U.S. Fish and Wildlife Service

Draft
Environmental Assessment
Wild Horse Wind Project Eagle Permit

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Abbreviations

APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BCR	Bird Conservation Region
BMP	Best Management Practice
CFR	Code of Federal Regulations
CRM	Collision Risk Model
Draft EA	Draft Environmental Assessment
DOI	Department of Interior
Eagle Act	Bald and Golden Eagle Protection Act
Eagle Permit	Long-term Eagle Take Permit
ECP	Eagle Conservation Plan
ECPG	Eagle Conservation Plan Guidance Module 1: Land-based Wind Energy Version 2
EMU	Eagle Management Unit
ESA	Endangered Species Act
FR	Federal Register
km	kilometer
kV	Kilovolt
LAP	Local Area Population
MBTA	Migratory Bird Treaty Act
MET	Meteorological Evaluation Towers
mph	miles per hour
MW	Megawatts
NEPA	National Environmental Policy Act
NWCC	National Wind Coordinating Collaborative
O&M	Operation and Maintenance
PEIS	Final Programmatic Environmental Impact Statement for the Eagle Rule Revision
PCM	Post-construction Monitoring
Project	Wild Horse Wind Facility
PSE	Puget Sound Energy
REA	Resource Equivalency Analysis

Service	U.S. Fish and Wildlife Service
SCA	Site Certification Agreement
Take	Incidental mortality or injury
U.S.	United States
U.S.C.	United States Code
WDFW	Washington Department of Fish and Wildlife
Zilkha	Zilkha Renewable Energy

Chapter 1 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 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 and maintenance of the Wild Horse Wind Facility (Wild Horse 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 United States Code [U.S.C.] 4321 et seq.). This Draft Environmental Assessment (Draft 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 5-year permit to the applicant based on their revised Eagle Conservation Plan (ECP). The alternatives to the proposed action are to deny the issuance of the permit, also called the No Action Alternative (Alternative 1) in this Draft EA and to issue a 30- 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 30-year permit (Alternative 3) would come with a requirement for monitoring, adaptive management, and compensatory mitigation over the expected life of the project.

We received an application for a 5-year Eagle Permit from Puget Sound Energy (PSE, or the Applicant) on January 6, 2015, requesting authorization of non-purposeful or "incidental" take of bald and golden eagles under the Eagle Act for operational activities associated with the Wild Horse Wind Facility. The Applicant's ECP (Appendix A) is the foundation of the permit application for the operation of the Project under an eagle permit. The analyses in this Draft 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

PSE's Wild Horse Project consists of a 273 MW wind generation facility and a 500kW solar generation facility in eastern Kittitas County, Washington located on 11,000 acres of open rangeland and shrub-steppe habitat near Whiskey Dick Mountain. A total of 149 wind turbine generators and 21 arrays of photovoltaic panels are mostly located on land owned by PSE; however some turbines are on public land administered by the Washington Department of Fish and Wildlife (WDFW) and the Washington Department of Natural Resources (WDNR). The Wild Horse Project (https://www.pse.com/pages/tours-and-recreation/wild-horse) includes the following relevant infrastructure:

- 127 Vestas V80 1.8-megawatt wind turbine generators (original project; 2006).
- 22 Vestas V80 2.0-megawatt wind turbine generators (expansion; 2009).
- A Renewable Energy Center (REC) which provides visitor information and outreach
- 450 kW solar demonstration facility containing 18 arrays of photovoltaic panels located at the former "Quarry #1 site" (labelled as "Solar Facility" in Figure 2)
- 50kW solar demonstration facility containing 3 arrays of photovoltaic panels located adjacent to the REC.
- Two permanent, un-guyed, lattice meteorological (MET) towers.

- A 150ft x 75ft (11,250 sq ft) maintenance facility
- Approximately 38 miles of roads.
- Approximately 100 miles of underground 34.5-kilovolt (kV) electrical distribution and fiber optic lines.
- Less than 1 mile of 34.5 kV overhead avian-safe electrical power lines.
- Approximately 8 miles of 230 kV overhead electrical transmission feeder line.
- One on-site electrical step-up substation.
- One off-site interconnection substation.

The original Wild Horse Wind Project was developed and constructed by Zilkha Renewable Energy (Zilkha) and then purchased by PSE. Construction of the original project, consisting of 127 turbines (Table 1), began mid-October 2005 and was completed in December 2006 when it became operational. PSE assumed management when the facility commenced commercial operations in 2006. In early 2009, Washington's Energy Facility Site Evaluation Council amended the Site Certification Agreement (SCA)[1] authorizing PSE to expand Wild Horse by an additional 22 turbines (Table 1). PSE began construction in May of 2009 and the expansion began operation on November 9, 2009.

Table 1: Year of Project construction and compensatory mitigation required under the Eagle Act.

Portion of Project	Construction/Operation	Number of Turbines	Requirement for Eagle Mitigation
Original Project	2005/2006	127	No: Pre-2009 Eagle Act Regs = Baseline[2]
Expansion	2009/2009	22	Yes: 1.2:1 for Golden Eagle take

[1] https://www.efsec.wa.gov/energy-facilities/wild-horse-wind-power-project/wild-horse-wind-power-project-sca

[2] Baseline is a term that means take has already been accounted for when setting take thresholds (USFWS 2016a). Any baseline take that is authorized under a permit does not need to be mitigated for in order for the Service's preservation standard to be met.

