



U.S. Fish and Wildlife Service

Final

Environmental Assessment

Biglow Canyon Wind Farm Eagle Permit

Prepared by

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

Applicant	Portland General Electric Company
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
ODOE	Oregon Department of Energy
ORNHIC	Oregon Natural Heritage Information Center
PEIS	<i>Programmatic Environmental Impact Statement for the Eagle Rule Revision, December 2016</i>
PGE	Portland General Electric Company
Project	Biglow Canyon Wind Farm
SCA	Site Certification Agreement
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 Take permit (eagle 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 Biglow Canyon Wind Farm (Biglow Canyon or Project). The Service’s proposal to issue an eagle permit constitutes a discretionary Federal action that is subject to the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.). This Final 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 5-year permit (Alternative 3). Denying the issuance of this eagle permit (Alternative 1) would result in no requirement for monitoring, adaptive management, or compensatory mitigation to offset predicted impacts of the Project. Issuing a 5-year permit (Alternative 3) would limit long-term conservation benefits to eagles and would not mandate long-term fatality monitoring due to the 5-year permit tenure.

We received an application for a 30-year eagle permit from Portland General Electric (PGE, or the Applicant) on April 2, 2015, requesting authorization of non-purposeful or “incidental” take of bald and golden eagles under the Eagle Act from Project operation. 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 constructed, owns, and operates the Project in Sherman County, Oregon (figures 1 and 2). The Project, constructed in three phases, was permitted through the Oregon Energy Facility Siting Council (EFSC). EFSC granted a Site Certificate to the Project’s previous owner, Orion Sherman County Wind Farm LLC (a wholly-owned subsidiary of Orion Energy LLC) in June 2006 for the construction of the Project. The Applicant acquired the Project in November of 2006 following an amendment to the Site Certificate that named the Applicant as the certificate holder in place of Orion Sherman County Wind Farm LLC. The Applicant began construction of Phase I of the Project in April 2007, with operations commencing December 21, 2007. The Project’s Site Certificate was amended again in 2007 and 2008 to allow for the development of Phases II and III, respectively (ODOE 2008). Phase II construction began in August 2008, with operations commencing on August 17, 2009; Phase III construction began in

August 2009, with operations commencing on August 20, 2010. Although constructed in three phases, the Project is a single facility under the Site Certificate Agreement (SCA).

The Project comprises 217 wind turbines with a generating capacity of 450 megawatts (MW); Phase I includes 76 turbines (125.4 MW), Phase II includes 65 turbines (149.6 MW), and Phase III includes 76 turbines (174.8 MW). The Project encompasses 19,844 acres of privately-owned land; however, project facilities are located on less than 1 percent (185 acres) of this area. In addition to the turbines, project facilities include turbine pads, above- and below-ground collection lines, an operations and maintenance building, four permanent un-guyed meteorological towers, and a network of access roads. The operation of the Project includes the operation of 217 wind turbines and activities supporting the operation of those turbines within the Project footprint (and as described in the ECP). Although this section describes many operational activities supporting the Project, eagle take that would be authorized under Alternatives 2 and 3 would be limited to take that results from eagle collision with turbines. Take resulting from other listed activities supporting Project operation would not be covered under the eagle take permit.

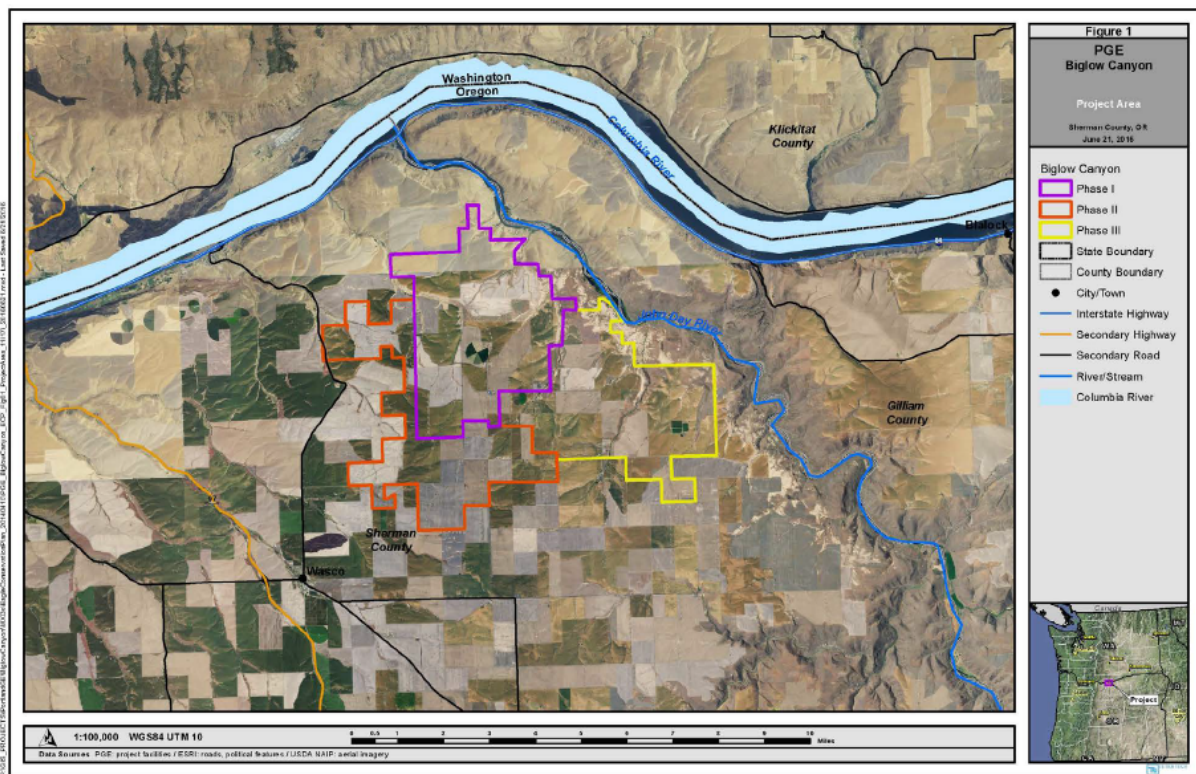


Figure 1. Biglow Canyon Wind Project Location

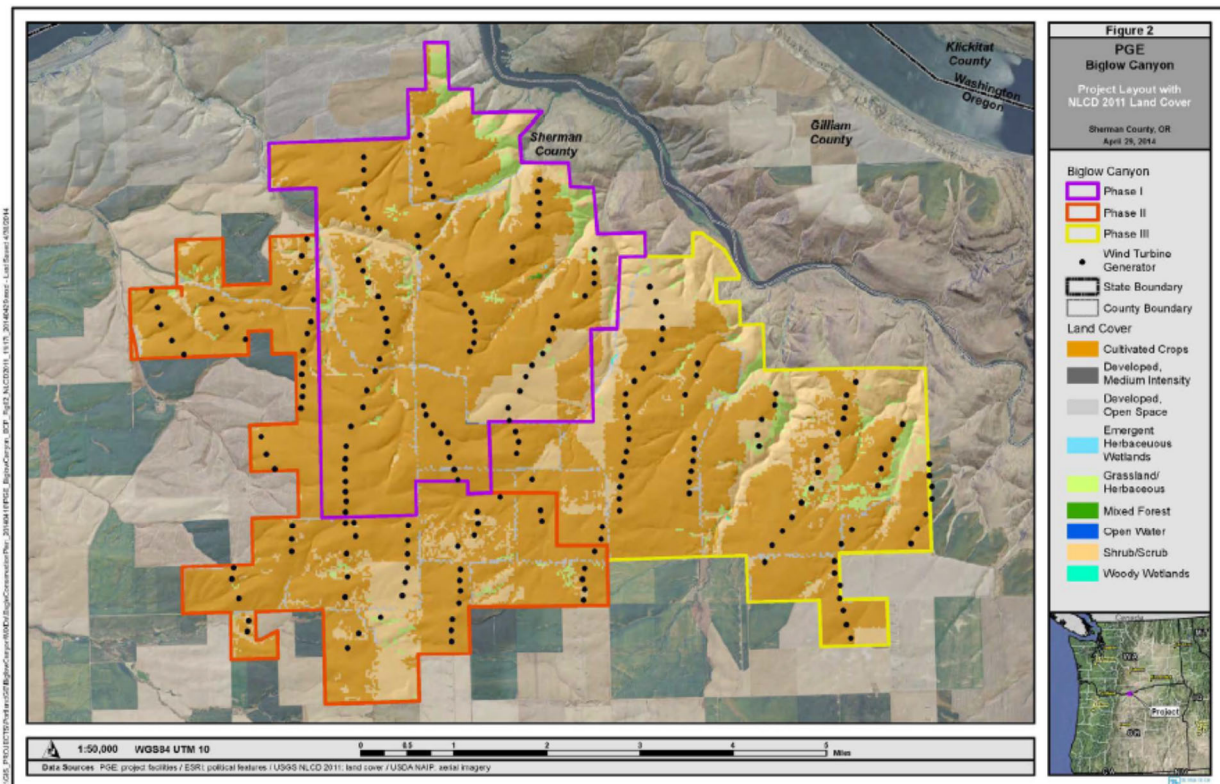


Figure 2. Biglow Canyon Wind Project Layout

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

As described in the ECP, PGE 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 layout was designed to minimize the destruction or alteration of grasslands and other native habitats that support prey species used by golden eagles and other raptors.
- Setbacks of approximately 3 miles (4.8 kilometers) from the centerline of the Columbia River and 1 mile (1.6 kilometers) from the centerline of the John Day River were used to constrain the Project area. These setbacks were implemented to minimize the potential for impacts to wintering bald eagles and other wildlife.
- Turbine string corridors nearest the John Day River were shortened and/or shifted to maintain a minimum 250 foot (76.2 meters) buffer between native habitats (e.g., grasslands, shrub-steppe) and ends of turbine corridors to minimize direct impacts to native habitat.

