project is predicted to be a fraction of that – 0.79 golden and 0.79 bald eagles per year, or 24 golden eagles and 24 bald eagles during the 30-year permit term.

The method required to identify high risk poles would be identical to that outlined under Alternative 2.

Similar to Alternative 2, under Alternative 3, PacifiCorp could provide compensatory mitigation using multiple methods or on a variety of different schedules. Three are presented here as the most realistic methods or schedules, and to depict a range of pole retrofit estimates that could occur under this Alternative if compensatory mitigation credits are not applied (see Table 3):

- 1) PacifiCorp can elect to provide all compensatory mitigation for the entire 30-year permit term up front to offset the take of 24 golden eagles. If they choose this option, PacifiCorp would be required to provide 458 to 1,052 retrofits depending on the longevity of retrofits and whether or not an in-lieu fee power pole retrofit program is used.
- 2) PacifiCorp can elect to provide compensatory mitigation for the first 5 years of predicted take to offset the take of 4 golden eagles. To offset this predicted take over these first 5 years, PacifiCorp would need to retrofit 246 high risk poles with a 10-year retrofit longevity, 107 high risk poles with a 30-year retrofit longevity, or 111 high risk poles through a Service-approved in-lieu fee program. PacifiCorp would then be required to provide additional compensatory mitigation at 5-year intervals for the remainder of the permit tenure (there are 6 total 5-year intervals during a 30-year permit). Without future eagle fatality information, we cannot predict the total amount of compensatory mitigation required beyond the first 5-year period under this mitigation schedule. However, we can assume that fatality predictions do not change over time. Given this assumption, PacifiCorp would continue to be required to offset the take of 4 golden eagle mortalities every 5 years through the subsequent 5 permit periods. To do this, PacifiCorp would need to perform a total of 642 to 1,476 retrofits over the 30-year permit tenure depending on the longevity of retrofits and whether or not an in-lieu fee program is used.

Just as under Alternative 3, if PacifiCorp elects to provide compensatory mitigation in 5-year intervals, the total amount of compensatory mitigation they provide may change every 5 years but will not fall short of offsetting the take authorized on the permit at a ratio of 1.2:1.

Table 6. High-risk power poles that will be retrofitted over the life of the Project under Alternative 3 by a range of retrofit completion schedules and retrofit longevitys.

Mitigation Completion Schedule	High-risk power pole retrofits required over the 30-year permit tenure by retrofit longevity
Incremental mitigation at 5-year intervals for the duration of the permit. Mitigate for first 5 years of predicted take before beginning of 2023 breeding season ¹ . Complete the same amount of mitigation in 5-year increments over the 30-year permit tenure until required offset is achieved.	<i>10-yr: 1,476</i>
	<i>30-yr: 642</i>
	<i>In-Lieu Fee Program: 666</i>
Mitigate for all 30 years of predicted take before beginning of 2023 breeding season.	<i>10-yr: 1,052</i>
	<i>30-yr: 458</i>
	<i>In-Lieu Fee Program: 472</i>

¹ We anticipate that mitigation done through the in-lieu fee program will not be completed until approximately 2 years from the date of permit issuance; thus will not be implemented until prior to the 2024 breeding season.

- 3) If compensatory mitigation is provided by applying mitigation credits described in Section 1.2.3, a mitigation credit of 77.12 PV Bird-Years would need to be applied to cover the compensatory mitigation requirement for the first 5 years of the permit tenure. Alternatively, a mitigation credit of 330.10 PV Bird-Years would need to be applied to cover the compensatory mitigation requirement for the 30 year permit tenure. As described in Section 1.2.3, PacifiCorp has a mitigation credit balance of 251.93 PV Bird-Years, less than the 330.10 required. As such, additional compensatory mitigation would be required beyond the available mitigation credits to offset all eagle take for the life of the permit under this Alternative.

3.3.3.3. *Fatality Monitoring*

Under Alternative 3, PacifiCorp would implement an operational fatality monitoring program as described in Alternative 2, including formalized eagle remains searches, searcher efficiency trials, and carcass persistence trials. Under this alternative, fatality monitoring results would be reported to the Service annually for any searches for eagle remains and any bias trials performed during the permit tenure. This includes years when formal eagle remains searches were not conducted.

3.3.3.4. *Adaptive Management*

The CRM conservatively predicts the turbine collision of 81 golden eagles and 81 bald eagles with Project turbines over the 30-year permit term (Table 2). As the number of eagle remains found increases through formalized fatality monitoring efforts, adaptive management would require PacifiCorp to implement a conservation measure that is likely to reduce take before permitted take is exceeded.

Under Alternative 3, PacifiCorp would implement the following adaptive management plan, which sets triggers that are slightly lower than what is described in Alternative 2 due to the reduced fatality prediction. As reflected in Alternative 2, triggers refer to and would be reached as a result of eagle remains found, not estimates of fatalities. Table 7 outlines triggers and conservation measures that have been identified through discussions with PacifiCorp, as ways to ensure realized take at the Project does not exceed our fatality prediction and the permitted amount of take for each species.

As with Alternative 2, Triggers 1-4 refer to and will be reached as a result of eagle remains found, not estimates of fatalities. Trigger 5 addresses if the minimum fatality monitoring requirement is not met. Trigger 6 addresses if a new eagle nest site is found near project turbines. The adaptive management measures associated with each trigger are designed to require Enhanced Fatality Monitoring efforts (i.e. achievement of an average site-wide probability of detection of 0.5 over the next 5-year period) and other measures with each successive trigger if tripped (Column 6). Upon permit issuance, Columns 1 and 2 define the applicable triggers. If adaptive management requires Enhanced Fatality Monitoring, the applicable triggers become those listed in Columns 3 through 5, depending on how many 5-year evaluation periods have required Enhanced Fatality Monitoring. If a trigger is activated resulting in the initiation of Enhanced Monitoring, then there is no return to previous triggers. Upon activation of a trigger, any measure will only be required for the subsequent 5-year review period, at which point, the measure can be discontinued and baseline fatality monitoring can resume (i.e., to reach an average site-wide probability of detection of > 0.35), unless another trigger has been achieved. Since Trigger 6 is not tripped by the discovery of eagle remains, it remains constant regardless of how much monitoring has been performed.

Table 7. Stepwise adaptive management for eagle take at the Goodnoe Hills Wind Project under Alternative 3.

Column 1	2	3	4	5	6
	Baseline Fatality Monitoring required (Sec 3.3.3.2)	After 5 Yrs of Enhanced Fatality Monitoring	After 10 Yrs Enhanced Fatality Monitoring	After 15+ Yrs Enhanced Fatality Monitoring	Adaptive Management Measure
Trigger 1	<p>≥ 7 golden eagle remains found in first 5 years OR ≥ 7 bald eagle remains found in first 5 years OR ≥ 10 golden eagle remains found in first 10 years OR ≥ 10 bald eagle remains found in first 10 years</p>	<p>≥ 12 golden eagle remains found in first 10 years OR ≥ 12 bald eagle remains found in first 10 years</p>			<p>At the beginning of the next 5-year review period (as defined in 50 CFR 22.26(c)(7)), implement both of the following:</p> <ul style="list-style-type: none"> a) Conduct a detailed desktop analysis of existing data for patterns in fatalities (i.e. location, age, timing, etc.) to determine if high risk areas might be apparent. Submit results of this analysis and any conclusions to the Service within 90 days of meeting this trigger. b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year Review period).
Trigger 2	<p>≥ 11 golden eagle remains found in first 10 years OR ≥ 11 bald eagle remains found in first 10 years OR ≥ 16 golden eagle remains found in first 15 years OR ≥ 16 bald eagle remains found in first 15 years</p>	<p>≥ 13 golden eagle remains found in first 10 years OR ≥ 13 bald eagle remains found in first 10 years OR ≥ 18 golden eagle remains found in first 15 years OR ≥ 18 bald eagle remains found in first 15 years</p>	<p>≥ 20 golden eagle remains found in first 15 years OR ≥ 20 bald eagle remains found in first 15 years</p>		<p>At the beginning of the next 5-year review period, implement both of the following:</p> <ul style="list-style-type: none"> a) Test a conservation measure designed to reduce the number of eagles exposed to collision risk (i.e. test a deterrent), to minimize the likelihood of future take. The measure will be installed on at least 5 turbines and its effectiveness tested. Effectiveness study design must be approved by the Service. Alternatively, implement another measure as agreed upon in writing during consultation with the Service. b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average

					site-wide probability of detection of 0.5 over the subsequent 5-year Review period).
Trigger 3	<p>≥ 21 golden eagle remains found in first 20 years OR ≥ 21 bald eagle remains found in first 20 years</p>	<p>≥ 23 golden eagle remains found in first 20 years OR ≥ 23 bald eagle remains found in first 20 years</p>	<p>≥ 24 golden eagle remains found in first 20 years OR ≥ 24 bald eagle remains found in first 20 years</p>	<p>≥ 25 golden eagle remains found in first 20 years OR ≥ 25 bald eagle remains found in first 20 years</p>	<p>At the beginning of the next 5-year review period, implement both of the following:</p> <p>a) Test a conservation measure designed to reduce the source of collision risk (i.e. curtail turbines), such as installation and use of an artificial intelligence-driven curtailment system or implementation of biomonitors to manually curtail turbines. The effectiveness of this measure must be tested, with the study design approved by the Service. Alternatively, perform another measure not listed here if agreed upon by the Service. This alternative measure might be the continuation of the measures described under Trigger 3, if it has been previously implemented and proven effective in consultation with the Service.</p> <p>b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period).</p> <p><i>Note: if Trigger 3 is met simultaneous to meeting a previous Trigger (i.e. if Trigger 3 is met for the first time at the same time that Trigger 1 or 2 is met for the first time), the measures listed under Trigger 3 will be required, but the implementation of measures under previous triggers will be at the discretion of the permittee.</i></p>
Trigger 4	<p>≥ 26 golden eagle remains found in first 25 years OR ≥ 26 bald eagle remains found in first 25 years</p>	<p>≥ 28 golden eagle remains found in first 25 years OR ≥ 28 bald eagle remains found in first 25 years</p>	<p>≥ 29 golden eagle remains found in first 25 years OR ≥ 29 bald eagle remains found in first 25 years</p>	<p>≥ 30 golden eagle remains found in first 25 years OR ≥ 30 Bald Eagle remains found in first 25 years</p>	<p>Immediately upon meeting this trigger, implement both of the following:</p> <p>a) If technology has been employed as a result of previous triggers, either: 1) alter programming/implementation of those technologies to improve their effectiveness, OR 2) employ onsite biological monitors during daylight hours who will</p>