Figure 1: Wild Horse Wind Project Location

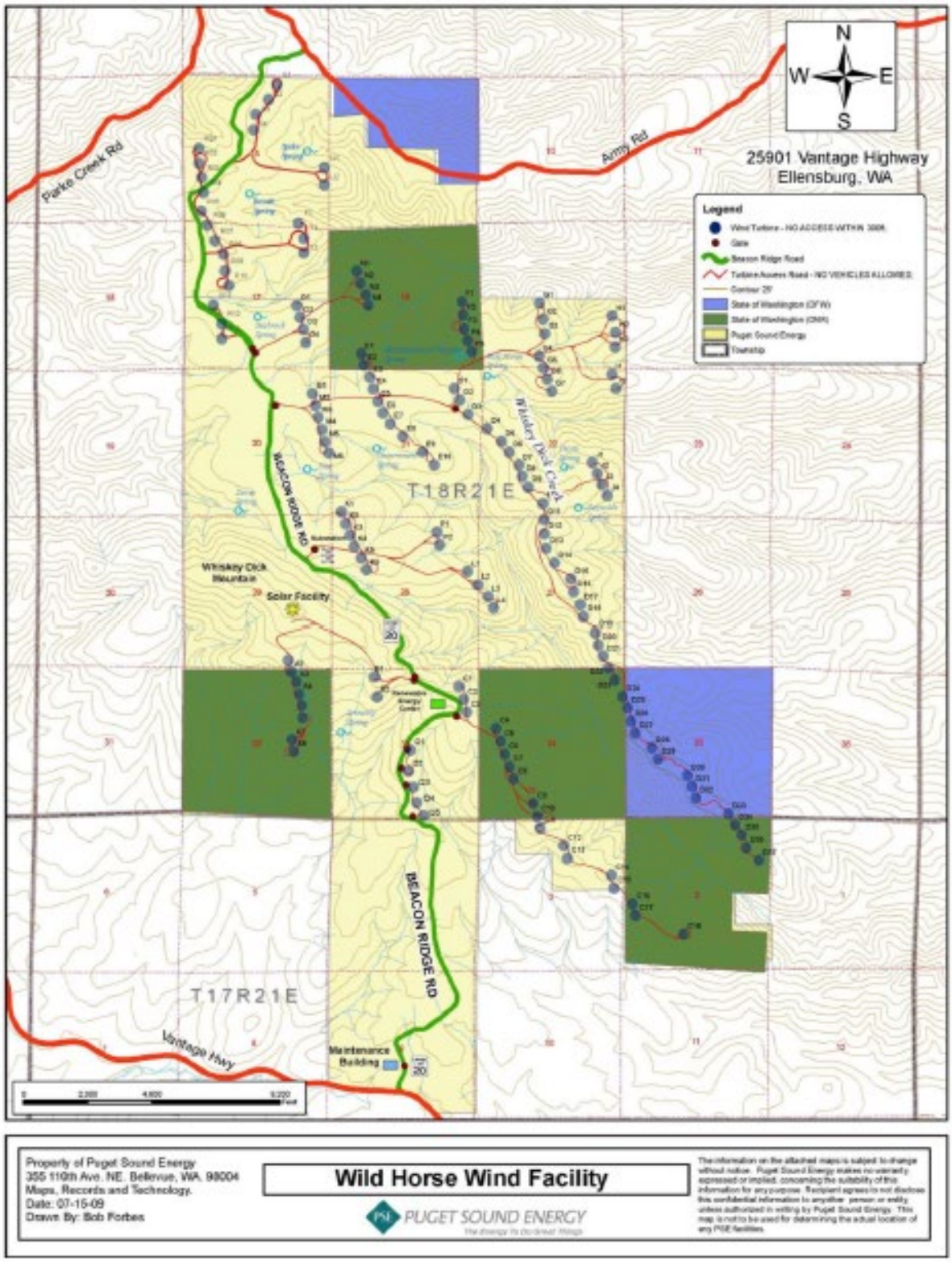

Figure 2: Wild Horse Wind Project

1.2.1. BIRD AND BAT CONSERVATION STRATEGY

In 2013, PSE developed a project-specific Bird and Bat Conservation Strategy (BBCS) for the Wild Horse Project to document PSE's voluntary adherence to state and federal land-based wind energy guidelines (WDFW 2003/2009; USFWS 2012) and agency coordination in the planning, development, and operation of the Project. The measures outlined in the BBCS are consistent with PSE's corporate Avian Protection Plan and Special Purpose Utility (SPUT) permit and include a summary of the avian and bat studies completed, and the significant avoidance, minimization, and mitigation measures implemented to benefit birds and bats and their habitats in the project area. The development of Wild Horse pre-dated the final Land Based Wind Energy Guidelines (USFWS 2012); therefore, the process for permitting, consultation, and site evaluation varies slightly from the tiered approach recommended in the Service's Guidelines.

1.2.2. AVOIDANCE AND MINIMIZATION MEASURES (SITING AND CONSTRUCTION)

As described in the ECP (Appendix A), Zilkha 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:

- Located turbines no less than 150 meters from springs identified during habitat mapping.
- Located turbines approximately 140 meters from the area known as The Pines, in the central portion of the project area.
- Located turbines away from riparian areas that likely contain a higher diversity of bird species.
- Located turbines away from prominent saddles along the main Whiskey Dick Ridge.
- Minimized new road construction where feasible by improving and using existing roads and trails instead of constructing new roads.
- Placed electrical collection lines underground wherever feasible to minimize perching locations and electrocution hazards to birds.
- Used low-RPM turbines and tubular towers to minimize the risk of avian collision with turbine blades and perching on towers.
- Installed bird flight diverters on guyed temporary meteorological towers, and using un-guyed permanent meteorological towers, to minimize the potential for avian collision with guy wires.
- Built power poles consistent with APLIC recommendations to minimize the risk of avian electrocution.
- Installed approximately 100 miles of underground 34.5 kV electrical distribution lines and fiber optic lines to minimize the risk of avian collisions and electrocutions.

1.2.3. MINIMIZATION MEASURES AND BEST MANAGEMENT PRACTICES (OPERATION AND MAINTENANCE)

As described in the ECP, PSE, after purchasing the project, developed and implemented several minimization measures and best management practices (BMPs). These following actions relevant to reducing eagle risk were implemented following construction, are currently being implemented, or both, during operation and maintenance (O&M); these measures will continue to be implemented, as appropriate and, in some cases, as required by PSE's SCA, during O&M of the Project regardless of the alternative we select:

Minimization Measures and Best Management Practices Implemented during Project Construction and O&M

- When possible, vehicle movement within the project footprint will be restricted to pre-designated access, contractor-required access, and public roads. Off-road driving will be avoided at all times unless deemed necessary.
- Project personnel will be required to drive 25mph or less, be alert for wildlife, and use additional caution in low-visibility conditions.
- Spark arrestors will be used on any power equipment.
- Avian diverters will be maintained on all guy lines/wires of any new temporary MET tower.
- Any new electrical transmission infrastructure will be constructed and maintained to meet the most recent APLIC standards (currently 2006) for reducing electrocution risk to birds.
- At least once every 3 years, project personnel will be trained on avoiding harassment and disturbance of eagles and other wildlife, how to identify wildlife species that may occur in the Project Footpring, understanding the Project's SPUT permit and what it authorizes, how to record incidental observations of avian carcasses, and how to properly handle dead or injured birds and bats if observed.
- Snow, if it accumulates within the project footprint, will be managed with strategic plowing to promote wildlife movement off of roadways (e.g. leaving gaps in snow banks that encourage animals to leave the road) in order to reduce potential collisions between big game and vehicles.
- If any new eagle nests are discovered (of either species) within 1 mile of the project footprint, non-emergency maintenance or other non-emergency activities in the project footprint will be restricted to outside the critical periods of eagle nesting (January 1 through August 31).
- Any dead medium- to large-sized carcasses, as well as any garbage or waste, will be regularly removed from the project footprint and disposed of beyond line-of-sight of the project footprint.
- Natural materials such as rock piles or woody debris and tall vegetation (e.g. tall forbs, grass, weeds) will be removed/maintained beneath turbines to reduce shelter and forage for small mammals.

1.2.4. POST-CONSTRUCTION MONITORING

As described in the ECP (Appendix A), PSE conducted post-construction monitoring of general avian and bat mortalities in 2007, 2010 and 2012 and eagle-specific monitoring was conducted over one year from 2015 to 2016 (detailed in the ECP, Appendix A). In general, post-construction monitoring included:

- Standardized carcass searches at all 149 turbines every 28 days.
- Searcher efficiency trials.
- Carcass removal trials following standardized carcass searches.
- Monitoring/reporting using on-site personnel during years when no formal monitoring was being performed.

1.2.5. WILDLIFE INCIDENT REPORTING AND HANDLING

PSE developed a Wildlife Incident Reporting and Handling System (WIRHS) in coordination with a Technical Advisory Committee [comprising public and private parties to air concerns and advise PSE regarding options for O&M] to standardize the actions taken by Wild Horse personnel in response to

wildlife incidents found within the project boundary. Under the WIRHS, Wild Horse field personnel are trained annually, by PSE, to identify and report avian and bat carcasses found during monthly turbine inspections. PSE has a Special Purpose Utility (SPUT) permit[3] that authorizes collection of avian remains if discovered at the project. WIRHS will continue to be implemented during O&M of the Project regardless of the alternative we select.

1.2.6. REPORTING

As described in the ECP (Appendix A), PSE has committed to report all eagle injuries/mortalities to our Eastern Washington Field Office, Office of Law Enforcement, and the Migratory Bird Permit office via email, within 24 hours of discovery. 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.

1.2.7. DECOMMISSIONING

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

[3] PSE maintains a SPUT Permit under the MBTA for migratory bird salvage, temporary possession, and monitoring at its wind facilities, administered by the FWS Regional Migratory Bird Permit Office under 50 CFR Part 13 and 50 CFR 21.27. *See Appendix B of the ECP.*

Chapter 2 Purpose and Need

2.1. Purposes and Need for Federal Action

The proposed 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 PSE in accordance with the requirements of the Eagle Act (50 CFR Part 22). We need to make a decision on this eagle permit application. 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, ensuring that the incidental take permit, if issued, and implementation of the permit conditions would further long-term conservation of bald and golden eagles.