- Turbine string corridors nearest the John Day River were shortened 200.0 to 500.0 feet (61.0 – 152.4 meters) to avoid steep slopes that may attract raptors.
- Attempts were made to site turbine string corridors parallel to the most likely bird movement corridors (i.e., canyons and ridgelines) in order to simultaneously minimize bird collision risk while also taking advantage of prevailing wind conditions.
- Turbine strings were spaced at least 0.5 miles (0.8 kilometers) apart and turbine towers were spaced approximately 2 rotor diameters apart to avoid creating a “wind wall” or continuous space of collision risk.
- PGE did not construct any facility components within areas of high quality wildlife habitat and avoided temporary disturbance of high quality wildlife habitat.
- A qualified biologist flagged sensitive resource areas on the Project site before construction occurred and visited the site periodically to inspect construction activities for compliance.
- PGE conducted pre-construction surveys for threatened and endangered plant and wildlife species at the Project site, including surveys for active eagle nests within a half-mile (1.6 kilometers) of any area that would be disturbed during construction.
- To determine whether or not nesting bald eagles had been documented to occur within 2.0 miles (3.2 kilometers) of the facility, PGE reviewed the Oregon Natural Heritage Information Center (ORNHIC) and USFWS databases annually and consulted with an expert designated by ODFW before beginning construction of each of the Project phases. PGE reported the results of the database review and consultation to the ODOE and ODFW.

Construction

- PGE implemented a waste management plan that included measures such as minimization and proper disposal of solid waste to prevent attraction of raptors or their prey.
- PGE implemented a Wildlife Incident Response and Handling System (WIRHS) for responding to and handling bird and bat casualties found by construction personnel during construction of the Project.
- During construction of the facility, PGE had an on-site assistant construction manager qualified in environmental compliance to ensure compliance with all construction-related SCA conditions.
- PGE committed to immediate reporting to USFWS and ODFW, respectively, in the event that eagle species or any federal or state endangered or threatened species were killed or injured during construction of the Project; however, no injuries or fatalities to threatened or endangered species, bald eagles or golden eagles occurred.

The impacts to eagles from the measures described in this section will be the same regardless of the alternative we select.

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

As described in the ECP, PGE has not committed to implementing any avoidance and minimization measures during project operation and maintenance, except experimentally in response to new information at the Project.

1.2.3. POST-CONSTRUCTION MONITORING

As described in the ECP, PGE conducted post-construction monitoring of avian and bat usage and mortalities for two years after each phase of Project development, totaling approximately 5 years of continuous monitoring. Monitoring was conducted for Phase I in 2008-2009 (PGE 2008, Jeffrey et al. 2009, Enk et al. 2010), Phase II in 2009-2011 (PGE 2010, Enk et al. 2012a, Enk et al. 2012b), and Phase III in 2010-2012 (Enk et al. 2012c, PGE 2011, Enk et al. 2013). In general, post-construction monitoring included:

- Fixed-point avian counts to (1) document bird use and abundance near the John Day Canyon rim relative to the wind project, and (2) document bird use and abundance near the Project turbines.
- Standardized carcass search surveys at 50 turbines once monthly (and occasionally 100 turbines monthly where monitoring efforts at different project phases overlapped) during winter and summer, and twice monthly during spring and fall.
- Searcher efficiency trials.
- Carcass persistence trials following standardized carcass searches.
- Monitoring and reporting of avian and bat fatalities by on-site personnel during years when no standardized carcass searches were being performed.

As a condition of the SCA, long-term nest surveys are scheduled every 5 years following completion of the last post-construction raptor nest survey. These surveys employ the same protocols as previous raptor nest surveys with the exception that surveys are limited to known nest locations from past surveys and are not inventories of the entire survey area. Information on golden eagle nest locations and status are available from annual statewide surveys. Although these surveys are not a census of the state's golden eagle population, they may be able to help PGE identify if any new territories have been established near the Project.

1.2.4. WILDLIFE INCIDENT REPORTING AND HANDLING

PGE developed a WIRHS to standardize the actions taken by Biglow Canyon personnel in response to wildlife incidents found within the project boundary. Under the WIRHS, Biglow Canyon field personnel are trained 1-2 times annually to identify and report to PGE avian and bat carcasses found during monthly turbine inspections. The Project's USFWS 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, PGE has committed to report all observed eagle injuries and mortalities to our Office of Law Enforcement within 24 hours of discovery, 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 PGE'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 Incidental Take permit (50 CFR 22.26) in response to a permit application submitted by PGE 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 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 two alternatives regarding issuance of a permit to authorize the take of bald eagles and golden eagles incidental to the operation of the Biglow Canyon Wind Farm. 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 bald eagles and golden 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 (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 2.4) 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 bald eagles and golden 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 USFWS 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 bald and golden 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).

PGE has requested authorization to take eagles incidental to the otherwise lawful operation of the 217 wind turbines at the Biglow Canyon Wind Project. 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 resulting from collision with Project wind turbines.

2.5.1 GEOGRAPHIC EXTENT

The analysis of effects on bald eagles and golden 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-four federally recognized Indian Tribes (Table 1), 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 18, 2017, to inform them about the eagle permit application, and to provide them the opportunity to review the application and consult on the potential issuance of an eagle permit. We also sent out letters to these Tribes on October 8, 2019, to update them of the status of the application process. Thus far, no Tribes have requested consultation with us regarding the Project’s eagle permit application. We also invited these Tribes by letter to review and comment on this EA. We received no comments from tribes.

Table 1. Tribes contacted for comment on the Service permit decision.

Tribes that Received Letters	
Coeur d'Alene Tribe	Port Gamble S'Klallam Tribe
Nez Perce Tribe	Puyallup Tribe
Northwestern Band of Shoshone Nation	Quinault Indian Nation
Burns Paiute Tribe	Sauk-Suiattle Indian Tribe
Confederated Tribes of the Grand Ronde Community of Oregon	Shoalwater Bay Tribe
Confederated Tribes of 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
Confederated Tribes of the Colville Reservation	Stillaguamish Tribe of Indians
Confederated Tribes of the Chehalis Reservation	Suquamish Tribe
Muckleshoot Tribe	Tulalip Tribes
Nisqually Indian Tribe	Yakama Nation

2.7. Public Participation

We posted the Draft EA for 30 days, requesting comment on the content and scope of the analysis, 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 no comments during the public comment period.

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 alternative is provided in Table 2, and detailed descriptions of the alternatives are provided in Section 3.3.

Table 2. Key components of the alternatives.

	Alternative 1 - No Action, Deny Permit	Alternative 2 - Issue 30-Year Permit Based on ECP	Alternative 3 - Issue 5- Year Permit
Predicted Annual Take	1.28 golden eagles and 0.64 bald eagles	1.28 golden eagles and 0.64 bald eagles	1.28 golden eagles and 0.64 bald eagles
Predicted Take over Permit Tenure	N/A	39 golden eagles and 20 bald eagles	7 golden eagles and 4 bald eagles
Take that needs to be offset¹ (annual rate)	None	15 golden eagles ² (0.49 per yr, rounded to nearest integer)	3 golden eagles (0.49 per yr, rounded to nearest integer)
Compensatory Mitigation to be provided	None	172 to 555 poles depending on retrofit longevity and the mitigation schedule OR	49 to 111 poles - depending on retrofit longevity OR

	Alternative 1 - No Action, Deny Permit	Alternative 2 - Issue 30-Year Permit Based on ECP	Alternative 3 - Issue 5- Year Permit
		other offsetting measure approved by the Service	other offsetting measure approved by the Service
Fatality Monitoring	Incidental observations only	Achieve an average probability of detection (g-value) over every 5-year term of ≥ 0.30	Achieve an average probability of detection (g-value) of ≥ 0.30 throughout the permit term
<p>¹Compensatory Mitigation is only required for golden eagle take estimated at the 76 turbines built after publication of the 2009 rule (Phase 3) at the Biglow Canyon Wind Project. See Section 1.2, above, and 3.3.2.2., below.</p> <p>²The number of eagles that would be mitigated for if compensatory mitigation were provided up-front. The applicant will likely elect to provide compensatory mitigation for the first five years only, and adjust their fatality prediction at each 5-year check-in; this may change the total number of eagles that need to be offset, but the direction and extent of such a change is not known at this time.</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 permit. Eagle 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 Project O&M 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 PGE’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. PGE 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, PGE would not be required to implement avoidance and minimization measures during operations and maintenance of the Project. Presently, PGE is only implementing these measures on an experimental basis. They may continue to implement measures experimentally as planned, but the Service would not know what measures might be selected or when they might be implemented.

3.3.1.2. *Compensatory Mitigation*

Under Alternative 1, PGE would not be required to provide compensatory mitigation to offset eagle fatalities to make the predicted take consistent with the Eagle Act preservation standard.

3.3.1.3. *Fatality Monitoring*

Under Alternative 1, PGE would continue to implement incidental fatality monitoring procedures throughout the life of the project as described in the ECP, finding dead eagles only incidental to other project related activities. PGE would follow the WIRHS process as per the SCA. No additional fatality monitoring would be required under this alternative.

3.3.1.4. *Adaptive Management*

Under Alternative 1, PGE would not be required to follow any adaptive management plan that would, if followed, require a conservation measure to be implemented or more fatality monitoring to occur should fatality rates be higher than expected. PGE has stated that they may implement conservation measures experimentally and in an adaptive management framework; however, we have no way to tell what measures might be selected or when they might be 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 permit authorizing the incidental take of 20 bald eagles and 39 golden eagles associated with the Biglow Canyon Project 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 amount of guaranteed (i.e. required by permit) benefit to eagles through greater upfront avoidance and minimization, compensatory mitigation, and fatality monitoring. The Service estimates incidental take over a 30-year period for the Project would be 39 golden eagles (1.28 per year) and 20 bald eagles (0.64 per year); therefore, the permit authorization would be for this level of incidental take, with associated conditions, as allowed and required by regulation (Table 2).