					<p>observe eagles in the vicinity of operating turbines and order turbine shut- downs in response to eagle presence. The effectiveness of this measure must be tested, with the study design approved by the Service, OR 3) implement another measure as agreed upon in writing during consultation with the Service.</p> <p>b) Perform Enhanced Fatality Monitoring during the next 5-year review period (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period).</p> <p><i>Note: if Trigger 4 is met simultaneous to meeting a previous Trigger (i.e. if Trigger 4 is met for the first time at the same time that Trigger 1, 2, or 3 is met for the first time), the measures listed under Trigger 4 will be required, but the implementation of measures under previous triggers will be at the discretion of the permittee.</i></p>
<p>Trigger 5</p>	<p>The average site-wide probability of detection of 0.35 is not achieved in any 5-year period during the permit tenure, as determined by the Service. OR Enhanced monitoring, if required through adaptive management, does not achieve an average site-wide probability of detection of 0.5 during the required 5-year period, as determined by the Service. OR If searcher efficiency rates are not quantifiable, through bias trials, for every search method in every year of the 5-year period, as determined by the Migratory Bird Permit Office.</p>				<p>At the beginning of the next 5-year review period, Perform Enhanced Fatality (i.e. achieve an average site-wide probability of detection of 0.5 over the subsequent 5-year review period).</p>
<p>Trigger 6</p>	<p>A new Golden Eagle nest is discovered within 1 mile of any project turbine OR A new Bald Eagle nest is discovered within 0.5 miles of any project turbine</p>				<p>Immediately upon meeting this trigger, implement all of the following:</p> <p>a) Immediately report the discovery of the new nest to the Service and discuss, in consultation with the Service, the potential impacts of project-related activities, if any, on the nesting eagles, and whether temporary or permanent nest take may be appropriate.</p> <p>b) Effectively immediately, do not conduct activities that are not in response to a safety emergency (50</p>

		<p>CFR 22.3) or essential turbine maintenance if the activities 1) will occur within 1 mile of an in-use Golden Eagle nest during the nesting season (Jan 1 to Aug 31) and is within line-of-sight of the nest, 2) will occur within 0.5 miles of an in-use Golden Eagle nest during the nesting season (Jan 1 to Aug 31), or 3) will occur within 660 feet of an in-use Bald Eagle nest during the nesting season (Jan 1 to Aug 31). This restriction must remain in place until coordination with the Service occurs while minimizing the risk of nest disturbance. This may include implementation of practical measures to avoid nest disturbance, or the issuance of a nest disturbance permit (50 CFR 22.26) if no practical avoidance measures can be implemented.</p> <p>c) Monitor the nest status twice annually to determine if it is in-use and if it was successful. If in-use, monitor the eagle activity surrounding the nest once every 10 years (in a year when the nest is in-use) to determine if the territory or home-range associated with the nest is likely to overlap the project footprint. At a minimum, this would entail conducting one point count for one full day (sunrise to sunset) every week for the duration of the breeding season (from the date the nest is determined to be in-use until Aug 31) or as long as the nest remains in-use during that season. The survey would be performed at a strategically placed point to determine if and how frequently one or both adults and/or fledglings (if applicable) are entering the project footprint and how often this may be occurring. In addition, if the nest produces nestlings, those nestlings must be banded with federal (USGS) aluminum bands if it is safe to do so. Another method(s) could be used to satisfy this requirement but must be approved by the Service prior to implementation.</p>
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3.3.3.5. 5-Year Reviews

Identical to Alternative 2, under Alternative 3, the Service would undertake an administrative permit review at least once every 5 years throughout the permit tenure, in accordance with 50 CFR 22.26(c)(7)(iii). In aid of that review, the permittee would compile, and submit to the Service, eagle fatality data and other pertinent information that is specific to the project at least 90 days prior to each review meeting. This information includes a summary of the number of total operational daylight hours at the project (at each turbine or summed across all turbines) each year since permit issuance, or since the last 5-year review, including how those hours were estimated. The data supplied to the Service will be used to inform the Service's collision risk estimates for the subsequent 5-year period. In addition to the site-specific data provided, the Service would also use other best available information when re-evaluating predicted take at each 5-year review.

3.3.4. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

3.3.4.1. Issue Permit with Additional Conditions

The Service considered an alternative to issue an eagle take permit with additional conditions beyond those outlined in Alternatives 2 and 3 that might further reduce effects to eagles, including avoidance and minimization measures, monitoring, compensatory mitigation, and/or adaptive management strategies. The additional avoidance and minimization measures the Service considered included:

- The use of artificial intelligence technology during wind turbine operations for the entire permit tenure to improve turbine curtailment when eagles are detected near the Project.
- Increasing the ratio to offset take through compensatory mitigation from 1.2:1 to greater than 2:1.
- Alternative compensatory mitigation methods other than pole retrofits. These methods have not yet been approved for offsetting Golden Eagle take.
- Increasing the fatality monitoring requirements to include additional years of eagle remains searches, searcher efficiency trials, and carcass persistence trials during the permit term.

The additional conditions considered under this alternative were eliminated from further consideration because Alternative 3 already analyzes a take offset ratio of 2:1 through compensatory mitigation, which is greater than the ratio required under the Eagle Act (USFWS 2016b). Similarly, Alternative 3 already analyzes the impacts of additional turbine curtailment to reduce the risk to eagles. Such curtailment is not required under the Eagle Act (USFWS 2016b).

3.3.4.2. Issue a permit for less than a 5-year duration

Under current regulations, an eagle take permit can be issued for any duration up to 30-years. Long-term activities, such as wind projects, are required to apply for long-term permits (≥ 5 years) because the nature of these activities requires longer-term monitoring, adaptive management, and potentially compensatory mitigation to comply with the BGEPA. Therefore, this alternative was dismissed from further consideration.

3.3.4.3. Issue a permit for a 5-year duration

Under current regulations, an eagle take permit can be issued for any duration up to 30-years. A 5-year duration permit would only extend through part of the expected life of the Project and would be considered a partial-denial of the permit application, as the applicant requested a duration of 30 years. A permit may be partially denied if (1) the application does not meet one or more of the issuance criteria described in Section 2.2.1 and 2.2.2, or (2) the risk of eagle mortality from operating the wind turbines is so low that a permit is not warranted. Conservation benefits to eagles and other raptor species would be limited to the 5-year permit tenure.

Chapter 4.0 Affected Environment

4.1. Introduction

The action of issuing an eagle take permit at an existing facility will affect relatively few specific resources aside from both eagle species and species that might also incidentally benefit from any permit conditions. This chapter therefore is limited to a description of the general environment of the Project and some of the wildlife found there, including both eagle species. This section also describes tribal interests and cultural resources that might be affected by the Federal action.

For further information about the general environment of the Project, we note that the Bonneville Power Administration (BPA) previously assessed the environmental effects of the Goodnoe Hills Wind Project when deciding whether to interconnect the project to BPA electrical transmission system. BPA's NEPA analysis, which we incorporate by reference here, provides a broad overview of the affected environment of the wind project generally (USDOE 2005).

4.2. Physical Environment

The Goodnoe Hills Project Area is located within the Columbia Plateau Level III Ecoregion. The Project is dominated by a mosaic of livestock modified grassland and shrub-steppe habitats with inclusions of ponderosa pine (*Pinus ponderosa*)-Oregon white oak (*Quercus garryana*) woodlands on the Columbia Hills Ridgeline's north facing slopes. The dominant land cover within the Project is shrub/scrub (~74%); followed by grassland/herbaceous (19%), cultivated crops (3%), developed, open space (2%), deciduous forest (1%), and evergreen forest (1%). The remaining less than 1% is composed of mixed forest, woody wetlands, emergent herbaceous wetlands, and developed, low intensity land cover types (Figure 2).

4.3. Other Wildlife

Of the over 40 federally listed threatened or endangered species that occur in the State of Washington, the yellow-billed cuckoo (Threatened; *Coccyzus americanus*) and bull trout

(Threatened; *Salvelinus confluentus*) are the only species listing under the ESA that has the potential to occur within the Project Area.

Historically, the yellow-billed cuckoo bred throughout much of North America; however, populations west of the Rocky Mountains have declined substantially in the last 50 years. Loss of streamside habitat is regarded as the primary reason for the population decline. Historical records show that breeding cuckoos were most often observed in willow bottoms along major river corridors. The Project area lacks suitable habitat for yellow-billed cuckoos, and we are aware of no recorded observations/sightings in Klickitat County. The Project area is also unlikely to be in a cuckoo migratory corridor, as this species is considered extirpated in Washington.