2.2. Decision to be Made

This EA evaluates alternatives to issue, or not, a permit to authorize the take of bald eagles and golden eagles incidental to the operation of the Wild Horse Wind facility. In order to issue an eagle take permit, we must determine whether or not: 1) the taking is necessary to protect a legitimate interest in a particular locality, 2) the taking is associated with, but not the purpose of, the activity, 3) the taking cannot practicably be avoided, 4) that the applicant has avoided and minimized impacts to eagles to the extent practicable, and 5) issuance of the permit will preclude issuance of another permit necessary to protect an interest of higher priority, including safety emergencies, Native American religious use, renewal of programmatic take permits, non-emergency activities necessary to ensure public health and safety (see 50 CFR 22.26 (i))[4].

2.3. Tiered EA

This Draft 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%.

[4] The Service published a rule revision on December 16, 2016 and it became effective January 17, 2017. There was a 6-month "grandfathering" period through July 14, 2017 wherein applicants could choose whether or not to have their application reviewed and administered under all the provisions of the 2009 regulations, as amended in 2013, or all the provisions of 2016 regulations; PSE chose to be administered under the provisions of the current regulations.

- 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 achieve that offset have been analyzed and established.
- There is not evidence to suggest that unpermitted take in the LAP is greater than 10%.
- The applicant agrees to the survey, monitoring, and reporting recommendations contemplated in the PEIS.

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 Draft 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 where the take is compatible with the preservation of the bald eagle and the golden eagle; is necessary to protect an interest in a particular locality; is associated with, but not the purpose of, the activity; and cannot practicably be avoided. The Service reviews applications and issues permits to applicants that meet all issuance criteria pursuant to 50 CFR 22.26.

The PEIS (USFWS 2016b) 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 (§ 2(c)). 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" (§ 7(a)(2)). To that end, we conducted an intra-USFWS Section 7 consultation that evaluates 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 over the permit term (5 years) and the expected operational life of the Project (assumed to be 30 years from the date of this EA). 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).

PSE has requested authorization to take eagles incidental to the otherwise lawful operation and maintenance of the 149 wind turbines at the Wild Horse 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 at the wind turbines and activities associated with their operations and maintenance.

2.5.1 GEOGRAPHIC EXTENT

The analysis of effects on bald 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 distance from the Project footprint equal to the species' median natal-dispersal distance. The median natal-dispersal distance is known to be 138 km (86 miles) for bald eagles and 175 km (109 miles) for golden eagles (USFWS 2016b). Thus, for bald eagles in this analysis, the LAP area is the area encompassed by a 86 mile perimeter around the project footprint. For golden eagles in this analysis, the LAP area is the area encompassed by a 109 mile perimeter around 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-five federally recognized Indian Tribes (Table 2) could have special interests that may be affected in the area surrounding the Project based on their proximity. 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. 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 Draft EA.

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

Tribes that Received Letters	
Chehalis Tribe	Puyallup Tribe of Indians
Coeur d'Alene Tribe	Sauk-Suiattle Indian Tribe
Confederated Tribes of the Colville Reservation	Shoshone-Bannock Tribes
Confederated Tribes of the Grand Ronde	Spokane Tribe of Indians
Hoh Tribe	Stillaguamish Tribe of Indians
Kalispel Tribe of Indians	Suqamish Tribe
Lower Elwah Klallam Tribe	Swinomish Indian Tribal Community
Lummi Indian Nation	Tulalip Tribes
Muckleshoot Indian Tribe	Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe	Upper Skagit Tribe
Nisqually Indian Tribe	Confederated Tribes of Warm Springs
Nooksack Indian Tribe	Yakama Nation
Port Gamble S'Klallam Tribe	

2.7. Public Participation

We posted this Draft EA for 30 days, requesting comment on the content and scope of the analysis in the Draft EA, 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.

Chapter 3 Alternatives

3.1. Introduction

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

3.2. Key Elements of Alternatives

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

Table 3: Key components of the alternatives.

	Alternative 1 - No Action, Deny Permit	**Alternative 2** - Issue 5- Year Permit Based on ECP	**Alternative 3** - Issue 30- Year Permit
Predicted Annual Take	1.72 Golden and 0.53 Bald Eagles	1.72 Golden and 0.53 Bald Eagles	1.72 Golden and 0.53 Bald Eagles
Predicted Take over Permit Tenure	N/A	9 Golden Eagles and 3 Bald Eagles	52 Golden and 16 Bald Eagles
Take that needs to be offset[5] (annual rate)	None	2 GOEA (0.25 per yr, rounded to nearest integer)	8 GOEA (0.25 per yr, rounded to nearest integer)
Compensatory Mitigation to be provided	None	33 to 74 poles depending on retrofit longevity.	92 to 444 poles depending on retrofit longevity and the mitigation schedule.
Fatality Monitoring	incidental observations only	3 years quarterly operational monitoring of all turbines	Achieve an average probability of detection (g-value) over every 5-year term of $\geq$ 0.35

[5] Compensatory Mitigation is only required for Golden Eagle take estimated at the 22 turbines resulting from the 2009 expansion at Wild Horse. See Section 1.2.

3.3. Alternatives Analyzed in Detail this Draft EA

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

Under this alternative, we would not issue an Eagle Permit because either (1) the application does not meet one or more of the issuance criteria in Section 2.2 and Section 2.3, or (2) the risk of eagle mortality from Project O&M is so low that a permit is not necessary. This alternative is reasonable to consider because it meets the Purpose and Need, and either issuing or denying a permit pursuant to PSE's permit application is a potential response. Should this alternative be selected, the Project would continue to operate under its current operational plan as described above in Chapter 1, but PSE would not have authorization, under the Eagle Act, to incidentally take eagles. Any incidental eagle take would be unauthorized and subject to any action deemed appropriate by the Service's Office of Law Enforcement and the U.S. Department of Justice. PSE would not be required to implement the measures outlined under Alternative 2 or 3 and in the ECP.

3.3.1.1. Avoidance and Minimization Measures and Best Management Practices

PSE would continue to implement measures already in place, and as required by their SCA, designed to reduce risk to eagles onsite during their operations and management of the Project [see Section 1.2.5.; and listed in Appendix A (ECP, Section 6.1.3)]

3.3.1.2. Compensatory Mitigation

Under Alternative 1, PSE would not be required to provide compensatory mitigation to offset eagle fatalities from the 22-turbine expansion to make the predicted take consistent with the Eagle Act preservation standard.

3.3.1.3. Fatality Monitoring

Under Alternative 1, PSE would continue to implement incidental monitoring procedures throughout the life of the project as described in the ECP, finding dead eagles only incidental to other project related activities. PSE would follow the Wildlife Incident Reporting and Handling System (WIRHS) process as per the SCA. No additional fatality monitoring would occur under this alternative.

3.3.1.4. Adaptive Management

Under Alternative 1, PSE would not be required to follow any adaptive management plan, which would, if followed, require a conservation measure to be implemented or more fatality monitoring to occur should fatality rates be higher than expected.

3.3.2. ALTERNATIVE 2: ISSUE 5-YEAR EAGLE PERMIT BASED ON THE EAGLE CONSERVATION PLAN

Under this alternative, the Service would issue a 5-year eagle permit authorizing the non-purposeful take of bald and golden eagles associated with the Wild Horse Project pursuant to 50 CFR § 22.26(f). The permit would be for the non-purposeful take of up to 9 golden eagles and 3 bald eagles during the 5-year permit period. The Collision Risk Model (CRM) provided in our ECP Guidance (USFWS 2013a) 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 use, hazardous area, and daylight operational hours (USFWS 2013a). The details of our eagle fatality estimate are provided in Appendix B. The 5-year permit would incorporate as permit conditions the avoidance and minimization measures,

monitoring, and mitigation described in the ECP (Appendix A) that PSE developed through coordination with the Service. However, the Service would evaluate only the ECP measures for the 5-year permit term and would assume that, over the remainder of the life of the Project, we would not be able to require ECP implementation and therefore could not rely on the long-term conservation benefits of the ECP in its analysis.