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 would incorporate as permit conditions the avoidance and minimization, monitoring, compensatory mitigation, and adaptive management measures listed in this section. PGE agreed to the avoidance and minimization measures listed below, which are intended to reduce the likelihood of eagle take from all activities associated with the Project.

3.3.2.1. *Avoidance and Minimization Measures*

1. Maintenance vehicle movement will be restricted to pre-designated access, Project personnel or contractor-required access, or public roads. If feasible, PGE will use existing roads and previously disturbed areas during operation and maintenance to minimize impacts to native habitat.
2. Project personnel will be required to drive 25 mph 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. 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. The training will also cover the WIRHS process for recording incidental observations of avian carcasses, and how to properly handle dead or injured birds in accordance with PGE's Special Purpose Permit from the Service.
7. Site staff will receive awareness-level training on watching for dead animal carcasses and sign of them (e.g. circling eagles, vultures, or other scavenging birds). Permittee will bury or remove any dead medium- and large-sized animals (i.e. squirrel or larger) found within 48 hours. Disposal will be beyond line-of-sight of Project turbines or in an appropriate trash receptacle securely protected from wildlife access.
8. If Project operations occur on land not owned by PGE, PGE must make a one-time notification to inform landowners on what to do if they discover a dead bird or eagle near a turbine. Any landowners collecting birds on your behalf must be designated as a subpermittee.
9. Natural material (e.g. rock piles, woody debris) and tall vegetation (i.e. tall forbs, grass, weeds) will be removed or maintained beneath turbines on designated project pads to reduce shelter and forage for small mammals.
10. Any snow management conducted by PGE within the project footprint will involve strategic plowing to promote wildlife movement (i.e. putting gaps in snow banks that encourages animals to leave the road) if snow banks more than six feet are created by project-related plowing to reduce potential collisions between wildlife and vehicles.

3.3.2.2. *Compensatory Mitigation*

Under Alternative 2, consistent with the Eagle Act preservation standard, PGE would be required to provide compensatory mitigation for golden eagle fatalities by implementing the mitigation strategy identified below. As shown in Table 2, compensatory mitigation would be required for golden eagles under Alternatives 2 and 3, but under Alternative 2, compensatory mitigation would be required over the life of the Project. Compensatory mitigation could be provided up front for all 30 years of predicted take, or in 5-year intervals with the amount of compensatory mitigation required being adjusted every 5 years as certainty about realized fatality rates improves.

As described in more detail in the PEIS (USFWS 2016b), the Service has set a preservation standard we must adhere to under the Eagle Act. This standard specifies that the Service will manage bald and golden eagles to maintain stable or increasing breeding populations of both species of eagle. To achieve this standard, the Service has established take thresholds for bald and golden eagles at the EMU scale. Eagle fatalities caused by activities in place prior to September 11, 2009, are accounted for in the baseline conditions which 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 under the Eagle Rule. 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 (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 is required for bald eagles. However, golden eagle take is expected, and thus must be offset with compensatory mitigation at a ratio of 1.2:1. Because Phases I and II of the Project were constructed and operational prior to September 11, 2009, the Applicant would be required to offset the take of golden eagles attributable to Phase III of the Project only. Take is predicted to be 0.49 golden eagles per year (see Appendix B), or 15 eagles during the 30-year permit term.

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). One mitigation strategy that meets the above criteria is power pole retrofitting 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.

We calculated, using our Resource Equivalency Analysis (REA), the total number of high-risk poles required to offset the take of 15 golden eagles at a 1.2:1 ratio (see Appendix C). The total

number of high-risk poles we will require depends on the retrofit longevity (i.e. the length of time the retrofit will meet APLIC (2006) guidelines). 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 no insulating covers are needed) or removing poles is a long-term way to bring high-risk power poles into compliance with APLIC (2006) guidelines without needing maintenance and generally receives credit for 30-year retrofit longevity. Conversely, applying insulating covers (i.e. covers of non-conducting material placed over conductors or grounded hardware) is a temporary way to bring high-risk poles into compliance with APLIC (2006) guidelines. 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 will require also depends on the date by which these retrofits are completed. Under Alternative 2, we will require that retrofits be completed by January 31, 2022, prior to the beginning of the 2022 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.

Under Alternative 2, PGE could provide compensatory mitigation on a variety of different schedules. Two are presented here as the most realistic schedules, and to depict a range of pole retrofit estimates that could occur under this Alternative. (See Table 3):

- 1) PGE can elect to provide all compensatory mitigation for the entire 30-year permit term up front. If they choose this option, PGE would be required to provide 172 to 395 retrofits depending on the longevity of retrofits.
- 2) PGE can elect to provide compensatory mitigation for the first 5 years of predicted take, and 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 administrative permit 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, PGE would be required to provide the same number of power pole retrofits for each of the first five 5-year intervals, offsetting take of 15 eagles by year 25 of the permit (3 eagles offset x 5 periods = 15 eagles offset). To do this, PGE would need to perform 245 to 555 retrofits depending on the longevity of retrofits. If PGE elects to provide compensatory mitigation in 5-year intervals, the total amount of compensatory mitigation they provide may change every 5 years, but will never fall short of offsetting the take authorized on the permit at a ratio of 1.2:1.

Table 3. 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 longevities.

Mitigation Completion Schedule¹	<i>High-risk power pole retrofits required over life of project by retrofit longevity²</i>
Mitigate for all 30 years of predicted take before beginning of 2022 breeding season.	30-yr: 172
	10-yr: 395
Mitigate for first 5 years of predicted take before beginning of 2022 breeding season. Complete the same amount of mitigation in 5-year increments for life of project.	30-yr: 245
	10-yr: 555
<p>¹Assumes life of project = 30 years from date of permit issuance.</p> <p>²Assumes no adjustment to the fatality prediction over time; thus, no adjustment to the mitigation requirement at each 5-year check-in, is made during the life of the project. If no adjustment is made, the offset of 15 eagles is achieved after five 5-year periods (3x5 = 15 eagles). See Appendix C for the details about the fatality predictions that lead to these mitigation requirements.</p>	

Under Alternative 2, PGE would need to retrofit between 172 and 555 power poles considered to be high-risk for golden eagles to bring each pole into compliance with APLIC (2006) guidelines. The exact number of poles required will depend on the retrofit longevities, the completion schedule proposed by PGE for each selected pole, and the timing of mitigation (provided for the permit tenure upfront or in 5-year increments). This requirement may also be met by retrofitting poles through the Eagle Electrocutation Solutions in-lieu fee program.

To ensure that selected poles are the highest risk poles on the landscape, we would require first that one or more areas or circuits is selected in high-quality golden eagle habitat and in the EMU where take will be occurring. Once an area or circuit is selected, we will require that power poles within that area or circuit be assigned a risk score (RRI) as described in Dwyer et al. (2014). The applicant should choose the highest risk poles (before retrofitting occurs), according to their RRI score, to make consistent with APLIC (2006) guidelines. These selected poles, together, must achieve an average RRI score of at least 0.4. 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. The Permittee has agreed to consider potential impacts to cultural resources by conducting a cultural resource assessment at the location of each pole where ground disturbance will be associated with the proposed retrofit action.

In order for retrofitted poles to count toward the compensatory mitigation requirement, PGE would be required to receive Service approval of the retrofit plan prior to conducting the retrofit work. To receive Service approval, PGE 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 proposed retrofit action to be taken on each pole, the expected retrofit longevity, and a summary of the cultural resource assessment at each selected pole where the retrofit might require ground disturbance. This cultural resource assessment should investigate the potential for direct and indirect impacts, if any, to cultural resources that are anticipated from the proposed retrofits.

3.3.2.3. *Compensatory Mitigation – Other Strategies*

The permittee or the Service may request an amendment to the compensatory mitigation plan to offset take of golden eagles. 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 50 CFR 22.26(c)(8). The regulation identifies the following requirements for compensatory mitigation (50 CFR 22.26(c)(1)(i), (iii)):

The compensatory mitigation plan must:

- 1) Ensure the preservation of bald eagles and golden eagles by either a) increasing the population by at least the amount of unavoidable mortality, or b) reducing another ongoing form of mortality by at least that amount;
- 2) Be determined based on application of all practicable avoidance and minimization measures;
- 3) Be sited within the same eagle management unit where the permitted take will occur, unless the Service determines that the affected population includes eagles that are likely to use other eagle management units during their seasonal migration;
- 4) Use the best available science in monitoring the long-term effectiveness of mitigation measures, and ensuring that necessary changes are implemented to achieve them;
- 5) Improve conditions of the affected eagle species in a manner that is demonstrably new and would not have occurred without the compensatory mitigation;
- 6) Be durable and, at a minimum, maintain its intended purpose for as long as impacts of the authorized take persist;
- 7) Account for and address uncertainty and risk of failure of compensatory mitigation measures.

Compensatory mitigation may include conservation banking, in-lieu fee programs, and other third-party mitigation projects or arrangements that have been pre-approved by the Service. Permittee-responsible mitigation 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, 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, PGE would be required to implement a post-permit fatality monitoring program, including formalized eagle remains searches, searcher efficiency trials, and carcass persistence trials. This monitoring effort would need to achieve a minimum average probability of detection of 30%, as determined by the Service, across every 5-year administrative permit period. In all of the 30 permit years PGE 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.