Bull Trout may potentially occur near the Project; however, there is no critical habitat within the footprint of the Project or within the adjacent Rock Creek watershed. Construction of the Project did not have, and continued operation of the Project will not have significant impacts on this fish species because of the lack of suitable fish habitat within the Project. The issuance of a 30-year eagle take permit will have no effect on bull trout should they occur in the vicinity.

Of the 34 species of birds on the list of Birds of Conservation Concern in BCR 9, only two, Northern Harrier (*Circus cyaneus*) and Short-eared Owl (*Asio flammeus*), may occasionally occur in the Project area. However, the issuance of a 30-year eagle take permit will have no effect on these species should they occur in the vicinity.

Bat fatality monitoring occurred from February 2009 to January 2010. PacifiCorp's adjusted bat fatality estimate was 0.68 bats/turbine/year (Appendix A). To calculate the potential risk from the increase in turbine blade dimensions, PacifiCorp calculated the proposed increase in rotor swept area and applied that increase to the reported fatality rate. The proportion increase was estimated at 57%, and the predicted fatality rate for the new turbine blades is 1.07 bats/turbine/year (Appendix A; 51 bats total per year). PacifiCorp monitors bat fatalities at turbines during monthly carcass searches.

4.4. Golden Eagles and Bald Eagles

4.4.1. GOLDEN EAGLE

Golden Eagle habitat generally includes open to semi-open terrain where they can effectively find and capture prey. Typical habitats are often associated with areas containing some topographic relief, such as rolling foothills and mountainous areas, but Golden Eagles also utilize flatter areas (e.g., sagebrush flats and agricultural fields). Golden Eagles most often nest on cliffs or rocky outcrops, but may also nest in trees or on manmade structures where high quality cliff sites are limited. Golden Eagles primarily prey on lagomorphs (e.g., hares and rabbits) and rodents (e.g., ground squirrels), but will also take other mammals, birds, and reptiles. Golden Eagles will also take advantage of carrion when available. Generally, any area that harbors suitable prey species may be utilized by Golden Eagles.

4.4.1.1. Population Status

Golden Eagles are distributed throughout much of North America, but the species is most abundant west of 100° W longitude, occurring from the arctic slope to central Mexico (Kochert et al. 2002). In our 2009 Eagle Rule final environmental assessment, we estimated the total Golden Eagle population in the western United States (west of approximately 100° west longitude) to be 32,593 eagles (USFWS 2009; USFWS 2016c). Millsap et al. (2013) estimated the population of Golden Eagles for the most recent decade for the western United States to be 31,370 to 33,460 Golden Eagles. A recent survey of the western US population of Golden Eagles, not including California, resulted in a population estimate of 18,446 eagles (90% confidence interval: 14,811 to 23,588) in summer 2014 and 35,494 (29,689-43,809) in mid-winter of 2015 (Neilson et al. 2012). According to the Service's 2016 eagle status report, the Golden Eagle population for the Pacific Flyway is estimated to be 15,927 (USFWS 2016c). Within BCR 9 (Great Basin), in which the Project is located, the summer 2014 population was estimated to be 5,904 (3,918 – 8,432), while the mid-winter population was estimated to be 9,717 (7,504 – 12,678 (Neilson et al. 2012). The population size of the LAP is estimated by applying the density estimates for EMUs to the LAP area (USFWS 2016b). Using these densities, we estimate the LAP of Golden Eagles (i.e., those birds within 175 km [109 miles] of the project) to be 640.49 Golden Eagles.

4.4.1.2. Golden Eagle Occurrence at the Goodnoe Hills Wind Facility

Golden Eagles are known to nest near the Project, and some use in the Project vicinity by Golden Eagles was documented during pre- and post-construction surveys. The Project does not appear to contain any high quality Golden Eagle foraging or nesting habitat, as it consists primarily of shrub-scrub and livestock-modified grasslands, but Golden Eagles may hunt for jackrabbits and other prey within these land cover types within the Project Area.

No pre-construction avian use surveys were performed for the Project. However, fixed-point avian use surveys (variable circular plots) were conducted at the Hoctor Ridge and Imrie wind farms, which are in the vicinity of the Project, during April – June 2006 (Johnson et al 2006a, 2006b), and again at the Imrie site from September 2007 – October 2010 (Enz et al. 2011).

Hoctor Ridge Fixed Point Surveys: Four Hoctor Ridge avian point count stations were located within one km of Project turbines. Point counts were surveyed once per week during April 11 – June 11. No eagles were observed during any of the avian point count surveys at Hoctor Ridge in 2006 (Johnson et al. 2006a), although these surveys only covered 2 months of a single year.

Imrie Fixed Point Surveys: During 2006, 10 avian point count stations were surveyed once per week during April 11-June 11. No eagles were observed at these 10 stations, although these surveys only covered 2 months of a single year. During surveys in 2007-2010, 10 Golden Eagle and 12 Bald Eagles were observed at 13 point count stations. The combined mean eagle use at the point was 0.03 eagles/20-minute survey. Of the 10 total Golden Eagles observed during the study period, 83% were flying within the roto-swept height (RSH) based on first flight height recorded; and 12 total Bald Eagles were observed flying with 58% within the RSH based on first flight height recorded (Enz et al. 2011). The Imrie exposure indices for Golden Eagles and bald eagles were relatively low (0.03 and 0.02, respectively) compared to red-tailed hawk (*Buteo*

jamaicensis, 0.16), the raptor species with the highest exposure index. An additional 8 Bald Eagles and 3 Golden Eagles were observed incidentally during 2007, 2008, and 2010 avian use surveys at Imrie. Overall, eagle use was spread throughout the Imrie survey area (from the southern border of Goodnoe Hills south to the Columbia River) with no apparent concentration areas (Appendix A; Enz et al. 2011).

Avian raptor nest surveys were conducted by foot and vehicle at Hoctor Ridge in April and June 2006 (Johnson et al. 2006a, 2006b). Aerial raptor nest surveys were conducted within a 2-mile buffer of Imrie in April and May, 2010 (Enz and Bay 2010). No eagle nests or observations of Golden Eagles were recorded during raptor nest surveys at Hoctor Ridge or Imrie, or their survey buffers that overlap the Project.

Post-construction standardized and informal remains searches were conducted in 2009 following the construction of the Goodnoe Hills Wind Project, and again in 2018-2019 in order to estimate and evaluate project-related impacts on birds (Appendix A). One juvenile Golden Eagle fatality was documented during standardized carcass searches in 2009. No eagle fatalities were found during the 2018-2019 standardized carcass searches. PacifiCorp has conducted vehicle and walking inspection surveys once per month at all Project turbines since January 2013. One Golden Eagle fatality has been documented during these searches. In summary, two Golden Eagle fatalities have been documented at the Project. These two fatalities were not located in the vicinity of each other.

4.4.2. BALD EAGLE

Bald Eagles typically nest along forested coasts, rivers, streams, reservoirs, and lakes (Buehler 2000) where they primarily prey on fish and waterfowl during the breeding season. Nest sites are often associated with riparian areas or forests where they utilize mature or old-growth trees and snags to support their large nests (Buehler 2000) located near these primary foraging areas. Bald Eagles may also nest on cliffs, rocky outcrops, manmade structures, and even on the ground, but these nest substrates are less common.

Bald Eagles are also opportunistic foragers and may hunt and/or scavenge mammalian, avian, and reptilian prey in upland areas more distant from the larger water bodies or fish bearing streams considered their more preferred foraging areas (Buehler 2000). Bald Eagle populations have expanded significantly in recent decades, which led to their removal from the endangered species list in 2007 (USFWS 2007).

4.4.2.1. Population Status

The Service and its partner agencies manage for migratory birds based on specific migratory route paths within North America (Atlantic, Mississippi, Central, and Pacific). Based on those route paths, State and Federal agencies developed the four administrative flyways that are used to manage migratory bird resources. For Bald Eagles, the Pacific Flyway is divided into three EMUs: southwest (south of 40 degrees N latitude), mid-latitude (north of 40 degrees to the Canadian border), and Alaska (USFWS 2016b). The Project is located in the Pacific Flyway North EMU.

Recent analysis conducted by the U.S. Fish and Wildlife Service estimates the median population size of Bald Eagles in the coterminous United States (excluding the southwest) to be 316,708 individuals; this is a 4.4 fold increase from 2009 estimates (USFWS 2020). The estimated median population size in the Pacific Flyway North EMU is 42,068 (USFWS 2020). These estimates were derived using: 1) estimates of the number of bald eagle nesting territories from 2018-2019 survey data, 2) bald eagle relative abundance estimates from eBird models and data, and 3) an updated analysis of bald eagle vital rates (USFWS 2020).

Using a different data source, the U.S. Geological Survey Breeding Bird Survey index trend estimate for the Bald Eagle over the entire Breeding Bird Survey coverage area between 1966 and 2012 is 5.3 percent (95-percent credible interval = 4.1–6.6 percent). The trend estimate for the coverage area that includes Alaska is 0.08 percent (95-percent credible interval = -8.41–5.44 percent) (USFWS 2016c). The number of Bald Eagles in the United States outside the Southwest (including Alaska) is predicted to continue to increase until populations reach an equilibrium at about 228,000 (20th quantile = 197,000) individuals (USFWS 2016c).

The population size of the LAP (Section 2.5.1) is estimated by applying density estimates for EMUs to the overlapping LAP area (USFWS 2016b). Using these densities, we estimate the LAP of Bald Eagles (i.e., those birds within 138 km [86 miles] of the project) to be 565.34 Bald Eagles.