3.3.2.1. Compensatory Mitigation

Under Alternative 2, consistent with the Eagle Act preservation standard, PSE will provide compensatory mitigation for eagle fatalities by implementing the mitigation strategy identified in the ECP (Appendix A). As shown in Table 3, compensatory mitigation would only be required under alternatives 2 and 3, but under Alternative 3, compensatory mitigation would occur over the life of the Project.

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 achieve 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, 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. This compensatory mitigation must occur within the EMU.

The original Wild Horse project, consisting of 127 turbines, became operational in 2006, prior to the 2009 Eagle Rule. Predicted golden eagle fatalities associated with the original Wild Horse project and its 127 turbines are considered part of baseline environmental conditions and, if take is authorized, would not be deducted from the EMU threshold. Thus, offsetting compensatory mitigation is not required for these 127 turbines. In early 2009, PSE expanded Wild Horse by an additional 22 turbines. This expansion became operational in November 2009 and, as such, is considered post-baseline. Golden eagle fatalities associated with the expansion count toward the regional take thresholds and require offsetting compensatory mitigation under all action Alternatives.

Under Alternative 2, we predict the number of golden eagle fatalities at the 22 turbine expansion to be 0.25 golden eagles per year, or 1.25 golden eagles over the 5-year permit term. Thus, with rounding, PSE is required to offset the take of 2 golden eagles at a ratio of 1.2:1 (see Appendix C for more detail).

Take offsets can be achieved from a variety of mitigation methods, as long as the mitigation method 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. One mitigation method 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 2 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) standards). Retrofit longevities often fall between 10 years and 30 years depending on the quality of the retrofit. For example, re-framing (i.e. increasing the distance between conductors and/or grounding points so no insulators are needed) or removing poles is a long-term way to bring high-risk power poles into compliance with APLIC (2006) standards without needing maintenance and generally receives credit for 30-year retrofit longevity. Conversely, applying insulators (i.e. insulator covers placed over conductors or grounded hardware) is a more temporary way to bring high-risk poles into compliance with APLIC (2006) standards. Without scheduled maintenance, these insulators, if sized properly and installed correctly, 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 are completed by January 31, 2021, prior to the beginning of the 2021 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.

To ensure that selected poles are the highest risk poles on the landscape, we will require first that one or more areas or circuits is selected in good golden eagle habitat known to have relatively high potential for golden eagle presence. Once an area or circuit is selected, we will require that power poles within that area or circuit are assigned a risk score (RRI) as described in Dwyer *et al.* (2014). The highest risk poles (before retrofitting occurs), according to their RRI score, must be chosen to be re-framed, removed, or otherwise retrofitted to achieve APLIC (2006) standards. These selected poles, together, must achieve an average RRI score of at least 0.4. The exact number of high-risk poles, and the location of those poles, must be approved, in writing, by the Service for the poles to count towards the compensatory mitigation requirement.

Under Alternative 2, we would require that PSE retrofit between 33 (assuming all retrofits have a 30-year retrofit longevity) and 74 (assuming all retrofits have a 10-year retrofit longevity) power poles considered to be high-risk for golden eagles to bring each pole into compliance with APLIC (2006) standards. The exact number of poles required will depend on the retrofit longevities proposed by PSE for each selected pole. PSE has chosen to retrofit high risk poles owned by Kittitas County PUD to meet their compensatory mitigation requirement. Should that agreement fall through, another utility would be appropriate with our written approval. Under Alternative 2, PSE would not be required to retrofit additional high risk poles beyond the 5-year permit term, over the life of the project.

3.3.2.2. Fatality Monitoring

Under Alternative 2, PSE would implement the operational fatality monitoring program discussed in the ECP (Summarized in Table 3) for the duration of the 5-year permit term. Operational fatality monitoring for years 1, 2, and 3 will include carcass searches in areas within 120 m of all turbine bases on a quarterly basis. Two methods have been identified for this fatality monitoring, both of which will be employed together in year 1, and one of which (determined in consultation with the Service) will be

deployed in years 2 and 3 at all turbines. The two selected methods include; 1) Scanning Surveys - visual scans/inspections by trained operations personnel at one-third of the turbines, and 2) Drone Surveys - visual inspections of all turbines using drones and software programmed to identify carcasses. During Scanning Surveys, operations personnel would visually and systematically scan/search all searchable area within 120 m of each searched turbine with the aid of binoculars from the edge of the turbine pad. During Drone Surveys, drones with high resolution cameras would be flown in a pattern around all project turbines designed to cover at least the 120-m survey plot.

It is anticipated that method 2 (Drone Surveys) will be the most efficient for deployment in years 2 and 3. Thus, post-construction fatality monitoring will likely be performed using Drone Surveys, described above, in years 2 and 3. However, if the Service determines that the site-wide probability of eagle detection (g-value) from Drone Surveys in monitoring-year 1 is less than 0.35, and if the site-wide g-value from Scanning Surveys is greater than or equal to 0.35, Scanning Surveys must be conducted in monitoring-years 2 and 3 in lieu of Drone Surveys. If neither method achieves a g-value of 0.35 in year 1, both must be performed simultaneously, as in monitoring-year 1, in monitoring-years 2 and 3.

In years 4 and 5, fatality monitoring will not occur at the Project (Survey method = No Survey). However, there remains a chance that eagle carcasses will be discovered during project related activities, such as turbine maintenance or general turbine inspection.

Carcass persistence trials and searcher efficiency trials (hereafter bias trials) would be conducted in each of 4 seasons and for each of the 3 selected carcass search methods – Scanning Surveys, Drone Surveys, and No Surveys. Results of these bias trials will be used to develop fatality estimates for each year of the permit tenure, based on the number of eagle remains discovered during survey and the rigor of the search method.

Additional operational fatality monitoring may be warranted in year 4 under this alternative, if triggered by Adaptive Management, described in greater details in the next section.

Under this alternative, fatality monitoring results will be reported to the Service annually for any method and bias trial performed that year. This includes years when operational monitoring was not conducted. In those years, reports would just provide details on what eagle remains, if any, were found incidentally. As required by PSE's SPUT permit, all eagle fatalities will be also be reported to the Service within 48 hours of discovery.

3.3.2.3. Adaptive Management

The CRM conservatively predicts the collision of 9 golden eagles and 3 bald eagles with project turbines over the 5 year permit term (Table 3). If realized take at the project is estimated to be lower than conservatively predicted, no action is needed under this Alternative. However, in the unlikely event that realized take is estimated to be greater than predicted, an adaptive management plan offers the ability to require responses from PSE to reduce take before permitted take is exceeded.

Under Alternative 2, PSE would implement adaptive management as appropriate during the 5 year permit term. Tables 4a and 4b outline triggers and conservation measures that have been identified through discussions with PSE, 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 4a are based on the assumption that the probability of detecting eagle remains (if present) during post-construction fatality monitoring (i.e. g-value) is 0.45 in years 1-3 of the permit tenure, and 0.12 in years 4-5 of the permit tenure. Triggers in Table 4b are based on the assumption that the probability of detecting eagle remains (if they are present) during post-construction fatality monitoring (i.e. g-value) is 0.7 in years 1-3 of the permit, and 0.12 in years 4-5.

Under Alternative 2, adaptive management outlined in Table 4a will be required for the tenure of the permit. However, if we determine that the 'g-value' (the probability of detecting a carcass if one is present) in year 1 is greater than or equal to 0.70, then adaptive management as outlined in Table 4b will be required. The tables are identical except for the number of eagles that must be found to trigger each measures. The triggers are higher (i.e. more eagles found) in Table 4b because fatality monitoring was found to be more effective than expected.