PGE would be required to implement bias trials, including searcher efficiency and carcass persistence trials for at least one full year, stratified by each of four seasons, during each 5-year administrative permit period. 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 at least twenty surrogate carcasses per season, placed at randomly selected turbines and at random locations within each search plot. Carcass persistence trials would use at least ten surrogate carcasses per season placed at randomly selected turbines or at random locations within the project footprint or similar nearby habitat. PGE would use raptor carcasses as surrogates when possible. When the required sample size cannot be obtained, other surrogates may be used. Carcass persistence 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 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 4, 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 39 golden eagles and 20 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 conservatively predicted, 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 concern exists that realized take is nearing authorized levels, adaptive management would require PGE to implement a conservation measure that is likely to reduce take before permitted take is exceeded.

Under Alternative 2, PGE would be required to implement the following adaptive management plan. Triggers refer to and will be reached as a result of eagle remains found, not estimates of fatalities. The adaptive management measures are designed to require Enhanced Fatality Monitoring efforts (i.e. more rigorous monitoring required) with the achievement of every trigger (Table 4). This additional monitoring would permanently increase the average probability of detection at the project. Thus, every time additional monitoring is required under adaptive management, a new column is used to define new sets of triggers (columns 2, 3, 4 or 5 in Table 4). Each new trigger (corresponding with increases in monitoring effort) requires that higher numbers of eagle remains are found in order to catalyze an adaptive management measure. Simply put, upon permit issuance, the left-most columns define the applicable triggers. If adaptive management requires additional monitoring, the applicable triggers become those listed in column 3 through 5, depending on how many 5-year evaluation periods have had Enhanced Fatality Monitoring. Upon achievement of any trigger, enhanced monitoring will only be required for the subsequent 5-year evaluation period, at which point monitoring can resume as initially prescribed (i.e. g-value of > 0.30), unless another trigger is achieved. Since Trigger 6 is not achieved by the discovery of eagle remains, it remains constant regardless of how much monitoring has been performed.

Table 4. Stepwise adaptive management for eagle take at the Biglow Canyon Project under a 30-year permit.

Triggers (by Fatality Monitoring Performed)					
	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>≥ 3 golden eagle remains found in first 5 years OR 5 golden eagle remains found in first 10 years OR 3 bald eagle remains found in first 10 years</p>	<p>6 golden eagle remains found in first 10 years OR 3 bald eagle remains found in first 10 years</p>			<p>At the beginning of the next 5-year review period¹ (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 b) Perform enhanced monitoring during the next 5-year review period (i.e. achieve an average g-value² of 0.5 over the subsequent 5-year review period).³
Trigger 2	<p>≥ 6 golden eagle remains found in first 10 years OR ≥ 7 golden eagle remains found in first 15 years OR ≥ 4 bald eagle remains found in first 15 years</p>	<p>≥ 7 golden eagle remains found in first 10 years OR ≥ 8 golden eagle remains found in first 15 years OR ≥ 4 bald eagle remains found in first 15 years</p>	<p>≥ 9 golden eagle remains found in first 15 years OR ≥ 5 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) 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) Perform enhanced monitoring during the next 5-year Review period (i.e. achieve an average g-value of 0.5 over the subsequent 5-year Review period).
Trigger 3	<p>≥ 9 golden eagle remains found in first 20 years OR</p>	<p>≥ 10 golden eagle remains found in first 20 years OR</p>	<p>≥ 11 golden eagle remains found in first 20 years OR</p>	<p>≥ 12 golden eagle remains found in first 20 years OR</p>	<p>At the beginning of the next 5-year review period, implement both of the following:</p>

	≥ 5 bald eagle remains found in first 20 years	≥ 5 bald eagle remains found in first 20 years	≥ 6 bald eagle remains found in first 20 years	≥ 6 bald eagle remains found in first 20 years	<p>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. This measure will be installed to cover at least 5 turbines and its effectiveness tested. Effectiveness study design must be approved by the Service. Alternatively, the permittee may perform another measure not listed here if agreed upon by the Service.</p> <p>b) Perform enhanced monitoring during the next 5-year review period (i.e. achieve an average g-value 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>≥ 11 golden eagle remains found in first 25 years</p> <p>OR</p> <p>≥ 6 bald eagle remains found in first 25 years</p>	<p>≥ 12 golden eagle remains found in first 25 years</p> <p>OR</p> <p>≥ 6 bald eagle remains found in first 25 years</p>	<p>≥ 13 golden eagle remains found in first 25 years</p> <p>OR</p> <p>≥ 7 bald eagle remains found in first 25 years</p>	<p>≥ 14 golden eagle remains found in first 25 years</p> <p>OR</p> <p>≥ 7 bald eagle remains found in first 25 years</p>	<p>Immediately upon meeting this trigger, 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 monitoring during the next 5-year review period (i.e. achieve an average g-value 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</i></p>

					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.
Trigger 5	<p>The 5-year minimum g-value of 0.30 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 a g-value 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>Perform enhanced monitoring during the next 5-year review period (i.e. achieve an average g-value 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>Immediately upon meeting this trigger, implement all of the following:</p> <ul style="list-style-type: none"> a) Cease all non-emergency maintenance activities (as defined in 50 CFR 22.3) if the activities a) 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, b) will occur within 0.5 miles of an in-use golden eagle nest during the nesting season (Jan 1 to Aug 31), or c) will occur within 660 feet of an in-use bald eagle nest during the nesting season (Jan 1 to Aug 31). b) 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

		<p>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> <p>c) 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>¹ The term “5-year Review Period” refers to each defined 5-year period during the permit term between the 5-year check-ins. Over a 30-year permit, there will be 6 such periods (years 1-5, 6-10, 11-15, 16-20, 21-25, and 26-30).</p> <p>² g-value: the probability of detecting an eagle carcass/remains, if carcass/remains are present. The g-value for a particular carcass search method can be calculated in the Evidence of Absence software (https://pubs.er.usgs.gov/publication/ds881) using site-specific data to account for Searcher Efficiency and Carcass Persistence.</p> <p>³ Upon achievement of Triggers 1 through 5, and the requirement Enhanced Monitoring achieves a g-value of 0.5 over a 5-year period, the triggers are permanently increased until the permit expires or until additional Enhanced Monitoring is performed. In other words, once Enhanced Monitoring achieves a g-value of 0.5 over a 5-year period, the adaptive management table will not return to previously used triggers.</p>		

3.3.3. ALTERNATIVE 3: ISSUE 5-YEAR EAGLE PERMIT

Under Alternative 3, the Service would issue a 5-year eagle permit authorizing the incidental take of 7 golden eagles (1.28 per year) and 4 bald eagles (0.64 per year) associated with the Biglow Canyon Project pursuant to 50 CFR 22.26 (Table 2). 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. A 5-year duration permit alternative is reasonable to consider, as a permit may be issued for any duration between 5 and 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.

When issuing a 5-year permit, the Service incorporates into the permit conditions the level of impacts to eagles during that abbreviated time and the nature and extent of reduced mitigation measures. Monitoring, adaptive management, and compensatory mitigation measures would differ from the ECP as outlined in this section. Under Alternative 3, PGE would implement truncated versions of the required measures described under Alternative 2 for the 5-year permit term. The Service would assume that, over the remainder of the life of the Project, we would not be able to require implementation of the measures, and therefore could not rely on the long-term conservation benefits of the measures in its analysis. Regardless of how compensatory mitigation is provided, far less of it would be required under this Alternative than under Alternative 2, as fewer eagles would be authorized due to the shorter permit tenure. The applicant would have the option to apply for renewal of the permit after 5 years. This EA only analyzes the impacts for the 5-year permit tenure, and makes no assumptions about whether PGE would request a renewal of their permit at expiration.

3.3.3.1. Avoidance and Minimization Measures

The 5-year permit would incorporate as permit conditions the avoidance and minimization measures described under Alternative 2, but would only require those avoidance and minimization measures be implemented for the 5-year permit tenure.

3.3.3.2. Compensatory Mitigation – Power Pole Retrofits

Under Alternative 3, consistent with the Eagle Act preservation standard, PGE will provide compensatory mitigation for the take authorized by implementing the mitigation strategy described under Alternative 2 over a 5-year permit term. Because of the shorter permit term, compensatory mitigation amounts would be reduced in Alternative 3 compared to Alternative 2.

No compensatory mitigation is required for bald eagles under Alternative 3, and authorized take of golden eagles at the Project must be offset with compensatory mitigation at a ratio of 1.2:1. Because Phases I and II of the Project were constructed and operational prior to September 11, 2009, the Applicant would be required to offset the take of golden eagles attributable to Phase III of the Project only. Take at Phase III of the Project is predicted to be 0.49 golden eagles per year (see Appendix B), or 3 eagles during the 5-year permit term.

The method required to identify high risk poles would be identical to that outlined under Alternative 2. In addition, for poles to count towards compensatory mitigation, they must be approved, in writing, by the Service.

To offset take through the 5-year permit tenure and to meet regulatory requirements, PGE would need to retrofit 49 power poles that are high risk to eagles and subsequently monitor, maintain, and replace/redo those retrofits for 30 years. This requirement may also be met by retrofitting 114 poles through the Eagle Electrocution Solutions in-lieu fee program or by implementing their own efforts to retrofit 111 power poles that are high risk to eagles and maintaining those retrofits for 10 years. Under Alternative 3, PGE would not be required to retrofit additional high risk poles beyond the 5-year permit term, over the life of the project.

3.3.3.3. Fatality Monitoring

Under Alternative 3, PGE would implement an operational fatality monitoring program, including formalized eagle remains searches, searcher efficiency trials, and carcass persistence trials. Eagle remains searches (i.e. carcass searches) would be conducted by PGE with a method that achieves, as determined by the Migratory Bird Permit Office, a 44%, 3-year average probability of detecting a collision of an eagle with a project wind turbine, should one occur during the first 3 years of the permit tenure. This monitoring effort, when combined with 2 years of only opportunistic monitoring in years 4 and 5, would equate to a 5-year average probability of detection of 30% (assuming the probability of detection in years 4 and 5 is 10% from operations and maintenance staff alone). If an average site-wide probability of detection of 44% is not achieved over the first 3 years, as determined by the Migratory Bird Permit Office, adaptive management measures are prescribed as described in Section 3.3.3.4.