4.4.2.2. *Bald Eagle Occurrence at the Goodnoe Hills Wind Facility*

The Project Area appears to contain relatively little high-quality Bald Eagle foraging or nesting habitat. No Bald Eagle nests have been documented within 10 miles of the Project. No pre-construction avian use surveys were performed for the Project. However, fixed-point avian use surveys (variable circular plots) were conducted at the Hoctor Ridge and Imrie wind farms, which are in the vicinity of the Project, during April – June 2006 (Johnson et al 2006a, 2006b), and again at the Imrie site from September 2007 – October 2010 (Enz et al. 2011).

No Bald Eagles were observed during any of the avian point count surveys at Hoctor Ridge or Imrie in 2006 (Johnson et al. 2006a), although these surveys only covered 2 months of a single year. Twelve Bald Eagles were observed during the Imrie fixed-point avian use surveys in 2007-2010. The combined mean eagle use (Golden Eagle and Bald Eagle) at the plot was 0.03 eagles/20-minute survey. Twelve total Bald Eagles were observed during the entire Imrie survey flying with 58% within the RSH based on first flight height recorded (Enz et al. 2011). The Imrie exposure indices for Golden Eagles and Bald Eagles were relatively low (0.03 and 0.02, respectively) compared to red-tailed hawk (*Buteo jamaicensis*, 0.16), the raptor species with the highest exposure index. An additional 8 Bald Eagles were observed incidentally during 2007, 2008, and 2010 avian use surveys at Imrie. Eagle use was spread throughout the Imrie survey area with no apparent concentration areas (Appendix A; Enz et al. 2011).

Post-construction standardized and informal remains searches were conducted in 2009 following the construction of the Goodnoe Hills Wind Project, and again in 2018-2019 in order to estimate and evaluate project-related impacts on birds (Appendix A). No Bald Eagles were documented during these surveys. No eagle fatalities were found during the 2018-2019 standardized carcass searches. PacifiCorp has conducted vehicle and walking inspection surveys once per month at all

Project turbines since January 2013. No Bald Eagle fatalities have been documented during these searches or incidentally since project operations began.

4.5. Migratory Birds

Large raptors and a few other large birds might benefit from the required avoidance and minimization measures, the compensatory mitigation (power pole retrofits or other approved strategies), and the adaptive management (if implemented). We do not expect other species of birds to be affected by the Federal action being considered in this document. With or without the eagle take permit, the Project will continue to operate in the same manner fundamentally, and any effects to wildlife will be unchanged by this permit action except as noted below.

4.5.1. RAPTORS AND OTHER LARGE BIRDS

Several large non-eagle raptors occur in this landscape, including Swainson's (spring and summer only), Red-tailed, Ferruginous, and Rough-legged Hawks (winter only). These species, with relatively long wingspans, all share the habit of perching on power poles, which puts them at some risk of electrocution as it does for eagles. Great Horned Owls and Common Ravens fit this category as well. Each of these species may benefit from compensatory mitigation actions, such as power pole retrofits, under Alternatives 2 and 3 (see Section 3.3.2). Peregrine Falcon and Burrowing Owl are also species that may utilize the Project Area. The other species all have relatively robust stable or increasing populations (Sauer et al. 2017, Partners in Flight 2019).

4.6. Tribal Traditional Uses/Native American Religious Concerns and Cultural Resources

The federal government has a unique responsibility and obligation to consider and consult with Native American Tribes on potential effects to resources that may have religious and cultural importance to Tribes. Eagles, eagle feathers, and eagle nests in particular may all be of interest and importance to area tribes; and eagles and their feathers are considered sacred in many Native American traditions. Under the Eagle Act and our implementing regulations, we may issue permits authorizing the taking, possession, and transportation of eagles, eagle parts, or eagle nests for Indian religious use, see 50 CFR 22.22. In addition, if eagle remains are found, they are sent to the Service's National Eagle Repository. If in good condition, the remains are distributed to permitted members of federally recognized tribes. See also the discussion of this topic in the PEIS (Section 3.7.1.4).

In addition, issuance of an eagle take permit is an undertaking under the National Historic Preservation Action, which requires consideration of effects of the permit issuance on historic and cultural resources as those are defined under the NHPA and implementing regulations at 36 CFR Part 800. The project area has already been surveyed for cultural resources in a prior analysis and no cultural resources or historic properties were found (see USDOE 2005).

Chapter 5.0 Environmental Consequences

5.1. Introduction

This chapter addresses the potential environmental consequences of implementing each alternative. Under both Alternatives 2 and 3, the permit term would be 30 years so the direct and indirect effects analyzed are considered over the expected life of the project. If an eagle take permit is issued under Alternatives 2 or 3, we will have periodic administrative permit reviews at intervals not greater than every 5 years. Each review would include, among other things, a re-evaluation of eagle take and required compensatory mitigation at the Project sites, the effectiveness of adaptive management measures implemented, the status and trends of eagle populations, and the continued accuracy of the potential effects analyzed in this NEPA document.

Effects of the alternatives are addressed in this chapter (see 40 CFR 1508.1 for definitions). Since the Project is fully built and operational, the effects associated with developing and constructing a wind project (USDOE 2005) are not further considered here. We note that “cumulative effects” as a definition for purposes of NEPA analyses has been repealed (see 40 CFR 1508.1(g)(3)). Nonetheless, because “cumulative effects” of other permitted take and other factors affecting eagle populations within an EMU is something we must determine as a requirement of our regulations implementing the Eagle Act (see 50 CFR 22.26(f), we address “cumulative effects” for purposes of the Eagle Act in Chapter 6.

5.2. Effects Common to All Alternatives

This section includes a description of the potential effects on resources that would result from implementation of any of the alternatives. These effects establish a baseline for the alternative-specific effects that follow, and are therefore not repeated for each alternative.

5.2.1. GOLDEN EAGLES AND BALD EAGLES

As part of the eagle take permit application review process, we are required by regulation (50 CFR 22.26(f)(1)) to evaluate and consider effects of issuing eagle incidental take permits on eagle populations at two scales: (1) the eagle management unit, and (2) local area (USFWS 2016a). We address the direct and indirect effects on Golden Eagles and Bald Eagles in the context of these two scales. All three alternatives have the potential to result in the future take of eagles, whether permitted or not.

5.2.1.1. *Collisions with Wind Turbine Blades*

The primary risk to eagles under all of the alternatives is from collision with rotating turbine blades. Mortality or injury is the direct adverse effect of eagles colliding with turbine blades. Two Golden Eagle fatalities have been documented since the Project became operational and it

remains possible that additional eagles have been injured/killed but their remains not detected. We expect periodic eagle fatalities are likely to occur during the life of the Project, due to the presence of Golden Eagles near the Project.

We developed predictions for the annual rates of Golden Eagle and Bald Eagle fatalities at the Project using our Collision Risk Model (Appendix B). This model predicts only the number of eagles likely to be killed by collision with wind turbines and does not predict impacts to eagles from nest disturbance or loss of productivity due to the death of breeding adults. The annual fatality estimates of 3.01 Golden Eagles and 3.01 Bald Eagles under Alternative 2 are 0.47% and 0.53%, respectively, of the LAP (see Chapter 6). The annual fatality estimates of 2.70 Golden Eagles and 2.70 Bald Eagles under Alternative 3 are 0.42% and 0.48%, respectively, of the LAP (see Chapter 6).

5.2.1.2. *Other Project-related Risks to Eagles*

Eagles are unlikely to be injured or killed by colliding with other Project structures, such as MET towers and overhead power lines, although collisions with these kinds of structures sometimes do occur (Erickson et al. 2001; APLIC 2012). Below is a list of Project structures or activities that could pose collision risk or nest disturbance risk to Bald Eagles and the reasons why we believe this risk is relatively low.

- Permanent MET towers installed at the Project do not have guy wires and pose a minimal risk of collision to eagles.
- Electrocution risk is negligible since all electrical collection lines for the Project are buried, and the aboveground 230-kV powerline has been designed following raptor-safe methods (APLIC 2006); therefore, risk of collision with Project collector and transmission lines is expected to be low.
- Project vehicles are driven throughout the site on a regular basis. Eagles are attracted to and often scavenge on animal carcasses on and near roads (roadkill). This behavior can lead to injury and mortality of eagles through vehicle collisions. However, speed limits on site, and regular removal of roadkill and other attractants to eagles, are designed to reduce this risk. Therefore, we predict that the risk of eagle injury and mortality from vehicle collisions at this Project will be low.
- Additional repowering or decommissioning will occur at the Project at some point in the future, regardless of the alternative selected. Activities could pose a risk to eagles through an increase in operations and maintenance activity, and human presence in the project footprint. This increase in activity and human presence could increase the risk of nest disturbance or behavioral alteration of eagles that might use the project footprint. At present, there are no known eagle nests within 10 miles of the project footprint. Thus, if present territory configurations surrounding the project remain, the risk is low to eagles from repowering or decommissioning. Should PacifiCorp wish to obtain authorization for eagle take incidental to future repowering or decommissioning activities or the subsequent operation of repowered turbines (in the event they repower again), they would need to apply for a new eagle take permit or amend any existing permit. At the time of application, we would review the details of their proposed activity and assess any likely impacts to eagles.

There have been no eagle breeding areas documented within 10 miles of the Project Area, and operations and maintenance activities within the project footprint are unlikely to disturb eagles. No concentration areas or migration corridors are known to exist within or within the vicinity of the project footprint.

5.2.2. FEDERALLY ENDANGERED AND THREATENED SPECIES

Turbine operations, and any effects on wildlife or plant populations, will occur whether or not a permit is issued; therefore, this criterion is not being evaluated across Alternatives. The issuance of an eagle take permit will not affect ESA-listed species or critical habitats. Any potential effects to ESA-listed species and critical habitats due to compensatory mitigation actions occurring under Alternatives 2 and 3 is evaluated in Sections 5.4.3 and 5.5.3, respectively.