Table 4: Stepwise adaptive management for eagle take at the Wild Horse Wind Project assuming, A. a lower probability of carcass detection, B. a higher probability of detection.

Trigger or Threshold[1]		Conservation Measures
A. Triggers assume probability of detection (g-value) of at least 0.45 in monitoring years 1-3 and 0.12 in monitoring years 4-5.		
Trigger 1	Remains of 1 GOEA found	• Conduct a detailed analysis of all existing data and information surrounding the known mortalities and relate it to existing meteorological data and wind turbine operational data to inform and target future conservation measures.
Trigger 2	Remains of $\geq$ 2 GOEAs found during the first 3 years of fatality monitoring OR Remains of 1 BAEA found during the first 3 years of fatality monitoring	• Conduct a detailed analysis of all existing data and information surrounding the known mortalities and relate it to existing meteorological data and wind turbine operational data to inform and target future conservation measures. • Implement an additional year of eagle fatality monitoring in year 4. The method should be identical to that performed in year 3 unless deviations are approved in writing by the Service.
Trigger 3	Remains of $\geq$ 2 GOEAs found during any 2 year period OR Remains of $\geq$ 3 GOEAs found during the permit term (5 years) OR	• Implement a monitoring and curtailment program that involves detection of eagles in the vicinity of the project and the automated or manual curtailment of turbines when the presence of eagles is detected. Annual curtailment under this measure should total at least 75 hours across all turbines and all days of the year. • Implement another conservation measure in writing in lieu of the monitoring and curtailment program described above. This may be especially

Trigger or Threshold[1]		Conservation Measures
	Remains of 2 BAEAs found during the permit term (5 years)	appropriate if the trigger is achieved near the end of the permit term and the implementation of the required measure (above) is not practicable for the short remaining permit tenure.
B. Triggers assume a probability of detection (g-value) of 0.70 in monitoring year 1. Triggers assume the method is the same across years 1-3, and a probability of detection (g-value) of at least 0.70 is achieved in monitoring years 2-3 and 0.12 in monitoring years 4-5.		
Trigger 1	Remains of 2 GOEAs found during the first 3 years of fatality monitoring	• Conduct a detailed analysis of all existing data and information surrounding the known mortalities and relate it to existing meteorological data and wind turbine operational data to inform and target future conservation measures.
Trigger 2	Remains of 3 GOEAs found during the first 3 years of fatality monitoring OR Remains of 1 BAEA found during the first 3 years of fatality monitoring	• Conduct a detailed analysis of all existing data and information surrounding the known mortalities and relate it to existing meteorological data and wind turbine operational data to inform and target future conservation measures. • Implement an additional year of eagle fatality monitoring in year 4. The method should be identical to that performed in year 3 unless deviations are approved in writing by the Service.
Trigger 3	Remains of $\geq$ 3 GOEAs found during any 2 year period OR Remains of $\geq$ 4 GOEAs found during the permit term (5 years) OR Remains of 2 BAEAs found during the permit term (5 years)	• Implement a monitoring and curtailment program that involves detection of eagles in the vicinity of the project and the automated or manual curtailment of turbines when the presence of eagles is detected. Annual curtailment under this measure should total at least 75 hours across all turbines and all days of the year. • Implement another conservation measure in writing in lieu of the monitoring and curtailment program described above. This may be especially appropriate if the trigger is achieved near the end of the permit term and the implementation of the required measure (above) is not practicable for the short remaining permit tenure.

1 -- Triggers based on project-wide take averaging 1.72 Golden Eagles (GOEA)/year and 0.53 Bald Eagles (BAEA)/year (9 GOEA eagles and 3 BAEA over a 5-year permit period).

3.3.3. ALTERNATIVE 3: ISSUE 30-YEAR PERMIT

Under Alternative 3, we would issue a 30-year permit to authorize take of 16 bald eagles (0.53 per year) and 52 golden eagles (1.72 per year) over the permit term, with associated conditions, as allowed by

regulation (Table 3). The 30-year permit would incorporate as permit conditions the avoidance and minimization measures described in the ECP (Appendix A) that PSE developed through coordination with the Service and would require those avoidance and minimization measures be implemented for the permit tenure. PSE would provide compensatory mitigation for predicted eagle take through implementation of the mitigation strategies identified in the ECP, but modified to fit a much longer permit tenure. Monitoring and adaptive management requirements would differ from Alternative 2 as outlined below, due to the longer permit tenure.

3.3.3.1. Compensatory Mitigation

Under Alternative 3, consistent with the Eagle Act preservation standard, PSE will provide compensatory mitigation for the first five years of predicted eagle fatalities by implementing the mitigation strategy as described in Alternative 2 and identified in the ECP (Appendix A). As shown in Table 3, this compensatory mitigation would occur under alternatives 2 and 3; however, only under alternatives 3 would compensatory mitigation be required to occur over the expected life of the Project. Compensatory mitigation for remaining 5-year administrative permit periods (there are 6 total during a 30 year permit tenure) would be provided at the beginning of each period, with the amount of mitigation required being being calculated from fatality estimates from post-permit fatality monitoring, updated fatality predictions, and any excess compensatory mitigation provided in the first 5-year administrative permit period.

Under Alternative 3, we predict the number of golden eagle fatalities at the 22-turbine expansion to be 0.25 golden eagles per year, or 1.25 golden eagles over the first 5-year administrative permit period (Appendix B). With rounding, under this alternative, PSE would offset the take of 2 golden eagles at a ratio of 1.2:1 over the first 5-year permit period. Because we do not yet have data from future post-permit fatality monitoring, we cannot predict how much compensatory mitigation requirements may change over the 30-year permit term. So, under this Alternative we assume that take predictions will not change and will be consistent across all remaining 5-year administrative permit periods.

For the first 5-year administrative permit period, compensatory mitigation requirements would be the same as under Alternative 2. However, under Alternative 3, we would also require compensatory mitigation to be provided, at a 1.2:1 ratio, for the remainder of the permit tenure. There is a wide range of schedules under which compensatory mitigation requirements could be completed under this Alternative. Table 5, below, depicts the exact number of high-risk poles that must be retrofitted to achieve a 1.2:1 mitigation to fatality ratio under Alternative 3 and over a range of plausible retrofit completion schedules and longevities.

Table 5: High-risk power poles that will be retrofitted over the life of the Project under Alternative 3 by a range of retrofit completion schedules and retrofit longevities.

Mitigation Completion Schedule[1]	*High-risk power pole retrofits required over life of project by retrofit longevity[2]*
	30-yr: 198

Mitigate for first 5 years of predicted take before beginning of 2021 breeding season. Complete mitigation in 5-year increments for life of project.	*10-yr:* 444
Mitigate for all 30 years of predicted take before beginning of 2021 breeding season.	*30-yr:* 92
	10-yr: 211

[1] Assumes life of project = 30 years from date of permit issuance.

[2] Assumes 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. See Appendix C for the details about the fatality predictions that lead to these mitigation requirements under each alternative.

Under Alternative 3, PSE would need to retrofit between 92 and 444 power poles considered to be high-risk for golden eagles to bring each pole into compliance with APLIC (2006) standards. The exact number of poles required will depend on the retrofit longevities and completion schedule proposed by PSE for each selected pole.

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

3.3.3.2. Fatality Monitoring

Under Alternative 3, PSE would be required to implement a post-permit fatality monitoring method of their choosing that achieves, as determined by the Service, a minimum average probability of detection of 35% across every 5-year administrative permit period. In none of the 30 permit years would PSE be allowed to achieve a probability of detection less than 8%. This could likely be accomplished by implementing either fatality monitoring method described under Alternative 2, or by implementing another method not yet described here. As under Alternative 2, PSE would be required to implement bias trials, including searcher efficiency and carcass persistence trials for one full year for each unique carcass search method employed during each 5-year administrative permit period. Additionally, as required by regulation, a 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.