Searcher efficiency trials would be conducted by PGE for at least one year per search method during the permit tenure and would be stratified by each of the four seasons in each year. These 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.

Carcass persistence trials would be conducted by PGE for at least one year during the permit tenure and would be stratified by each of the four seasons of the year. PGE would use raptor carcasses as surrogates when possible. The number of surrogate carcasses per season for searcher efficiency and carcass persistence trials would be the same as under Alternative 2. When the required sample size cannot be obtained, other surrogates may be used. Carcass persistence trials would last for a duration of at least 90 days per season.

In years 4 and 5, fatality monitoring would not occur at the Project. However, eagle carcasses might be discovered by onsite personnel during turbine maintenance or general turbine inspections. Additional operational fatality monitoring may be warranted in year 4 under this alternative, if triggered by Adaptive Management, described in detail in the next section.

Under this alternative, fatality monitoring results would be reported to the Service annually for any searches for eagle remains and any bias trial performed during the permit tenure. This includes years when formal eagle remains searches were not conducted. This reporting would not be required beyond the 5-year permit term, over the life of the project. As a condition in PGE's SPUT permit, all eagle fatalities will be also be reported to the Service within 48 hours of discovery.

3.3.3.4. Adaptive Management

The CRM conservatively predicts the collision of 7 golden eagles and 4 bald eagles with project turbines over the 5-year permit term (Table 2). As the number of eagle remains found increases through formalized fatality monitoring efforts, adaptive management would require PGE to implement a conservation measure that is likely to reduce take before permitted take is exceeded.

Under Alternative 3, PGE would implement the following adaptive management plan. Under this Alternative, triggers would be assessed and conservation measures implemented over a shorter time period than under Alternative 2. As reflected in Alternative 2, triggers refer to and would be reached as a result of eagle remains found, not estimates of fatalities.

outlines triggers and conservation measures that have been identified through discussions with PGE, as ways to ensure realized take at the Project does not exceed our fatality prediction and the permitted amount of take for each species. Triggers in Table 5 are based on the assumption that the average probability of detecting eagle remains (if present) during the first 3 years of the permit tenure (i.e. average g-value) is 0.44, and in years 4 and 5 is 0.10. Under Alternative 3, adaptive management outlined in Table 5 will be required for the tenure of the permit.

Table 5. Stepwise adaptive management for eagle take at the Biglow Canyon Project under Alternative 3.

Trigger or Threshold		Conservation Measures
Trigger 1	Remains of 1 golden eagle found during the permit tenure	Immediately upon achievement of this trigger, implement the following: c) 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
Trigger 2	Remains of 2 golden eagles found during the first 3 years of fatality monitoring OR Remains of 1 bald eagles found during the first 3 years of fatality monitoring	Immediately upon achievement of this trigger, implement the following: c) 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.
Trigger 3	Remains of 2 golden eagles found during any 2 year period OR Remains of ≥ 3 golden eagles found during the permit term (5 years) OR Remains of ≥ 2 bald eagles found during the permit term (5 years)	Immediately upon achievement of this trigger, implement either measure a) or b) below and implement measure c): c) 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. This measure will be installed on at least 5 turbines and its effectiveness tested. Effectiveness study design must be approved by the Service. Alternatively, the permittee may perform another measure not listed here if agreed to by the Service. d) 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 to by the Service. This Alternative measure might be the continuation of the measures described under Trigger 2, if it has been previously implemented and proven effective in consultation with the Service. e) Perform enhanced monitoring for one additional year (i.e. achieve an average g-value ¹ of 0.44 over the subsequent year after achievement of this trigger). <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</i>

Trigger or Threshold		Conservation Measures
		<i>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>
Trigger 4	The 3-year minimum average g-value ¹ of 0.44 is not achieved (on average) across the first 3 years of the permit tenure, as determined by the Service. OR Enhanced monitoring, if required through adaptive management, does not achieve a g-value ¹ of 0.44, as determined by the Service.	Perform enhanced monitoring for one additional year or until the expiration of the permit, whichever is shorter. In other words, achieve an average g-value ¹ of 0.44 over the subsequent year after achievement of this trigger or until the permit expires).
Trigger 5	A GOEA nest is discovered within 1 mile of any project turbine OR A BAEA nest is discovered within 0.5 miles of any project turbine	Immediately upon meeting this trigger, implement all of the following: a) Cease all non-emergency maintenance activities (as defined in 50 CFR 22.3) if the activities a) 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, b) will occur within 0.5 miles of an in-use golden eagle nest during the nesting season (Jan 1 to Aug 31), or c) will occur within 660 feet of an in-use bald eagle nest during the nesting season (Jan 1 to Aug 31). b) 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 in a year when the nest is in-use to determine if the territory or home-range associated with the nest overlaps the project footprint. c) 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.

3.3.4. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

3.3.4.1. Issue Permit with Additional Conditions

An alternative was considered to issue an eagle take permit with additional conditions that might further reduce effects to eagles, including avoidance and minimization measures, monitoring, compensatory mitigation, and/or adaptive management strategies. The Service has the authority to add additional conditions deemed appropriate to all permits issued (50 CFR 13.21(e)). Additional avoidance and minimization measures were considered, such as including requiring the use of artificial intelligence technology during wind turbine operations to improve turbine curtailment when eagles are detected near the Project. The Service also considered mitigation conditions, such as increasing the ratio to offset take from 1.2:1 to 2:1. Fatality monitoring requirements could also be increased to include additional years of eagle remains searches, searcher efficiency trials, and carcass persistence trials during the permit term. However, requiring these additional conditions would be unnecessary to achieve the preservation standard for eagles, and would require a justification to deviate from national practice. Thus, for the purposes of analyzing effects of issuing an eagle take permit at this Project, and in conformity with national practice, we did not consider an additional alternative that would add additional conditions to the permit.

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

Under current regulations, an eagle 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 the 2009 rule as modified

After the publication of the most recent rule revision in December 2016, we gave all existing permit applicants the choice of having their permit processed under the old regulations (2009, as modified in 2013) or the new regulations (2016). PGE elected to apply for a 30-year permit under the new (2016) regulation. This decision is up to the applicant; therefore, this alternative was also dismissed from further consideration.

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.

4.2. Physical Environment

The Project Area is located approximately 5 miles northeast of the city of Wasco in Sherman County, Oregon, within the Columbia Plateau Ecoregion. The Project Area is located between the John Day River to the east, the Columbia River to the north, and smaller canyons to the south and east (Figure 1). The overall Project boundary encompasses approximately 25,000 acres of privately owned land, which is used primarily for dryland wheat agriculture. There are some Conservation Reserve Program lands within the Project Area (Jin et al. 2013), and shrub-steppe and grassland habitats are located in portions of the Project Area that are unsuitable for agriculture (Figure 2).

Elevations within the Project Area range from 250 feet above sea level near the mouth of the John Day River to 1,600 feet on the higher ridges. Precipitation throughout the region ranges from 6 – 12 inches per year (Thorson et al. 2003).

4.3. Bald and Golden Eagles

4.3.1. 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 to be 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). Because of their delisted status and their protection under the Eagle Act, bald eagles remain on our Birds of Conservation Concern 2008 list for Bird Conservation Region (BCR) 9 (USFWS 2008), which overlaps the Project.

4.3.1.1. 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 mid-latitude EMU.

The estimated median population size of bald eagles in the Pacific Flyway mid-latitude EMU is 14,792 (USFWS 2016c). This estimate was derived using the estimated number of occupied bald eagle territories in the coterminous United States and conservative estimates of the proportion of the population that consisted of breeding adults (USFWS 2016c). Our estimate of total population size for bald eagles in the coterminous United States increased from 2009 to 2016 (68,923 in 2009 to 72,434 in 2016), which is correlated with a substantial increase in the estimated number of occupied nesting territories in the lower 48 states over that period (USFWS 2016c).

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 the finest scale density estimates available to the Service 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 bald eagles.

4.3.1.2. Bald Eagle Occurrence at Biglow Canyon

Bald eagles appear to use the Project Area and surrounding landscape occasionally, primarily during spring and fall migration or during the winter. This use seems to be consistent with bald eagle use at other existing wind projects in the Columbia Plateau Ecoregion (Johnson et al. 2002, Johnson 2004, ABR, Inc. 2005). The Project Area does not contain high-quality bald eagle foraging or nesting habitat. No bald eagle nests have been documented within 2 miles of the Project. The closest known bald eagle nest to the Project is approximately 4 miles from the Project boundary, along the Columbia River (Isaacs 2015).

Aerial nest surveys were conducted within a 2-mile buffer of the entire Project Area in May/June 2001 and again in April 2004. Subsequent surveys prior to construction focused on areas within 0.5 miles of proposed construction corridors, per EFSC requirements (WEST 2005). No bald eagle nests were documented during either the baseline or the EFSC surveys. Because the Project was built in three phases, additional raptor nest surveys for sensitive species, including eagles, were conducted prior to construction of each additional phase, per EFSC requirements. Surveys were required within 0.5 miles of proposed construction activities the spring prior to construction (ODOE 2006). No bald eagle nests were found during these surveys either.

Fixed-point avian use surveys were conducted at Biglow Canyon from March 2004 through March 2005. These surveys used a fixed-point avian count study protocol, and were designed to evaluate the spatial and temporal patterns of avian use to estimate potential impacts prior to development. No bald eagles were observed during these surveys. At the Oregon Department of Fish and Wildlife's request, additional pre-construction surveys were conducted at six new point count locations beginning in September 2005. These surveys included all birds, but focused on raptors and other large birds. Points were located throughout the three phases, with two points along the John Day Canyon in Phase III. Two bald eagles were observed during these additional surveys.