5.3. Alternative 1 – No Action

Under the No Action Alternative, in which we do not issue an eagle take, the Project would continue to operate under their current operational plan with recently repowered turbines as described in Chapter 1. Therefore, under this alternative, PacifiCorp would continue to implement conservation measures, best management practices (BMPs), and incidental monitoring, report all avian and bat fatalities under their SPUT permit, and manage avian issues and concerns consistent with PacifiCorp's APP. However, the eagle-specific conservation measures, fatality monitoring, compensatory mitigation, and adaptive management described above under Alternatives 2 and 3 would not be implemented, and we would have no authority to require implementation of these measures.

5.3.1. EAGLES

Under Alternatives 1 fatality rates (at the upper 80th quantile) from collision with Project turbine blades for Golden Eagles and Bald Eagles are predicted to be 3.01 Golden Eagles per year, and 3.01 Bald Eagles per year (Table 3, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 90.3 Golden Eagles and 90.3 Bald Eagles (both estimates rounded up to 91 eagles). The fatality rates due to only the repowering of the Project are predicted to be 0.88 Golden Eagles per year, and 0.88 Bald Eagles per year (Table 3, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 26.4 Golden Eagles and 26.4 Bald Eagles (both estimates rounded up to 27).

This level of mortality would be experienced at both the LAP and EMU scales. Our conservative assumption is that these mortalities are generally considered additive, meaning that these individual eagles would otherwise have survived a normal lifespan (USFWS 2016c).

Under this alternative, monitoring for eagle fatalities would consist only of incidental finds by trained project operations staff. Reporting would occur as outlined under both the WIRHS and voluntary SPUT Permit. If an eagle fatality is documented, such take would be unauthorized and in violation of the Eagle Act and would be a matter for our law enforcement to address. The

Service would not have the ability to require offsetting mitigation to offset take occurring at the project; thus, there would be a net loss of eagles under this alternative.

The benefits to eagles that would occur under Alternatives 2 and 3 from required conservation measures, fatality monitoring, and adaptive management would not occur under the No-Action Alternative. Additionally, no compensatory mitigation would be required to offset take of eagles under Alternative 1.

5.3.2. RAPTORS AND OTHER LARGE BIRDS

Under Alternative 1, raptors and other large birds that would benefit from power pole retrofits or any other compensatory mitigation strategy designed to reduce electrocution risk to eagles, as would occur under the other alternatives, would not receive those benefits. If power pole retrofits were completed to offset take under Alternatives 2 and 3, more raptors are likely to be electrocuted under this alternative. The number of birds saved by pole retrofits under Alternatives 2 and 3 would be challenging to quantify, however, as there are not good data around baseline electrocution rates of large birds in Washington or the Pacific Northwest.

5.3.3. FEDERALLY ENDANGERED AND THREATENED SPECIES

Turbine operations, and any effects on wildlife or plant populations, will occur whether or not a permit is issued; therefore, this criterion is not being evaluated across Alternatives. Denying an eagle take permit would not threaten other wildlife or plant populations not currently protected under the Endangered Species Act. No compensatory mitigation would be occurring under Alternative 1; therefore, no actions unique to this alternative will have effects on ESA-listed species or critical habitats.

5.3.4. TRIBAL TRADITIONAL USES/NATIVE AMERICAN RELIGIOUS CONCERNS AND CULTURAL RESOURCES

Selection of Alternative 1 is not expected to substantially interfere with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. Since eagle remains that are found at the Project must be sent to the Service's National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes, eagle remains will still be made available for cultural practices and ceremonies. However, if we select the No Action Alternative, PacifiCorp will not be required to implement operational monitoring. And although on-site staff may continue to report eagle fatalities found incidentally, without regular monitoring it is likely that a smaller percentage of eagle remains will be found. This would reduce the number of eagles collected and available to Native Americans for their use for ceremonial purposes.

Alternative 1 also would not require PacifiCorp to mitigate for predicted eagle mortality at their facility, which would result in a net loss to eagle populations. Because all eagle take associated with the project would be unauthorized under this alternative, such takes would be a violation of the Eagle Act. Unauthorized take of eagles would likely be concerning to many tribes because of the overall cultural importance of eagles.

Under this alternative, there would be no permit issued, and therefore no federal undertaking under the NHPA.

5.4. Alternative 2 – Issue 30-Year Permit based on the ECP

Under this alternative, a 30-year eagle take permit would be issued authorizing the incidental take of Golden Eagles and Bald Eagles associated with the Project pursuant to 50 CFR 22.26. The permit would be for the incidental take of up to 91 Golden Eagles and 91 Bald Eagles during the 30-year permit period. The 30-year permit would incorporate, as permit conditions, the avoidance and minimization measures, monitoring, compensatory mitigation, and adaptive management described above that PacifiCorp developed through coordination with the Service. We evaluate these measures for the 30-year permit term and assume they would be implemented over the life of the Project.

5.4.1. EAGLES

Fatality rate predictions are the same as under Alternative 1 (see Section 5.3.1). PacifiCorp would commit to implementing operational eagle fatality monitoring throughout the permit tenure and for the expected life of the project. The specifics of this fatality monitoring method would be determined by PacifiCorp but they would be required to achieve, at a minimum, an average site-wide probability of detection of 0.35 (35%) over each 5-year period and include carcass persistence and searcher efficiency trials as described in Chapter 3. If adaptive management triggers are met, monitoring effort would increase. Fatality monitoring at this temporal scale (life of project) would provide better opportunity for learning about long-term risk to eagles at wind facilities in the Pacific Northwest and beyond, improving the Service's ability to predict fatalities at wind projects across the landscape (i.e. update the priors used in the CRM). Additionally, monitoring at this temporal scale would allow the Service to update periodically the fatality prediction over the life of the project to reflect the best available information.

As described in detail in Chapter 3, compensatory mitigation implemented under Alternative 2 could be scheduled/conducted under a range of mitigation completion schedules and retrofit longevity proposals (Table 4). This compensatory mitigation could be implemented in 5 year increments, completed for the entire permit term upfront, or could be completed using another Service-approved mitigation strategy. In any case, take would be offset using a 1.2:1 ratio, based on the preservation standard of the Eagle Act (PEIS; USFWS 2016c). Under all scenarios in Section 3.3.2.2, Alternative 2 results in a lower number of total power pole retrofits (or other mitigation) compared to Alternative 3, where required compensatory mitigation is based on a higher mitigation ratio (2:1), albeit a lower fatality estimate due to additional eagle conservation measures reducing the estimated take. It is impossible to predict whether the birds saved through pole retrofitting would be breeding adults, juveniles, or floaters (non-breeding adults); however, our resource equivalency analysis (REA) assumes that the losses due to electrocution are proportional to the demographic distribution of the population and therefore similar to the demographics of those taken from wind turbines. Any other mitigation strategies that are

approved by the Service would also be required to provide a net benefit for eagles for the duration of the permit. As such, compensatory mitigation required under this alternative would offset take of Golden Eagles at a lower level than what would occur under Alternative 3, but would be compatible with the preservation standard of the Eagle Act. Increased compensatory mitigation beyond meeting the preservation standard may be consistent with the goals of maintaining or improving eagle populations, but may not be practicable for the applicant, and is not required under the Eagle Act (USFWS 2016b). As evaluated in the PEIS, the 1.2:1 mitigation ratio is thought to appropriately balance what is reasonable and practicable for permittees with the biological needs of the species, consistent with the Eagle Act. Based on the uncertainty in the effectiveness of a particular compensatory mitigation practice, the Service has the authority to require further adjustments to mitigation ratios to provide a buffer in the event that the planned mitigation is less effective than anticipated. However, at this time, the Service does not have sufficient information to determine whether pole retrofit mitigation is less effective than anticipated.

As under Alternative 2, fatality rates higher than predicted would be addressed through the adaptive management process, which requires additional conservation measures should evidence suggest eagle take rates may result in exceedance of authorized take.

Under Alternative 2, PacifiCorp would be applying all appropriate and practicable avoidance and minimization measures to reduce impacts to eagles, and would be applying all appropriate and practicable compensatory mitigation to compensate for the remaining unavoidable impacts for the life of the Project.

Based on the intensity and context of these effects and consideration of the elements associated with this alternative, Alternative 2 is not expected to result in significant adverse effects to populations of Golden Eagles or Bald Eagles, and is expected to meet the Service's eagle preservation standard at the EMU and LAP scale (See Chapter 6) for the first 5 years and for the life of the Project.

5.4.2. RAPTORS AND OTHER LARGE BIRDS

There would be a parallel effect on large birds as for eagles under this alternative. If pole retrofits are completed to offset take, we expect there to be fewer electrocuted hawks and owls under this alternative than under the No Action Alternative. The number of birds affected would be challenging to quantify, however, as there are not good data around baseline electrocution rates of other large birds. Other mitigation strategies used to offset mitigation are likely to be either net neutral or provide some benefit to raptors and other large birds.

5.4.3. FEDERALLY ENDANGERED AND THREATENED SPECIES

The issuance of an eagle take permit would not threaten other wildlife or plant populations not currently protected under the Endangered Species Act. Turbine operations, and any effects on wildlife or plant populations, will occur whether or not a permit is issued. The Project is already operational and permit issuance will not cause disturbance to riverine habitats or watersheds.

Compensatory mitigation would be required to offset take of Golden Eagles under Alternative 2. The location and types of power pole retrofits under this alternative would be provided to the Service in a Pre-Retrofit Plan (or have already been provided during approval of the compensatory mitigation credits described in Section 1.2.3). The Service would then evaluate the effects of the proposed retrofits on ESA-listed species and critical habitats at that time as appropriate.