Under this Alternative, we would require that searcher efficiency trials be conducted for every unique carcass search method used, even in years where carcasses might only be discovered incidentally. 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, stratified by each of four seasons. We would further require that PSE use 20 surrogate carcasses per season placed at randomly-selected turbines and at random locations within each search plot.

Also, we would require that carcass persistence trials be conducted, at minimum, over the course of one year during the every 5-year period, stratified by each of four seasons. We would require that PSE use 20 surrogate carcasses per season placed at randomly selected turbines and at random locations within the project footprint or similar nearby habitat. Raptor carcasses would be used as surrogates when possible. Trials would be required to last a minimum of 90 days per season when raptor carcasses are used.

As illustrated in Table 6 (under 'Adaptive Management Measure', and columns 2, 3, and 4), progressively more rigorous fatality monitoring may be warranted under Alternative 3, depending on the number of eagle fatalities observed during post-permit fatality monitoring.

3.3.3.3. Adaptive Management

Under Alternative 3, PSE would be required to implement the following adaptive management plan, which is designed for a longer permit term than what is described in the ECP. Triggers are assessed over a longer time period than under Alternative 2 and therefore potentially more complex. The adaptive management measures are designed to require progressively increasing levels of monitoring effort (i.e. the 'Enhanced Fatality Monitoring' columns 2, 3, and 4 in Table 6) with the achievement of every trigger. Thus, every time additional monitoring is required under adaptive management, a new column (column 2, 3, or 4 in Table 6) is used to define the applicable triggers, and each new trigger (corresponding with increases in monitoring effort) requires higher numbers of eagle remains to be found to achieve that trigger. Simply put, upon permit issuance, the left-most column defines the applicable triggers. After reaching that trigger, and the associated requirement of additional monitoring, the applicable triggers become those listed in column 2; this continues across the columns each time a trigger is achieved. The triggers increase with each new level of enhanced monitoring to give credit to the permittee for the additional monitoring effort and resulting increase in certainty in fatality estimates at the Project. Note that the plan below may change at each 5-year check-in based on fatality estimates and predictions derived from the required post-permit monitoring described above.

Table 6: Stepwise adaptive management for eagle take at the Project under a 30-year permit.

Triggers (by Fatality Monitoring Performed)				
Fatality Monitoring required (Sec 3.3.3.2)	*5 Yrs of Enhanced Fatality Monitoring*	*10 Yrs Enhanced Fatality Monitoring*	*15+ Yrs Enhanced Fatality Monitoring*	**Adaptive Management Measure**
Remains of ≥ 5 GOEAs found in first 5 years or Remains of ≥ 7 GOEAs found in first 10 years or Remains of ≥ 3 BAEAs found in first 10 years or g-value of 0.35 not achieved over any 5-year permit term	Remains of ≥ 8 GOEAs found in first 10 years or Remains of ≥ 3 BAEAs found in first 10 years or Required g-value not achieved over any 5-year term	Required g-value not achieved over any 5-year term	Required g-value not achieved over any 5-year term	1. Conduct a detailed analysis of all existing data and information surrounding the known mortalities, and relate it to existing meteorological data and wind turbine operational data to further inform and target future conservation measures. And 2. In the 5 years following the trigger, increase PCM effort to achieve a g-value of 0.5 over 5-year period. No year will have a g-value less than 0.08.
Remains of ≥ 9 GOEAs found in first 10 years or Remains of ≥ 10 GOEAs found in first 15 years	Remains of ≥ 10 GOEAs found in first 10 years or	Remains of ≥ 12 GOEAs found in first 15 years or	Remains of ≥ 16 GOEAs found in first 20 years or	1. Based on the above analysis and new information, design and immediately implement methods for reducing eagle fatalities. Method must be approved in writing by the Service. And

or Remains of ≥ 13 GOEAs found in first 20 years or Remains of ≥ 4 BAEAs found in first 15 years or Remains of ≥ 5 BAEAs found in first 20 years	Remains of ≥ 11 GOEAs found in first 15 years or Remains of ≥ 14 GOEAs found in first 20 years or Remains of ≥ 4 BAEAs found in first 15 years or Remains of ≥ 5 BAEAs found in first 20 years	Remains of ≥ 15 GOEAs found in first 20 years or Remains of ≥ 5 BAEAs found in first 15 years Or Remains of ≥ 6 BAEAs found in first 20 years	Remains of ≥ 6 BAEAs found in first 20 years	2. A protocol to evaluate the effectiveness of the measures employed must also be implemented, designed in consultation with the Service upon achievement of this trigger. And 3. In the 5 years following the trigger, increase PCM effort to achieve a g-value of 0.5 over 5-year period. No year will have a g-value less than 0.08
Remains of ≥ 15 GOEAs found in first 20 years or Remains of ≥ 16 GOEAs found in first 25 years or Remains of ≥ 6 BAEAs found in first 25 years	Remains of ≥ 16 GOEAs found in first 20 years or Remains of ≥ 17 GOEAs found in first 25 years or	Remains of ≥ 17 GOEAs found in first 20 years or Remains of ≥ 18 GOEAs found in first 25 years or	Remains of ≥ 18 GOEAs found in first 20 years or Remains of ≥ 19 GOEAs found in first 25 years or	1. Employ a method to identify eagles within the project footprint and immediately curtail turbine(s) when and where eagles are at risk. Method must be approved in writing by the Service. AND 2. A protocol to evaluate the effectiveness of the measures employed must also be implemented, designed in consultation with the Service upon achievement of this trigger.

	Remains of ≥ 6 BAEAs found in first 25 years	Remains of ≥ 7 BAEAs found in first 25 years	Remains of ≥ 7 BAEAs found in first 25 years	AND 3. In the 5 years following the trigger, increase PCM effort to achieve a g-value of 0.5 over 5-year period. No year will have a g-value less than 0.08
Discovery of a GOEA Nest within 1 mile of the project footprint Or Discovery of a BAEA Nest within 660ft of the project footprint				1. Do not conduct non-emergency activities within 1 mile of an in-use Golden Eagle nest or 660 feet of an in-use Bald Eagle nest *(Emergency constitutes threat of serious bodily injury or a risk to human life, including a threat of fire hazard, mechanical failure, or power outage*). 2. Monitor the nest yearly to determine if it is in-use. If in-use, monitor eagle activity for a minimum of 2 breeding seasons to determine if the eagle-use area includes the project footprint. 3. Upon achievement of this trigger, a request for temporary or permanent nest take may be submitted to the Service. Additional permits are required, whether an eagle nest is in-use or not, when certain limited circumstances are met.

3.3.4. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

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

Under current regulations, an Eagle Permit can be issued for a maximum of a 30-year term. Eagle Permits can also be issued for fewer than five years. PSE has requested a 5-year permit, even though Project operations might continue for around 30 years. It is not reasonable, in this case, to entertain an alternative that would permit the Project for a shorter time than that for which PSE has applied. Therefore, this alternative was dismissed from further consideration.

3.3.4.2. 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. PSE elected to apply for a 5-year permit under the new (2016) regulation. This decision is up to the applicant; therefore, this alternative was also dismissed from further consideration.

3.3.4.3. Alternative Forms of Compensatory Mitigation: Public Education – Poisoning and Trapping

Poisoning and trapping are known sources of mortality to eagles (USFWS 2016c). Highly toxic pesticides or other contaminants, misapplied or inadvertently released to the environment, sometimes find their way into the food chain and expose eagles and other scavengers to lethal levels. Additionally, traps set for mammals, baited with meat, also occasionally attract and trap and either kill or injure eagles. Eagles might benefit from compensatory mitigation campaigns instituted by PSE to publicize the risks of these activities and educate people conducting these activities how to perform them to minimize risks to eagles. Further, poisoning incidents might be reduced by compensatory mitigation that improves monitoring and enforcement of label restrictions by agencies with that responsibility. However, we are unaware of a reliable way to quantify the benefit to eagles from campaigns made to reduce these threats. Without further study, our confidence would be low in a model that attempted to quantify benefits of such mitigation. Because of the uncertainty around the efficacy of these potential mitigation measures, and because the responsibility for reducing inadvertent poisonings might be best left in the hands of other agencies, this alternative does not reasonably fit the Service's purpose and need at this time.