Post-construction fixed-point avian use surveys were conducted for 2 years following the construction of each phase of the Project in order to document bird use and abundance near the Project turbines and along the adjacent John Day Canyon. Thirty bald eagle observations (excluding incidental observations) were recorded during the post-construction surveys for the three phases of the Project, between 2008 and 2012. Maps of survey point locations and flight paths are depicted in the ECP.

Two post-construction surveys for raptor nests for each of the phases were conducted within the first 5 years of operation. The first year of post-construction raptor nest surveys were conducted at each of the three phases in years 2008, 2010, and 2011, respectively. The second year of post-construction surveys for raptor nests was conducted in 2012 and covered all three phases. No bald eagle nests were observed during 4 years of aerial raptor nest surveys within 2 miles of the Project boundary. A raptor nest survey was conducted in March-June 2017. No bald eagle breeding areas were detected during this survey.

4.3.2. 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. Because of concern for golden eagle populations long-term, golden eagles are listed on our *Birds of Conservation Concern 2008* list for BCR 9 (USFWS 2008), which overlaps the Project.

4.3.2.1. 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. 2015). 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 Biglow Canyon 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. 2015). The population size of the LAP is estimated by applying the finest scale density estimates available to the Service 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 631 golden eagles.

4.3.2.2. Golden Eagle Occurrence at Biglow Canyon

Golden eagles are known to nest near the Project, and limited use of the Project 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 agricultural land, but golden eagles may hunt for jackrabbits and other prey within the shrub-steppe and grassland habitat in the Project Area. Two golden eagle nests have been documented within 2 miles of the Project, both of which are approximately 2 miles from the Project boundary, and were occupied at least once between 2011 and 2014 (Figure 3; Isaacs 2015).

Aerial nest surveys were conducted within a 2-mile buffer of the entire Project Area in May/June 2001 and again in April 2004. Subsequent surveys prior to construction focused on areas within 0.5 miles of proposed construction corridors, per EFSC requirements (WEST 2005). No golden eagle nests were documented during either the baseline or the EFSC surveys. Because the Project was built in three phases, additional raptor nest surveys for sensitive species, including eagles, were conducted prior to construction of each additional phase, per EFSC requirements. Surveys were required within 0.5 miles of proposed construction activities the spring prior to construction (ODOE 2006). No golden eagle nests were found during these surveys either.

Two post-construction surveys for raptor nests for each of the phases were conducted within the first 5 years of operation. The first year of post-construction raptor nest surveys were conducted at each of the three phases in years 2008, 2010, and 2011, respectively. The second year of post-construction surveys for raptor nests was conducted in 2012 and covered all three phases. No golden eagle nests were observed during 4 years of aerial raptor nest surveys within 2 miles of the Project boundary. The first 5-year raptor nest survey was conducted in March-June 2017. One occupied and three unoccupied golden eagle breeding areas were detected during the survey. Maps of nest locations are depicted in the ECP (ECP Figure 6).

Additional information on eagle nests in the state of Washington is available from the Washington Department of Fish and Wildlife (WDFW), which has performed eagle nest surveys between 1990 and 2014. These surveys have detected six golden eagle breeding areas and no bald eagle breeding areas within a 10-mile radius of the Project (WDFW, unpublished data). The two nearest golden eagle breeding areas in Washington are located approximately 4 miles (6.4 kilometers) northwest of the Project. Available information on occupancy of these breeding areas and associated nest status since 2010 is presented in Table 9 of the ECP. In total, the centroids of 11 known golden eagle breeding areas lay within 10 miles (16.1 kilometers) of the Project boundary.

Fixed-point avian use surveys were conducted at Biglow Canyon from March 2004 through March 2005. These surveys used a fixed-point avian count study protocol, and were designed to evaluate the spatial and temporal patterns of avian use to estimate potential impacts prior to development. No golden eagles were observed during these surveys. At the Oregon Department of Fish and Wildlife's request, additional pre-construction surveys were conducted at six new point count locations beginning in September 2005. These surveys included all birds, but focused on raptors and other large birds. Points were located throughout the three phases, with two points along the John Day Canyon in Phase III. Ten golden eagles were observed during these additional surveys.

Post-construction fixed-point avian use surveys were conducted for 2 years following the construction of each phase of the Project in order to document bird use and abundance near the Project turbines and along the adjacent John Day Canyon. Fifty-four golden eagle observations (excluding incidental observations) were recorded during the post-construction surveys for the three phases of the Project, between 2008 and 2012. Maps of survey point locations and flight paths are depicted in the ECP.

Three golden eagle fatalities have been documented in the Project Area between 2012-2017, including two fatalities in Phase II (September 14, 2012, and December 15, 2017), and one fatality in Phase III (February 4, 2015).

4.4. Migratory Birds and Bats

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) that would be required under Alternatives 2 and 3. We do not expect other species of birds to be affected by the Federal action being considered in this EA. 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.

4.4.1. 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 wing spans, 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). Ferruginous Hawks are a bird of conservation concern (USFWS 2008) because of concern regarding its population status and trends. 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).

4.4.2. BATS

Bat fatality monitoring occurred at each of the three phases of the Project for two consecutive years once they became operational. The 2-year average fatality rate for bats was 1.29, 1.64, and 0.44 bat fatalities/MW/year at Phase I, II, and III, respectively. All identifiable bat fatalities were silver-haired bat and hoary bat. PGE reports bat species information to the Service and the Oregon Department of Fish and Wildlife in annual reports.

4.5. Federally Endangered and Threatened Species

Of the 42 federally listed threatened or endangered species that occur in the State of Oregon, the yellow-billed cuckoo is the only terrestrial species threatened, endangered, proposed, or candidate for listing under the ESA that has the potential to occur within the Project Area. However, the Project Area lacks suitable habitat for yellow-billed cuckoos, and we are aware of no recorded observations/sightings in Sherman County. The Project Area is also unlikely to be in a cuckoo migratory corridor, as this species is considered extirpated further north in Washington and British Columbia.

There are six federally threatened and endangered fish species, including the Bull Trout (*Salvelinus confluentus*), with the potential to occur near the Project; however, neither continued operation nor construction of the Project has significant impacts on any of these fish species because of the lack of fish habitat within or near the Project (ODOE 2006).

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.

4.6. Tribal Traditional Uses/Native American Religious Concerns

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 under the National Historic Preservation Act. Resources or issues of interest to the Tribes that could have a bearing on their traditional use and/or religious freedom include eagles (e.g., ceremonial use of eagle feathers). In addition, some Tribes and tribal members may consider eagle nests sacred sites (or traditional cultural properties) or potential historic properties of religious and cultural importance, as provided for in the American Indian Religious Freedom Act. Power pole retrofits could potentially affect cultural resources if the ground is disturbed during removal or replacement, and pole locations overlap with cultural sites.

Chapter 5.0 Environmental Consequences

5.1. Introduction

This chapter addresses the potential environmental consequences of implementing each alternative. Under Alternative 2, 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 permit is issued under Alternative 2, 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 site, 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.

Under Alternative 3, the permit term would be 5 years, so the direct and indirect effects analyzed are considered over a 5-year term. If an eagle permit were issued under Alternative 3, the permit would expire in five years. The permit may be renewed after its expiration following a new

review and a determination if issuance criteria have been met. Under Alternative 3, this EA only analyzes the impacts for the 5-year permit tenure.

Direct and indirect effects of the alternatives are addressed in this chapter; cumulative effects are addressed in Chapter 6 (see 40 CFR 1508 for definitions). Since the Project is fully built and operational, the effects associated with developing a wind project are not considered here.

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. BALD AND GOLDEN EAGLES

As part of the eagle permit application review process, we are required to evaluate and consider effects of issuing eagle 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 bald and golden 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. Three golden eagle fatalities have been documented since the Project became operational and additional fatalities may have gone undetected. We expect periodic eagle fatalities are likely to continue for the life of the Project.

Based on results from pre-construction avian use data and post-construction fatality monitoring, we developed predictions for the annual rate of bald and golden 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 other eagle take such as nest disturbance, loss of productivity due to the death of breeding adults, or other loss listed in section 5.2.1.2 below. The annual fatality estimates of 1.28 golden eagles and 0.64 bald eagles are 0.2% and 0.1%, 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.
- Above-ground segments of the power collection system are limited to 7.0 miles (11.3 kilometers), and all other collector electrical systems between turbine strings are underground outside of native habitats. Electrocutation risk is negligible since most of the electrical lines on site are underground, and those above ground were built using raptor-safe methods (APLIC 2006), such as minimum conductor spacing and anti-perch guards to reduce the risk of raptor collision with Project power lines; 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.
- 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 bald eagle nests and one known golden eagle nest near the project footprint. Thus, if present territory configurations surrounding the project remain, the risk is low to eagles from repowering or decommissioning. Should PGE wish to obtain authorization for eagle take incidental to repowering or decommissioning activities or the subsequent operation of repowered turbines, they would need to apply for a new eagle take permit or amend any existing permit. At the time of application or renewal, we would review the details of their proposed activity and assess any likely impacts to eagles.

Although there have been golden eagle breeding areas documented within 10 miles of the Project Area, 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

Based on the lack of suitable habitat for ESA-listed species that occur near the Project, the Service does not anticipate that any of the Alternatives analyzed here will have an effect on federally listed threatened or endangered species or critical habitats.