5.4.4. TRIBAL TRADITIONAL USES/NATIVE AMERICAN RELIGIOUS CONCERNS AND CULTURAL RESOURCES

Selection of Alternative 2 is not expected to substantially interfere with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. Since eagle remains that are found at the Project must be sent to the Service's National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes, eagle remains are being made available for cultural practices and ceremonies. However, with a requirement for fatality monitoring that extends through the expected life of the project, more eagle remains will be discovered compared to Alternative 1. More eagle remains may be found under Alternatives 2 and 3, increasing the number of eagles collected and available to Native Americans over time for their use for ceremonial purposes.

This alternative, because it may require the permittee to undertake future pole retrofits as compensatory mitigation, may have the potential to affect historic and cultural resources because of the pole retrofits (i.e., if the retrofit requires pole relocation and that relocation requires associated ground-disturbing activity). This would not occur within the Project area, however, as there are no high risk poles within the Project area. All electrical collection lines for the Project are buried and the aboveground 230-kV power line has been designed following APLIC guidelines.

Any future power pole retrofits as compensatory mitigation would occur offsite, anywhere within the multi-state Pacific Flyway EMU. The need for power pole retrofits as compensatory mitigation could increase the risk of disturbance of cultural resources and historic properties compared to Alternative 1; however, because pole replacements are likely to be a rare component of required retrofits and the activities associated with retrofitting poles will involve the use of standard utility equipment on existing service roads and in previously disturbed habitat, no impacts to cultural resources or historic properties are expected. Nonetheless, PacifiCorp has agreed to conduct a cultural resources assessment for each power pole they select for retrofitting if pole replacement is necessary. A report from these assessments at all selected poles would be provided to the Service as part of the approval process for the compensatory mitigation method. Based on that information, the Service would consult with interested Indian tribes and the State Historic Preservation Officer (in the relevant State) at that time as appropriate.

Based on information available, the Service does not anticipate that issuance of a permit will preclude issuance of another permit necessary to protect an interest of higher priority, including: 1) a safety emergency, 2) increased need for traditionally practiced Native American tribal

religious use that requires taking eagles from the wild, 3) a non-emergency activity necessary to ensure public health and safety, and 4) other interest (50 CFR 22.26(e)(7)).

5.5. Alternative 3 – Issue 30-Year Permit with Additional Eagle Conservation Measures

Under this alternative, a 30-year eagle take permit would be issued authorizing the incidental take of Golden Eagles and Bald Eagles associated with the Project pursuant to 50 CFR 22.26. The permit would be for the incidental take of up to 81 Golden Eagles and 81 Bald Eagles during the 30-year permit period. The 30-year permit would incorporate, as permit conditions, the avoidance and minimization measures, monitoring, compensatory mitigation, and adaptive management described in Alternative 2 that PacifiCorp developed through coordination with the Service. Additionally, two conservation measures would be required throughout the permit tenure to further avoid, and mitigate for, the take of eagles (50 CFR 22.26(f)(4,5)). First, wind turbines would be curtailed for a total of 17,544.1 daylight hours each year across all turbines in order to achieve a 10% reduction in predicted fatalities of Golden Eagles and a 10% reduction in predicted fatalities of Bald Eagles over the permit tenure. Second, estimated take of eagles would be offset through compensatory mitigation at an elevated ratio of 2:1. This offset ratio would require additional compensatory mitigation through power pole retrofits beyond Alternative 2 to compensate for unavoidable impacts after all practicable avoidance and minimization measures had been applied.

5.5.1. EAGLES

Under Alternative 3, fatality rates (at the upper 80th quantile) from collision with Project turbine blades for Golden Eagles and Bald Eagles are predicted to be 2.70 Golden Eagles per year, and 2.70 Bald Eagles per year (Table 3, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 81 Golden Eagles and 81 Bald Eagles. Fatality rates due to only the repowering of the Project are predicted to be 0.79 Golden Eagles per year, and 0.79 Bald Eagles per year (Table 3, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 23.7 Golden Eagles and 23.7 Bald Eagles (both estimates rounded up to 24).

Alternative 3 provides a commitment to implementing the measures outlined above, including minimization, monitoring, compensatory mitigation, and adaptive management for the duration of the 30-year permit term, similar to Alternative 2. These measures would be supplemental to the conservation measures and BMPs implemented under the SPUT permit and APP, and would provide additional benefits specific to eagles. However, under Alternative 3, an additional turbine curtailment measure would be required to further avoid take of eagles. While further reducing eagle fatalities through turbine curtailment would be consistent with the preservation standard of the Eagle Act, curtailing turbines at this level is not required under the Eagle Act (USFWS 2016b). Additionally, PacifiCorp would be required to complete levels of compensatory mitigation exceeding what has been determined to be necessary to compensate for the remaining unavoidable impacts for the life of the Project and meet the preservation standard of the Eagle Act (USFWS 2016b). Reduced fatality estimates for Bald Eagle and Golden Eagles

would be anticipated based on additional turbine curtailment, which would further meet the preservation standard of the Eagle Act.

As described in detail in Chapter 3, compensatory mitigation implemented under Alternative 3 could be conducted under a range of mitigation completion schedules and retrofit longevity proposals (Table 6). This compensatory mitigation could be implemented in 5 year increments, completed for the entire permit term upfront, or could be completed using another Service-approved mitigation strategy. Take would be offset using an elevated 2:1 ratio, exceeding the preservation standard of the Eagle Act, albeit using a lower fatality estimate than in Alternative 2 due to additional eagle conservation measures reducing the estimated take. As such, compensatory mitigation required under this alternative would offset take of Golden Eagles at a higher level than what would occur under Alternative 2. Increased compensatory mitigation beyond meeting the preservation standard may be consistent with the goals of maintaining or improving eagle populations, but may not be practicable for the applicant, and is not required under the Eagle Act (USFWS 2016b). As evaluated in the PEIS, the 1.2:1 mitigation ratio appropriately balances what is reasonable and practicable for permittees with the biological needs of the species, consistent with the Eagle Act. Based on the uncertainty in the effectiveness of a particular compensatory mitigation practice, the Service has the authority to require further adjustments to mitigation ratios to provide a buffer in the event that the planned mitigation is less effective than anticipated. However, at this time, the Service does not have sufficient information to determine whether pole retrofit mitigation is less effective than anticipated.

Under all scenarios in Table 3, Alternative 3 results in a greater number of total power pole retrofits (or other mitigation) compared to Alternatives 1 and 2, where the compensatory mitigation is based on a higher fatality estimate but the mitigation ratio is lower. It is impossible to predict whether the birds saved through pole retrofitting would be breeding adults, juveniles, or floaters; however, our REA assumes that the losses due to electrocution are proportional to the demographic distribution of the population and, thus similar to the demographics of those taken from wind turbines.

Other mitigation strategies under Alternative 3, if selected by PacifiCorp and approved by the Service, would also be a benefit to eagles for the permit tenure. Any other mitigation strategies that are approved by the Service would also be required to provide a net benefit for eagles for the duration of the permit. Compensatory mitigation required under this alternative would offset take of Golden Eagles at a higher level than what would occur under Alternative 2, due to the elevated offsetting ratio of 2:1. However, at the time of this EA, PacifiCorp is intending to implement only power pole retrofits to achieve their compensatory mitigation requirement.

Similar to Alternative 2, under Alternative 3, PacifiCorp would commit to implementing operational eagle fatality monitoring throughout the permit tenure and for the expected life of the project. The specifics of this fatality monitoring method would be determined by PacifiCorp but they would be required to achieve, at a minimum, an average site-wide probability of detection of 0.35 (35%) over each 5-year period and include carcass persistence and searcher efficiency trials as described in Chapter 3. If adaptive management triggers are met, monitoring would increase. Fatality monitoring at this temporal scale (life of project) would provide better

opportunity for learning about long-term risk to eagles at wind facilities in the Pacific Northwest, improving the Service's ability to predict fatalities at wind projects across the landscape (i.e. update the priors used in the CRM). Additionally, monitoring at this temporal scale would allow the Service to update periodically the fatality prediction over the life of the project to reflect the best available information.

Similar to Alternative 2, fatality rates higher than predicted would be addressed through the adaptive management process under Alternative 3, which requires additional conservation measures should evidence suggest eagle take rates may result in exceedance of authorized take.

Under this Alternative, the Service's eagle preservation standard would be achieved. Based on the intensity and context of these effects and consideration of the elements associated with this alternative, Alternative 3 is not expected to result in significant adverse effects to populations of Golden Eagles or Bald Eagles at the EMU or LAP scale over the life of the Project.

5.5.2. RAPTORS AND OTHER LARGE BIRDS

There would be a parallel effect on large birds as for eagles under this alternative. If wind turbines were curtailed by 17,544.1 daylight hours each year in order to achieve a reduction in predicted fatalities of Golden Eagles and Bald Eagles by 10% over the permit term, we anticipate there to be fewer hawk and owl fatalities due to Project operations. Furthermore, if additional pole retrofits are completed to offset take at a higher ratio, we expect there to be fewer electrocuted hawks and owls under this alternative than under the No Action Alternative and Alternative 2. The number of birds affected would be challenging to quantify, however, as there are not good data around baseline electrocution rates of other large birds. Other mitigation strategies used to offset mitigation are likely to be either net neutral or provide some benefit to raptors and other large birds.

5.5.3. FEDERALLY ENDANGERED AND THREATENED SPECIES

The issuance of an eagle take permit would not threaten other wildlife or plant populations not currently protected under the Endangered Species Act. Turbine operations, and any effects on wildlife or plant populations, will occur whether or not a permit is issued. The Project is already operational and permit issuance will not cause disturbance to riverine habitats or watersheds.