Chapter 4 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 that might be affected by the Federal action.

4.2. Physical Environment

Wild Horse is located six miles west of Vantage in eastern Kittitas County, Washington (Figure 1-1). The primary habitat in the project area is shrub-steppe, consistent with the typical vegetation zone of much of the Columbia Basin ecoregion; grasslands are also found on very steep slopes and exposed ridges (Figure 4-1). This upland habitat type is dominated by big sagebrush (*Artemisia tridentata*) and stiff sagebrush (*A. rigida*), with some areas where threetip sagebrush *A. tripartite*), antelope bitterbrush (*Purshia tridentate*), and wax currant (*Ribes cereum*) are dominant. A mix of grasses and forbs make up the understory. Lithosols are common in this habitat type, especially on exposed ridgetops. On some steep slopes, fingers of exposed cobbles and rock are intermingled among herbaceous habitat.

A small amount of riparian habitat is associated with the larger creeks. Native trees and shrubs, such as Douglas hawthorn (*Crataegus douglasii*) and chokecherry (*Prunus virginiana*), dominate the riparian areas. A small amount of ponderosa pine (*Pinus ponderosa*) forest occurs in a narrow strip along one of the main project area drainages. Wild Horse is located at the southeastern tip of a mountainous/higher elevation region that tapers to the southeast toward the Columbia River. Elevations are highest in the northwest portion of the project and decrease to the southeast.

The Project ECP (Figure 3) depicts topography and habitat type around the Project.

4.3. Wildlife

Of the 30 federally-listed threatened or endangered species that occur in Washington State, five terrestrial species are known to occur in Kittitas County, including marbled murrelet (*Brachyramphus marmoratus*), northern spotted owl (*Strix occidentalis*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*), and Canada lynx (*Lynx canadensis*). None of these federally-listed species are likely to occur in the vicinity of the Project, and none have been observed in the area. Ferruginous hawks (*Buteo regalis*) and greater sage-grouse (*Centrocercus urophasianus*) are the only state-listed species that are likely to occur in the vicinity of Wild Horse, and were recently or historically documented in the area (Erickson et al. 2003; PSE 2018).

The Project is located along the western edge of the Colockum sage-grouse management unit and was used historically by the Columbia Plateau population of Greater Sage-Grouse, especially in fall and winter. The Colockum management unit potentially provides habitat connectivity for sage-grouse on the Yakima Training Center and those in Douglas County. Post-construction sage-grouse surveys (Erickson et al 2008) found no sage-grouse leks or individuals in the study area during the surveys. In the fall of 2007, one adult sage-grouse was flushed during the Avian and Bat Monitoring Study and one sage-grouse nest site was documented within 98 meters of an operating wind turbine. Another female sage-grouse was observed on December 27, 2017 near turbine D31. An individual thought to be the same bird was observed in the same spot on January 3, 2018 (PSE 2018). PSE implemented conservation measures to improve habitat value for sage-grouse onsite, consistent with the Sage-grouse Conservations and Tasks outlined in the WDFW Greater Sage-grouse Recovery Plan (WDFW 2004). Sage-grouse habitat has improved at the site since in recent years (PSE 2018). Improved habitat conditions for sage-grouse will likely also improve habitat conditions for other species that might be prey for golden eagles.

Bat echolocation surveys, conducted from mid-May through late October 2007 (WEST 2007) found relatively low bat use at Wild Horse during the late summer to early fall. This relatively low use corresponds to late summer dispersal and fall migration periods when most bat mortalities have been documented at U.S. wind facilities (WEST 2007).

4.4. Bald and Golden Eagles

4.4.1. 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. No such habitat exists within or immediately adjacent to Wild Horse and no bald eagle nests have been documented in the project area or nearby. 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 lead 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.

4.4.1.1. 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 North EMU.

The estimated median population size of bald eagles in the Pacific Flyway North 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) due to the 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 density estimates for EMUs to the overlapping LAP area (USFWS 2016b). Using these densities, we estimate the LAP of bald eagles (i.e., those birds within 138 km [86 miles] of the project) to be 598 bald eagles.

4.4.1.2. Bald Eagle Occurrence at Wild Horse

Aerial nest surveys were conducted within a 2-mile buffer of the original phase of Wild Horse in April 2003 and within a 2-mile buffer of the expansion in April 2006. Additional raptor nest surveys were conducted in 2008 and 2011 and included a 1-mile buffer of both the original phase of Wild Horse and the expansion. No bald eagle nests were identified in any of these surveys. This is not surprising as the habitat in the immediate vicinity of Wild Horse would not be expected to attract nesting bald eagles. The closest nesting habitat for bald eagles is the Columbia River, approximately 6.5 mi (10.5 km) east of Wild Horse. The closest known nest is approximately 9.2 mi (14.8 km) to the southeast of Wild Horse (WDFW 2014). Maps of survey routes are and nest locations are depicted in the ECP (Appendix A).

Fixed-point avian use surveys were conducted at Wild Horse from May 10, 2002 through May 22, 2003, with the goal of estimating the temporal and spatial use of the study area by birds (Erickson et al. 2003). As summarized in the ECP (Appendix A), a total of 179 30-minute surveys were conducted throughout the yearlong study period and only one bald eagle was observed, with the one observation recorded in early December. Bald eagle use was estimated by the applicant to be 0.005 bald eagles/800-m plot/30-min survey during the 2002-2003 study period.

More recent eagle-specific use surveys were conducted at Wild Horse from March 2015 through March 2016 (WEST 2016). A summarized in the ECP (Appendix A), the 2015-2016 surveys resulted in 310 hours of survey effort (84 hours in spring, 60 in summer, 84 in fall, and 82 in winter) and eight bald eagle observations. All eight observations in 2015-2016 occurred between February 9 and April 3. The bald eagle observations recorded during the two years of fixed-point surveys suggest that bald eagle occurrence within the project area primarily occurs in the winter and spring. Bald eagle use during this period was estimated by the applicant to be <0.01 bald eagles/800-m plot/60- min survey. Maps of survey point locations and flight paths are depicted in the ECP (Appendix A).

4.4.2. 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 speaking, 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. In Washington, golden eagles are classified as a candidate species (WDFW 2019).

4.4.2.1. 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 Wild Horse 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 density estimates for EMUs to the LAP area (USFWS 2016b). Using these densities, we estimate the LAP of golden eagles (i.e., those birds within 175 km [109 miles] of the project) to be 690 golden eagles.

4.4.2.2. Golden Eagle Occurrence at Wild Horse

Aerial nest surveys were conducted within a 2-mile buffer of the original phase of Wild Horse in April 2003 and within a 2-mile buffer of the expansion in April 2006. No occupied golden eagle nests were identified during either survey effort. During the 2003 survey, one unoccupied stick nest considered suitable for golden eagles was identified in the northern portion of the two-mile buffer. The nest had blown down prior to the 2006 survey. Additional raptor nest surveys were conducted in 2008 and 2011 and included a 1-mile buffer of both the original phase of Wild Horse and the expansion area. No occupied golden eagle nests were identified in the 2008 or 2011 surveys. Maps of survey routes are and nest locations are depicted in the ECP (Appendix A).