5.3. Alternative 1 – No Action

Under the No Action Alternative, in which we do not issue an eagle take permit, PGE has indicated that the Biglow Canyon Project would continue to operate under its current operational plan as described in Chapter 1. Therefore, under this alternative, PGE would continue to implement conservation measures, best management practices (BMPs), and incidental monitoring under the SCA, report all avian and bat fatalities under their SPUT permit, and manage avian issues and concerns consistent with PGE’s Avian Protection Plan (APP). (An APP describes a utilities’ commitment to reducing bird electrocution and collision risk on that utilities’ distribution lines across their service area.) However, the eagle-specific conservation measures, 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

Fatality rates (at the upper 80th quantile) from collision with Project turbine blades for bald eagles and golden eagles under Alternative 1 are predicted to be 1.28 golden eagles per year, and 0.64 bald eagles per year; over 5 years, this equates to 7 golden eagles and 4 bald eagles (Table 2, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 39 golden eagles and 20 bald eagles. These predictions are the same as under Alternatives 2 and 3. 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 of incidental finds only by trained project operations staff. Reporting would occur as outlined under both the SCA, 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 compensatory 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, compensatory mitigation, and adaptive management would not occur under the No-Action Alternative.

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 Oregon or the Pacific Northwest.

5.3.3. CULTURAL AND OTHER PRIORITY USES

Eagles and their feathers are sacred in many Native American traditions. Selection of Alternative 1 is not expected to interfere substantially with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. However, eagle remains that are found go to the Service's National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes. If we select the No Action Alternative, PGE will not be required to implement operational monitoring. 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 PGE 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. This would likely be concerning to many tribes.

5.4. Alternative 2 – Issue a 30-Year Permit

Under this alternative, a 30-year eagle permit would be issued authorizing the incidental take of bald eagles and golden eagles associated with the Project pursuant to 50 CFR 22.26. The permit would be for the incidental take of up to 39 golden eagles and 20 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 PGE 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

Under Alternative 2, PGE 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 PGE but they would be required to achieve, at a minimum, a site-wide probability of detection (g-value) of 0.30 (30%) over each 5-year period and include carcass persistence and searcher efficiency trials as described in Chapter 3. If adaptive management triggers were met, monitoring efforts would increase. Fatality monitoring at this temporal scale (life of project) would provide additional data, compared to Alternative 3, and 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 temporal scale would allow the Service to update continuously 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 conducted under one of a range of mitigation completion schedules and retrofit longevity proposals (Table 3) implemented every 5 years. Alternatively, compensatory mitigation could be completed for the entire permit term up front or could be completed using another Service-approved mitigation strategy. Under all scenarios in Alternative 2 results in a greater number of total power pole retrofits (or other mitigation) compared to Alternative 3, where power pole retrofits are limited to the 5-year permit term and do not extend through the life of the project. 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 to electrocution are proportional to the demographic distribution of the population and, thus 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 eagles beyond what would occur under Alternative 3.

Under Alternative 2, realized fatality rates that are 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, PGE 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 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 or Alternative 3. The number of birds affected would be challenging to quantify, however, as there are not good data around baseline electrocution rates of large birds in northeastern Oregon. 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

No effects on federally endangered or threatened species or designated critical habitat are anticipated as a result of issuing a 30-year eagle take permit. The footprint of this facility may include habitat for the bull trout (*Salvenius confluentus*); however, the issuance of a 30-year eagle take permit will have no effect on bull trout should they occur in the vicinity. 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. The Service would then evaluate the effects of the proposed retrofits on ESA-listed species and their critical habitats at that time as appropriate.

Furthermore, 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.

5.4.4. CULTURAL AND HISTORIC PROPERTIES AND OTHER PRIORITY USES

Eagles and their feathers are sacred in many Native American traditions. Selection of Alternative 2 is not expected to interfere substantially with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. However, with a requirement for fatality monitoring that extends through the expected life of the project, it is likely that more eagle remains will be discovered compared to Alternative 3. Eagle remains that are found go to the Service's National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes. The largest percentage of eagle remains may be found under Alternative 2, increasing the number of eagles collected and available to Native Americans over time for their use for ceremonial purposes.

Continued operation of the project under Alternative 2, including incidental take of eagles, is not expected to interfere with other priority uses or permits during the 30-year permit term because the eagle preservation standard is expected to be achieved through the implementation of permit conditions.

Under Alternative 2, a greater number of power pole retrofits will be required. This could increase the risk of disturbance of cultural resources and historic properties compared to Alternative 3; however, because retrofits and/or pole replacements 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, PGE has agreed to conduct a cultural resources assessment for each power pole they select for retrofitting if the proposed retrofit action will involve ground disturbance. A report from these assessments 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 at that time as appropriate.

The Service does not anticipate that issuance of a permit will preclude issuance of another permit necessary to protect an interest of higher priority.

5.5. Alternative 3 – Issue 5-year eagle permit

Under this alternative, a 5-year eagle permit would be issued authorizing the incidental take of bald eagles and golden eagles associated with the Biglow Canyon Project pursuant to 50 CFR 22.26. The permit would be for the incidental take of up to 7 golden eagles and 4 bald eagles during the 5-year permit period. The applicant would have the option of applying for renewal of their permit at 5-year intervals. The 5-year permit would incorporate, as permit conditions, the avoidance and minimization measures, monitoring, compensatory mitigation, and adaptive management described above that PGE developed through coordination with the Service. However, we evaluate these measures only for the 5-year permit term and must assume they would not be implemented over the life of the Project, as it is up to the applicant to request renewal if they so choose.

5.5.1. EAGLES

Alternative 3 provides a commitment to implementing the measures outlined above, including minimization, monitoring, compensatory mitigation, and adaptive management for the duration of the permit term, but with no commitment to renew the permit over the remaining life of the project. These measures would be supplemental to the conservation measures and BMPs implemented under the SCA, SPUT permit, and APP, and would provide additional benefits specific to eagles. Similar to Alternative 2, PGE 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. However, under Alternative 3, these measures would only apply to the 5-year permit term.

Under this alternative, as described in the ECP, PGE would commit to implementing operational eagle fatality monitoring during the 5-year permit term. This approach would satisfy the Service's monitoring requirement, and would include periodic surveys of each turbine for eagle remains, along with carcass persistence and searcher efficiency trials.

Mitigation implemented under Alternative 3 would continue through the 5-year permit term only, and would include a strategy to complete power pole retrofits at a 1.2:1 ratio for golden eagle mortality attributable to Phase III of the Project. Power pole retrofits are intended to protect eagles from electrocution. If retrofitting were selected as a mitigation strategy, between 49 and 111 utility pole retrofits would be completed prior to January 31, 2022. The applicant would provide assurances, if needed, that the retrofitted poles would remain in compliance with APLIC guidelines (2006) over the agreed upon retrofit longevity. Avoided electrocution fatalities will offset project-related golden eagle fatalities at a ratio of 1.2:1, thereby benefitting eagle populations as a whole. Eagles from nearby LAPs could also benefit from pole retrofits or other

potential mitigation as described above. 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.

Other mitigation strategies under Alternative 3, if selected by PGE and approved by the Service, would also be a benefit to eagles for the tenure of the 5-year permit. However, at the time of this EA, PGE is intending to implement only power pole retrofits to achieve their compensatory mitigation requirement.

Under this Alternative, the Service's eagle preservation standard would be achieved, but only for as long as the permit tenure (5 years). 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 or bald eagles at the EMU or LAP scale over the life of the Project. In fact, because this is an existing project that will continue to operate regardless of the alternative chosen, we expect there to be benefits to eagles overall in the short-term under this alternative due to the long-term monitoring, mitigation, and adaptive management measures as described above. However, beyond 5 years after permit issuance, the Service's eagle preservation standard would not likely be met under this alternative.

5.5.2. RAPTORS AND OTHER LARGE BIRDS

We expect that there will be some benefit to raptors and other large birds under Alternative 3 because, if power pole retrofits are selected as a mitigation strategy, they will be designed to reduce electrocution risk to eagles and, therefore, would reduce the electrocution risk to this group of birds. As a result, there would be potentially fewer electrocuted hawks and owls under this alternative than under the No Action Alternative. However, the benefits to raptors and other large birds would not be as great as under Alternative 2, where more compensatory mitigation would be required. The number of birds affected under this Alternative would be challenging to quantify, as there are not good data around baseline electrocution rates of large birds in Oregon or the Pacific Northwest. Other mitigation strategies used to offset mitigation, such as roadside carcass removal, 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

No effects on federally endangered or threatened species or designated critical habitat are anticipated as a result of issuing a 5-year eagle take permit. The footprint of this facility may include habitat for the bull trout (*Salvenius confluentus*); however, the issuance of a 5-year eagle take permit will have no effect on bull trout should they occur in the vicinity. 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. The location and types of power pole retrofits under this alternative would be

provided to the Service in a Pre-Retrofit Plan. The Service would then evaluate the effects of the proposed retrofits on ESA-listed species and their critical habitats at that time as appropriate.

Furthermore, 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.

5.5.4. CULTURAL AND HISTORIC PROPERTIES AND OTHER PRIORITY USES

Eagles and their feathers are sacred in many Native American traditions. Selection of Alternative 3 is not expected to interfere substantially with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. Eagle remains that are found go to the Service's National Eagle Repository and, if in good condition, are distributed to permitted members of federally recognized tribes. Under Alternative 3, the larger percentage of eagle remains may be found compared to Alternative 1, increasing the number of eagles collected and available to Native Americans for their use for ceremonial purposes. However, a smaller percentage of eagle remains may be found compared to Alternative 2, which may cause fewer eagle remains to be found and sent to the National Eagle Repository.

We do not anticipate that the take of eagles at Biglow Canyon under Alternative 3 will interfere with cultural practices and ceremonies related to eagles, or affect the ability of Native Americans to utilize eagles, parts, or feathers in a manner consistent with federal law. As under Alternative 2, permitting the incidental take of eagles is not expected to interfere with other priority uses or permits because the eagle preservation standard is expected to be achieved under implementation of the ECP.