Compensatory mitigation would be required to offset take of Golden Eagles under Alternative 3. More poles may be retrofitted under Alternative 3 than under Alternative 2. However, no effects are anticipated as a result of power pole retrofitting activities. The location and types of power pole retrofits under this Alternative would be provided to the Service in a Pre-Retrofit Plan (or have already been provided during approval of the compensatory mitigation credits described in Section 1.2.3). The Service would then evaluate the effects of the proposed retrofits on ESA-listed species and their critical habitats at that time as appropriate.

5.5.4. TRIBAL TRADITIONAL USES/NATIVE AMERICAN RELIGIOUS CONCERNS AND CULTURAL RESOURCES

Selection of Alternative 3 is not expected to substantially interfere with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. Similar to Alternatives 1 and 2, since eagle remains that are found at the Project must be sent to the Service’s National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes, eagle remains are being made available for cultural practices and ceremonies. However, with a requirement for fatality monitoring that extends through the expected life of the project, more eagle remains will be discovered compared to Alternative 1. More eagle remains may be found under Alternatives 2 and 3, increasing the number of eagles collected and available to Native Americans over time for their use for ceremonial purposes.

Under Alternative 3, an increased number of power pole retrofits will be required in comparison to Alternative 2. This could increase the risk of disturbance to offsite cultural resources and historic properties compared to Alternative 2; however, because pole replacements are likely to be a rare component of required retrofits and the activities associated with retrofitting poles will involve the use of standard utility equipment on existing service roads and in previously disturbed habitat, no impacts to cultural resources or historic properties are expected. Nonetheless, PacifiCorp has agreed to conduct a cultural resources assessment for each power pole they select for retrofitting if pole replacement is necessary. A report from these assessments at all selected poles will be provided to the Service as part of the approval process for the compensatory mitigation method. Based on that information, the Service will consult with interested Indian tribes and the State Historic Preservation Officer of the relevant State at that time as appropriate.

Based on information available, the Service does not anticipate that issuance of a permit will preclude issuance of another permit necessary to protect an interest of higher priority, including: 1) safety emergencies, 2) increased need for traditionally practiced Native American tribal religious use that requires taking eagles from the wild, 3) non-emergency activities necessary to ensure public health and safety, and 4) other interests (50 CFR 22.26(e)(7)).

Chapter 6.0 Cumulative Effects

The Council on Environmental Quality recently modified the uniform federal regulations implementing NEPA, including modifications to the definition of “effects” to be considered, and the express repeal of the definition of “cumulative” impacts, see 40 CFR 1508.1(g)(3). As described previously, however, under our Eagle Act implementing regulations, we must determine whether the direct and indirect effects of the take and required mitigation, together with the cumulative effects of other permitted take and additional factors affected the eagle populations within the eagle management unit and the local area population are compatible with the preservation of bald and Golden Eagles, see 50 CFR 22.26(f). Thus, we are assessing cumulative effects here pursuant to our obligations under the Eagle Act.

Under Alternative 2, the Service predicts that 3.01 Golden Eagles and 3.01 Bald Eagles will be killed annually (prediction at the 80th quantile) associated with the Project. Under Alternative 3, the Service predicts that 2.70 Golden Eagles and 2.70 Bald Eagles will be killed annually (prediction at the 80th quantile) associated with the Project. We combined the predicted annual impacts of the Project under the two action alternatives with impacts from other permitted and unpermitted human activities that take eagles to determine if issuing an eagle take permit for the Project would be consistent with the Service's population management objective of maintaining stable or increasing populations of eagles. To perform this analysis, we followed methods outlined in Appendix F of the Eagle Conservation Plan Guidance (USFWS 2013), using the most recent values for species-specific natal dispersal to delineate the LAPs.

In the Service's PEIS (USFWS 2016b), we identified annual permitted eagle take rates between 1 and 5 percent of the estimated LAP as concerning, with 5 percent being the upper threshold of what would be appropriate to authorize (i.e. permit), annually under the Eagle Act preservation standard, whether offset by compensatory mitigation or not. Additionally, literature suggests that unpermitted anthropogenic annual mortality of Golden Eagles across the landscape is equivalent to approximately 10 percent of the population (USFWS 2016b). Thus, evidence suggesting that background levels of unpermitted anthropogenic take exceeds 10 percent of that LAP may indicate that anthropogenic take is higher than average near the project being analyzed. Further, if unpermitted take rates from one source, especially one that seems likely to be under-reported, seem relatively high, this may indicate that the LAP is experiencing concerning levels of unpermitted take. Considering this information, authorized take greater than 5 percent of the LAP, or qualitative indicators that suggest that unauthorized take may exceed 10 percent of the LAP, or qualitative indicators of relatively high levels of take from one source, could trigger additional environmental analysis to determine whether issuance of the permit for a particular project is compatible with the preservation of eagles. Considering this information, authorized take greater than 5 percent of the LAP, or qualitative indicators that suggest that unauthorized take may exceed 10 percent of the LAP, could trigger additional environmental analysis to determine whether issuance of the permit for a particular project is compatible with the preservation of eagles.

6.1. Local Area Population Analysis

We used the Service's Cumulative Effects Tool to conduct the LAP analysis for each species under Alternatives 2 and 3, which we describe in detail below. Each analysis incorporates both records of federal eagle take permits issued (i.e. authorized take) and unpermitted eagle mortality records that are available to the Service.

6.1.1. GOLDEN EAGLES

The Golden Eagle LAP for the Project overlaps and is composed of eagles in two Golden Eagle Local Area Density Units (LADUs³) – the Great Basin and Northern Rocky Mountains. Based on the densities in each of those units, we estimate this LAP to contain approximately 640.55 Golden Eagles; the 1%, 5% and 10% benchmarks for this estimate are approximately 6.41, 32.03, and 64.06 Golden Eagles, respectively (Table 8).

6.1.2. BALD EAGLES

The Bald Eagle LAP overlaps and is composed of eagles in two LADUs - the Pacific and Northern Rocky Mountains EMUs. Based on the density in those units, we estimated this LAP to contain approximately 565.34 Bald Eagles. The 1%, 5% and 10% benchmarks of this estimate are approximately 5.65, 28.27, and 56.53 Bald Eagles, respectively.

Table 8. Estimated golden eagle and bald eagle local area population (LAP) for the Goodnoe Hills Project.

LADU	Estimated Number of Golden Eagles	Estimated Number of Bald Eagles
Great Basin (portion of LAP)	466.72	N/A
Northern Rockies (portion of LAP)	159.56	N/A
Pacific (portion of the LAP)	14.28	565.34
Total Local Area Population	640.55	565.34
1% LAP Benchmark	6.41	5.65
5% LAP Benchmark	32.03	28.27
10% LAP Benchmark	64.06	56.53

³ LADUs are the smallest geographic unit for which we have reliable eagle density estimates. Densities in these LADUs are used to estimate the total size of the LAP.

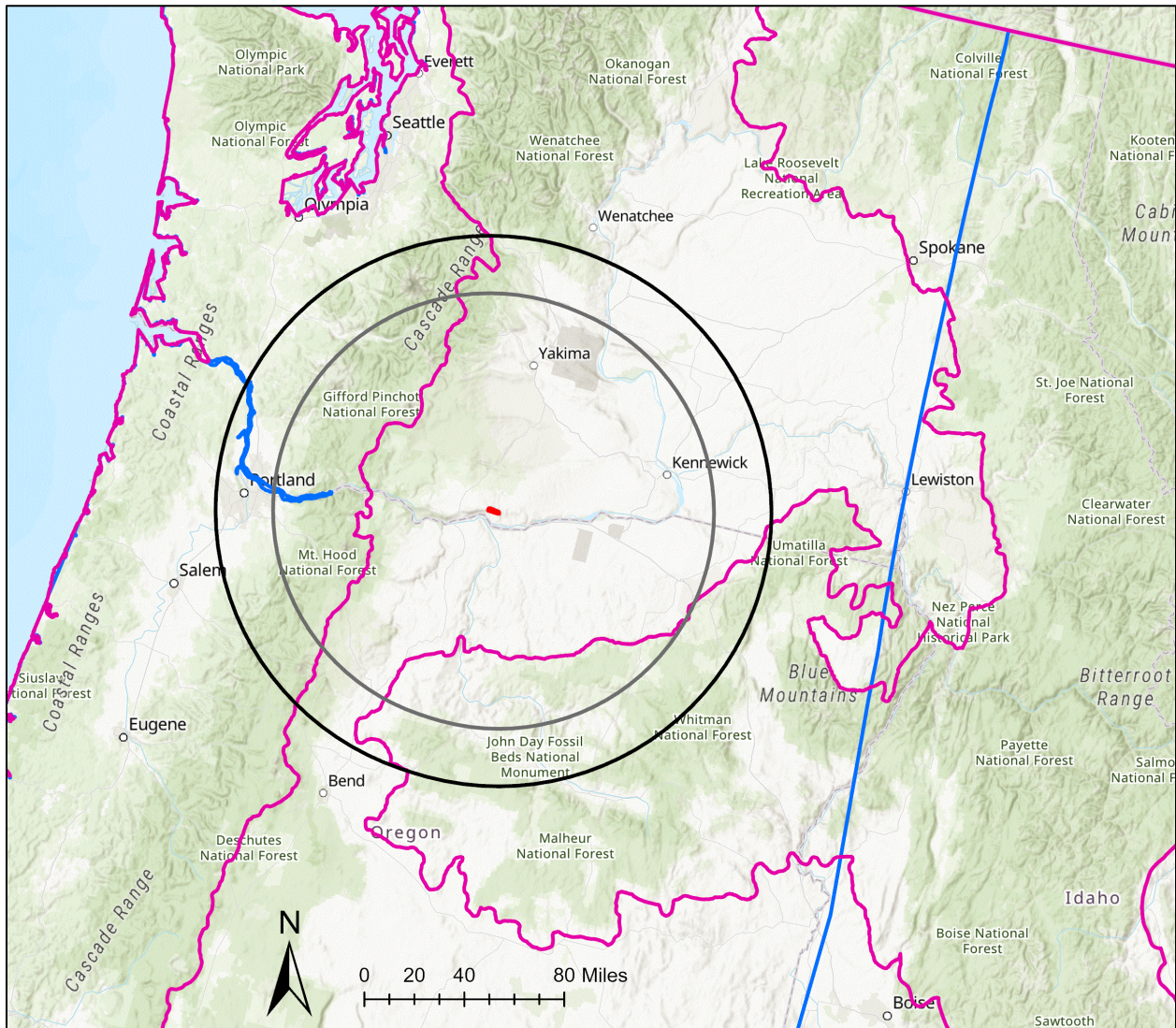


Figure 3. The Project Local Area Population (109 mi. radius circle in black for golden eagles, 86 mi. radius circle in gray for bald eagles). The Project footprint in red. The Golden Eagle LADU boundary in magenta, Bald Eagle LADU in blue.

6.2. Authorized Take

6.2.1. GOLDEN EAGLES

At the time of this EA, the Service has authorized the annual take of approximately 8.72 Golden Eagles that overlaps the species-specific LAP for the Project. The Service has also received applications for additional eagle take at other wind projects that have LAPs that overlap the Project’s Golden Eagle LAP. Although take may be authorized at those projects eventually, the predicted take for Golden Eagles at those projects is not considered in the following analysis.

The projected annual total of permitted Golden Eagle fatalities within the LAP, should Alternative 2 or 3 be selected, is 11.73 or 11.42, respectively. These values are calculated by adding the predicted annual take at the focal project (3.01 and 2.70 under Alternatives 2 and 3, respectively) to the previously authorized annual take approximation in the above paragraph that overlaps the LAP (8.72). Under Alternatives 2 and 3, permitted Golden Eagle take would be approximately 1.83% and 1.78% of the LAP, respectively, which is above the 1% but below the 5% threshold.

6.2.2. BALD EAGLES

At the time of this EA, the Service has authorized the annual take of approximately 8.31 Bald Eagles that overlaps the species-specific LAP for the Project. The Service has also received applications for additional eagle take at other wind projects that have LAPs that overlap the Project's Bald Eagle LAP. Although take may be authorized at those projects eventually, the predicted take for Bald Eagles at these projects is not considered in the following analysis.

The projected annual total of permitted Bald Eagle fatalities within the LAP, should Alternative 2 or 3 be selected, is 11.32 or 11.01, respectively, including the Project. Under Alternatives 2 and 3, this permitted Bald Eagle take would be approximately 2.00% or 1.95% of the LAP, respectively, which is above the 1% but below the 5% threshold.

6.3. Unauthorized Take

An important caveat that comes with the Service's unauthorized take database is that it primarily includes records of take that have been discovered and reported incidental to other activities. Some industries have found and self-reported incidental eagle mortalities at a higher rate than others, and some types of eagle mortalities (e.g., from vehicle collision) lend themselves to better incidental discovery and reporting while mortalities that typically occur in remote locations are unlikely to be discovered. Thus, some causes of mortality (e.g., poisoning), may be under-represented in our database. However, the information presented below is the best information available to us regarding eagle mortalities within the LAP.

When conducting the unauthorized take analysis in the Project LAP, we used eagle mortality records from the Service's database (Table 9) within the average species-specific natal dispersal distance for the most recent 10-year period (2010 – 2019). We used this period because it seems likely that annual rates of fatalities by cause and annual rates of reporting those fatalities by cause may have changed over the last half-century. For example, it seems likely that increased knowledge of how to reduce avian electrocutions may have altered the rate at which electrocutions have occurred over time. Concurrently, an increased awareness of the issue may have altered the level of reporting.

6.3.1. GOLDEN EAGLES

Based on the records in the Service's eagle mortality database there were 83 unauthorized anthropogenic Golden Eagle mortalities within 109 miles of the Project from 2011 to 2020

(Table 9). Of the known anthropogenic causes of mortality for Golden Eagles, 28 (33.7%) were due to electrocution, 26 (31.3%) were due to collision with a wind turbine, and 20 (24.1%) were due to unknown cause.

Although many of the available Golden Eagle mortality records from the Service’s database are related to strikes by wind turbines and electrocutions, we cannot say that these sources of eagle mortality are more prevalent on the landscape and more important drivers of eagle populations than other anthropogenic sources of mortality due to the inconsistency in recovery probability. A better range-wide perspective of Golden Eagle mortality comes from research using satellite telemetry marked birds. The Service (USFWS 2016c) reported the known cause of mortality for 97 of 139 recovered radio telemetered eagles. In the study, approximately 11% of the mortalities were attributable to electrocution, 11% were shot and approximately 7% were killed due to collisions. In the report, collisions are pooled together; however, in checking with the author these were primarily composed of vehicle and wire collisions and none of the telemetered eagle deaths were associated with wind turbine collisions (B. Millsap, USFWS, pers. comm. 2018). We believe it is likely that eagle mortalities due to non-wind turbine collisions, shooting, or poisoning are under-reported in the Project LAP, primarily from differences in recovery probability. This further illustrates a bias with these mortality records since there is not a systematic mortality survey effort.

With these potential biases in mind, we used all data available to the Service from 2011 to 2020 to calculate the annual unpermitted eagle take rate documented within the LAP. From this analysis, the Service calculates that we know of approximately 8.3 anthropogenic Golden Eagle mortalities per year in the Project LAP. This unpermitted take would be approximately 1.30% of the Project LAP. This conservative percentage is below the 10% benchmark and does not suggest that recurring anthropogenic take near the Project is negatively affecting the LAP.

6.3.2. BALD EAGLES

Based on the records in the Service’s eagle mortality database there were 108 unauthorized anthropogenic Bald Eagle mortalities within 86 miles of the Project from 2011 to 2020 (Table 9). Of the known anthropogenic causes of mortality for Bald Eagles, 55 (50.9%) were due to electrocution, 35 (32.4%) were due to collision with wire or another type of collision, and 15 (13.9%) were due to an unknown, trauma or other cause (Table 9). The same biases may exist in the Service’s Bald Eagle datasets as do with the Golden Eagle datasets.

With these potential biases in mind, we used all data available to the Service from 2011 to 2020 to calculate the annual unpermitted eagle take rate documented within the LAP. From this analysis, the Service calculates that approximately 10.8 annual Bald Eagle mortalities may influence the LAP. This unpermitted take would be approximately 1.91% of the Project LAP. This conservative percentage is below the 10% benchmark and does not suggest that recurring anthropogenic take near the Project is negatively affecting the LAP.

Table 9. Known unauthorized golden eagle and bald eagle mortalities.

Source	Golden Eagles		Bald Eagles	
	Number of Fatalities ^{1,2}	Number of Fatalities (Annual)	Number of Fatalities ^{1,2}	Number of Fatalities (Annual)
Electrocution	28	2.8	55	5.5
Poisoning ³	1	0.1	2	0.2
Shooting	2	0.2	1	0.1
Collision with Wind Turbines	26	2.6	0	0
Collision with Vehicle	1	0.1	6	0.6
Collision (Wire/Other)	2	0.2	29	2.9
All other anthropogenic sources ⁴	22	1.8	15	1.5
Total	82	8.2	108	10.8
% of LAP	1.28		1.91	

¹This is the minimum number of unpermitted eagle fatalities discovered and/or reported. Likely more fatalities were not discovered and/or reported.

²Reporting period is 2011-2020.

³Sources of poisoning include lead, pesticide, and other sources.

⁴All other anthropogenic sources include Other, Unknown, and Trauma

6.3.3. SUMMARY

Under both action alternatives, authorizing the take of both Golden Eagles and Bald Eagles at this Project will lead to a cumulative permitted take of less than 5% of their respective LAPs. Further, we have no evidence to suggest that recurring unauthorized anthropogenic take will exceed 10% of the LAPs and has reached concerning levels. Additionally, there is no evidence that there are concerning levels of take from any one source. Should we issue a permit under either action alternative, PacifiCorp will compensate for Golden Eagle take, and Bald Eagle take will be within EMU take thresholds. In addition, PacifiCorp will be required to provide sufficient monitoring, adaptive management, and operational measures that should serve to keep any incidental eagle take at the Project within authorized levels and consistent with the Service's preservation standard for eagles.

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Appendices

All appendices for this project (and other long-term eagle take permits) are available online at: <https://www.fws.gov/pacific/migratorybirds/Library/wpanalyses.html>

Appendix A Eagle Conservation Plan, available at:

https://www.fws.gov/pacific/migratorybirds/PDF/Good_docs/GOOD_Appendix_A.pdf

Appendix B Bayesian Eagle Collision Risk Model, available at:

https://www.fws.gov/pacific/migratorybirds/PDF/Good_docs/GOOD_Appendix_B.pdf

Appendix C Resource Equivalency Analysis, available at:

https://www.fws.gov/pacific/migratorybirds/PDF/Good_docs/GOOD_Appendix_C.pdf

Appendix D List of Preparers, available at:

https://www.fws.gov/pacific/migratorybirds/PDF/Good_docs/GOOD_Appendix_D.pdf