Power pole retrofits under this Alternative will occur within right-of ways. Retrofits and/or pole replacements will involve the use of standard utility equipment/vehicles on existing service roads and in previously disturbed habitat; thus, no impacts to cultural resources and historic properties are expected under Alternative 3. Nonetheless, PGE has agreed to conduct a cultural resources assessment for each power pole they select for retrofitting if the proposed retrofit action will involve ground disturbance. A report from these assessments will be provided to the Service as part of the pre-retrofit approval process. Based on that information, the Service will consult with interested Indian Tribes and the State Historic Preservation Officer at that time as appropriate.

Chapter 6.0 Cumulative Effects

Under both action alternatives, the Service's Fatality Model (USFWS 2013) predicts that 1.28 golden eagles and 0.64 bald eagles will be killed annually (prediction at the 80th quantile) at the Project. We combined the predicted annual impacts of the Project with impacts from other permitted and unpermitted human activities to determine if issuing an eagle 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 ECPG (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 that suggests background levels of unpermitted anthropogenic take that exceeds 10 percent of that LAP may indicate that anthropogenic take is higher than average near the project being analyzed. 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, 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. In addition, we communicated with state wildlife agencies within the LAP to incorporate any eagle mortality records they have that may not be included in our database.

6.1.1. GOLDEN EAGLES

The golden eagle LAP for the Biglow Canyon Project overlaps and is composed of eagles in three golden eagle Local Area Density Units (LADUs¹) – the Northern Rockies, Great Basin and Northern Pacific Rainforest. We estimate this LAP to contain approximately 631 golden eagles; the 1%, 5% and 10% benchmarks for this estimate are approximately 6, 32, and 63 golden eagles, respectively).

6.1.2. BALD EAGLES

The bald eagle LAP overlaps and is composed of eagles in only one EMU - the Pacific. We estimated this LAP to contain approximately 565 bald eagles. The 1%, 5% and 10% benchmarks of this estimate are approximately 6, 28, and 57 bald eagles, respectively.

¹ 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.

Table 6. Estimated Golden Eagle and Bald Eagle Local Area Population for the Biglow Canyon Project.

Bird Conservation Region	Estimated Number of Golden Eagles	Estimated Number of Bald Eagles
Great Basin (portion of LAP)	443.52	N/A
Northern Rockies (portion of LAP)	172.33	N/A
Northern Pacific Rainforest (portion of the LAP)	15.23	N/A
Pacific (portion of LAP)	N/A	565.14
Total Local Area Population	631.08	565.14
1% LAP Benchmark	6.31	5.65
5% LAP Benchmark	31.55	28.26
10% LAP Benchmark	63.11	56.51

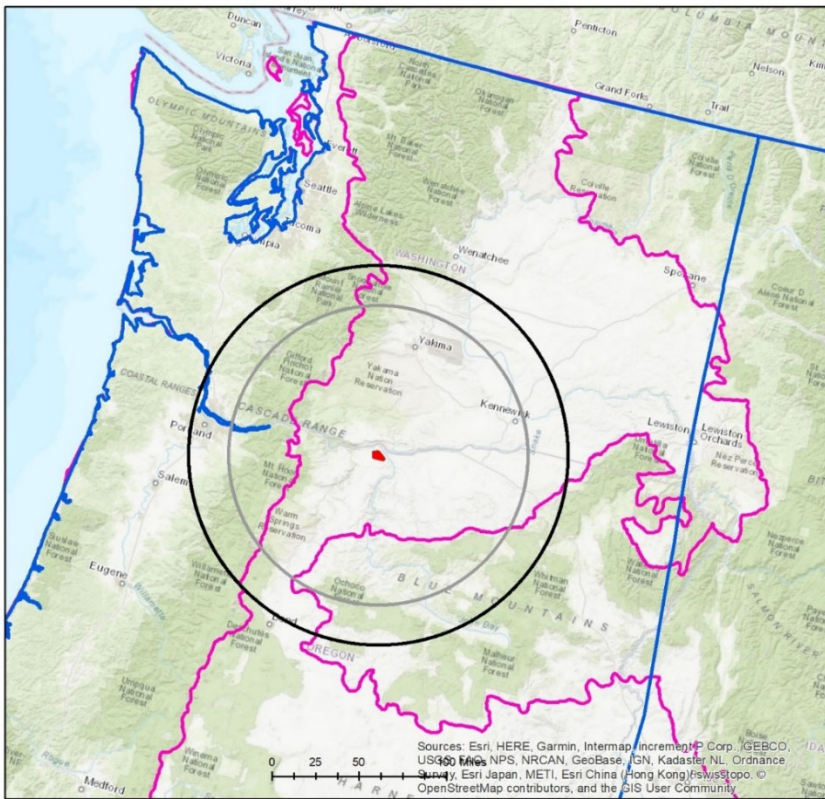


Figure 3. The Biglow Canyon Wind Farm Local Area Population (109 mi. radius circle in black for golden eagles, 86 mi. radius circle in gray for bald eagles). The golden eagle Local Area Density Unit boundary in magenta, bald eagles in blue.

6.2. Authorized Take

6.2.1. GOLDEN EAGLES

At the time of this EA, the Service has authorized the annual take of approximately 1.82 golden eagles that overlaps the species-specific LAP for the Biglow Canyon Project. The Service has also received applications for additional eagle take at other wind projects that have LAPs that overlap the Biglow Canyon Project golden eagle LAP. Although take may be authorized at those projects eventually, the predicted take for golden eagles at these projects is not considered in the following analysis.

Under Alternatives 2 and 3, the sum of all annual authorizations for all currently permitted golden eagle take within the LAP, including take associated with the Biglow Canyon Project, is 3.1 birds per year. This value is calculated by adding the predicted annual take at the focal project (1.28) to the previously authorized annual take approximation in the above paragraph that overlaps the LAP (1.82). This permitted take would be approximately 0.49% of the LAP, which is currently below both the 1% and 5% threshold.

6.2.2. BALD EAGLES

At the time of this EA, the Service has authorized the annual take of approximately 3.62 bald eagles that overlaps the species-specific LAP for the Biglow Canyon Project. The Service has also received applications for additional eagle take at other wind projects that have LAPs that overlap the Biglow Canyon Project 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.

Under Alternatives 2 and 3, the sum of all annual authorizations for all currently permitted bald eagle take within the LAP, including take associated with the Biglow Canyon Project, is 4.26 eagles. This permitted take would be approximately 0.75% of the LAP, which is below both the 1% and 5% thresholds.

6.3. Unauthorized Take

An important caveat that comes with the Service's unauthorized take data is that it primarily includes records of take that have been incidentally discovered and reported. In addition, some industries have self-reported incidental eagle mortalities at a higher rate than others, and some types of eagle mortalities (e.g., road kill) lend themselves to better incidental discovery and reporting while mortalities 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 Biglow Canyon Project LAP, we used eagle mortality records from the Service’s database (Table 7) within 2 times the average species-specific natal dispersal distance for the most recent 10-year period (2009 – 2018). This distance (2x natal dispersal distance) was used because it is the largest distance within which an eagle mortality would be expected to affect the LAP in question, making it a conservative way to inform this analysis. 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 281 unauthorized anthropogenic golden eagle mortalities within 218 miles of the Biglow Canyon Project from 2009 to 2018 (Table 7). Of the known anthropogenic causes of mortality for golden eagles, 32 (11.4%) were due to collision with wind turbines, 101 (35.9%) were due to electrocution and 8 (2.8%) were shot.

Although many of the available golden eagle mortality records from the Service’s database are related to strikes by wind turbines, electrocutions, or shooting, 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 Biglow Canyon 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 2009 to 2018 to calculate the annual unpermitted eagle take rate documented within the LAP. From this analysis, the Service calculates that we know of approximately 28.1 (4.45%) anthropogenic golden eagle mortalities per year in the Biglow Canyon 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 278 unauthorized anthropogenic bald eagle mortalities within 172 miles of the Biglow Canyon Project from 2009 to 2018 (Table 7). Of the known anthropogenic causes of mortality for bald eagles, 151 (54.3%) were due to electrocution, 32 (11.5%) were due to collision with wires and other objects, and 15 (5.4%) were due to poisoning (Table 7). 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 2009 to 2018 to calculate the annual unpermitted eagle take rate documented within the LAP. From this analysis, the Service calculates that approximately 27.8 (4.92%) annual bald eagle mortalities may influence the 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 7. Known unauthorized golden eagle mortalities within 218 miles and bald eagle mortalities within 172 miles of the Biglow Canyon Project from 2009 through 2018.

Source	Golden Eagles		Bald Eagles	
	Number of Fatalities ^{1,2}	Number of Fatalities (Annual)	Number of Fatalities ^{1,2}	Number of Fatalities (Annual)
Electrocution	101	10.1	151	15.1
Poisoning ³	9	0.9	15	1.5
Shooting	8	0.8	2	0.2
Collision with Wind Turbines	32	3.2	1	0.1
Collision with Vehicle	6	0.6	10	1.0
Trapped	0	0	1	0.1
Collision (Wire/Other)	10	1.0	32	3.2
All other anthropogenic sources ⁴	115	11.5	66	4.9
Total	281	28.1	278	27.8
% of LAP	4.45%		4.92%	

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 2009-2018.

³Sources of poisoning include lead 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 bald eagles and golden eagles at this Project will lead to a cumulative permitted take less of 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. Should we issue a permit under either action alternative, PGE will compensate for golden eagle take, and bald eagle take will be within EMU take thresholds. In addition, PGE will be required to provide sufficient monitoring, adaptive management, and operational measures that should serve to keep any incidental eagle take at the Biglow Canyon 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 posted at <https://www.fws.gov/pacific/migratorybirds/Library/wpanalyses.html>

Appendix A Eagle Conservation Plan

Appendix B Bayesian Eagle Collision Risk Model

Appendix C Resource Equivalency Analysis

Appendix D List of Agencies and Persons Consulted and List of Preparers