Fixed-point avian use surveys were conducted at Wild Horse from May 10, 2002 through May 22, 2003, with the goal of estimating the temporal and spatial use of the study area by birds (Erickson et al. 2003). As summarized in the ECP (Appendix A), a total of 179, 30-minute surveys were conducted throughout the yearlong study period and 15 golden eagle observations were recorded. Two additional golden eagle

observations were recorded incidentally during the 2002-2003 study period. Golden eagles were documented throughout the year, but were most frequently observed in fall and winter. Golden eagle use was estimated by the applicant to be 0.075 observations/800-m plot/30-min survey during the 2002-2003 study period, with the highest use (0.143 observations/800-m plot/30-min survey) measured in the fall.

More recent eagle-specific use surveys were conducted at Wild Horse from March 2015 through March 2016 (WEST 2016). As summarized in the ECP (Appendix A), the 2015-2016 surveys resulted in 310 hours of survey effort (84 hours in spring, 60 in summer, 84 in fall, and 82 in winter) and 13 golden eagle observations. Golden eagle observations in 2015-2016 were spread evenly throughout the spring (five observations), fall (four observations), and winter (four observations), while no golden eagles were observed during the summer. Golden eagle use during this period was estimated by the applicant to be <0.01 observations/800-m plot/60- min survey. Maps of survey point locations and flight paths are depicted in the ECP (Appendix A).

4.5. Migratory Birds

PSE has implemented several conservation measures that benefit birds typical of shrub-steppe habitats during the construction and operation of their Project. These were mitigations agreed to with WDFW and are described in the ECP (Appendix A). However, aside from other large raptors and a few other large birds that might benefit from the required avoidance and minimization measures, the compensatory mitigation (power pole retrofits), and the adaptive management (if implemented), discussed below, we do not expect other species of birds to be affected by the Federal action being considered in this Draft EA. With or without the eagle take permit, the Project will continue to operate in the same manner fundamentally, and so any effects to wildlife will be unchanged by this permit action except as noted below.

4.5.1. Raptors and Other Large Birds

Several large non-eagle raptors occur in this landscape, including Swainson's (spring and summer only), Red-tailed, Ferruginous, and Rough-legged hawks (winter only). These species, with relatively long 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 power pole retrofits that would be the required compensatory mitigation actions under Alternatives 2, 3 or 4 (see Section 3.3.2). Ferruginous Hawk is a bird of conservation concern (USFWS 2008) because of concern regarding its population status and trends. The other species all have relatively robust stable or increasing populations (Sauer et al. 2017, Partners in Flight 2019).

4.6. Tribal Traditional Uses/Native American Religious Concerns

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.

Chapter 5 Environmental Consequences

5.1. Introduction

This chapter addresses the potential environmental consequences of implementing each alternative. Under alternative 2 the permit term would be 5 years so the direct and indirect effects analyzed in this Draft EA are considered over a 5-year term. Under Alternative 3, the permit term would be 30 years so the direct and indirect effects analyzed in this Draft EA are considered over the expected life of the project. If an Eagle Permit is issued under Alternative 2, it may be renewed after its expiration following our review and a determination if issuance criteria have been met. If an Eagle Permit is issued under Alternative 3, we will have periodic administrative reviews, at intervals not greater than every 5 years. Each review and any subsequent Eagle Permit renewal would include, among other things, a re-evaluation of eagle take 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.

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 Wild Horse wind facility 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 four alternatives have the potential to result in the 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. Four 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 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 nest disturbance or loss of productivity due to the death of breeding adults.

The predicted risk of eagle collisions with Project wind turbines (Table 3, and see Appendix B) is moderate as defined in the Eagle Conservation Plan Guidance (ECPG; USFWS 2013a). Additionally, the Project footprint does not contain a known important eagle-use area, such as a nest or migration corridor.

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.
- Less than one mile of overhead 34.5 kV electrical distribution lines and 8 miles of off-site 230kV transmission line. These were built raptor-safe using APLIC standards (APLIC 2006), and so pose a minimal risk of electrocution to eagles. There is a risk of eagles colliding with these lines, but data suggest that risk is small (USFWS 2016c), although not well quantified.
- 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.
- Electrocution 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)
- Repowering or decommissioning will occur at the Project at some point in the future, regardless of the alternative selected. Both activities could pose a risk to eagles through an increase in construction 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 or golden eagle nests (current or historic) in the vicinity of the project footprint. Thus, if present territory configurations remain in the vicinity of the project, the risk is low to eagles from repowering or decommissioning. Should PSE 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 bald eagles.

Eagles are unlikely to be disturbed from project operations and maintenance, since no known eagle nests, concentration areas, or migration corridors are known to exist within or within the vicinity of the project footprint.

5.3. Alternative 1 – No Action

Under the No Action Alternative, in which we do not issue an eagle take permit, the Wild Horse Project would continue to operate under its current operational plan as described in Chapter 1. Under this alternative, PSE has indicated that they would continue to implement conservation measures, best management practices (BMPs), and incidental monitoring under the SCA and the BBCS that PSE has developed, report all avian and bat fatalities under their SPUT permit, and manage avian issues and concerns consistent with PSE'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, mitigation, and adaptive management described in the ECP 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 and golden eagles under Alternative 1 are predicted to be 1.72 golden eagles per year, and 0.53 bald eagles per year; over 5 years, this equates to 9 golden eagles and 3 bald eagles (Table 3, Appendix B). Over the expected life of the project (assumed to be 30 years), this equates to 52 golden eagles and 16 bald eagles. 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). The predicted eagle fatality rates under Alternative 1 are the same as Alternatives 2 and 3.

Under this alternative, conservation measures and BMPs per the SCA and described in the ECP would continue to be implemented, including low speed limits to reduce the risk of vehicle collisions, removal of large game or livestock carcasses to reduce potential for attracting scavenging eagles, and maintaining avian-safe power line design on all power poles. Monitoring for eagle fatalities would consist of incidental finds only. Reporting would occur as outlined under both the SCA, WIRHS and SPUT Permit. If an eagle fatality is documented, such take would be unauthorized and in violation of the Eagle Act and would be a matter for our law enforcement to address. The Service would not have the ability to require offsetting mitigation to offset take occurring at the project; thus, there would be a net loss of eagles under this alternative.

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

5.3.2. Raptors and Other Large Birds

Raptors and other large birds that would benefit from power pole retrofits designed to reduce electrocution risk to eagles, as would occur under the other alternatives, would not receive those benefits under Alternative 1. More raptors are likely to be electrocuted under this alternative. The number of birds saved 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 eastern Washington.

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 substantially interfere with cultural practices and ceremonies related to eagles, or to affect the ability of tribes to use eagle feathers consistent with Federal law. However, if we select the No Action Alternative, PSE will not be required to implement operational monitoring, and although on-site staff will continue to report eagle fatalities found incidentally, without regular monthly monitoring some eagles may not be found, reducing the number of eagles collected and available to Native Americans for their use for ceremonial purposes. (Eagles that are found go first to OLE and then to the FWS National Eagle Repository and, if in good condition, are available to permitted members of tribes.)

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

5.4. Alternative 2 – Issue 5-year eagle permit based on the Eagle Conservation Plan

Under this alternative, a 5-year eagle permit would be issued authorizing the incidental take of bald and golden eagles associated with the Wild Horse Project pursuant to 50 CFR § 22.26(f). The permit would be for the incidental take of up to 9 golden eagles and 3 bald eagles during the 5-year permit period. The 5-year permit would incorporate, as permit conditions, the avoidance and minimization measures, monitoring, compensatory mitigation, and adaptive management described in the ECP (Appendix A) that PSE developed through coordination with the Service. However, we evaluate the ECP measures only for the 5-year permit term and assume the ECP would not be implemented over the life of the Project.

5.4.1. EAGLES

Alternative 2 provides a commitment to implementing the measures outlined in the ECP, 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, BBCS, SPUT permit, and APP, and would provide additional benefits specific to eagles.

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

Mitigation implemented under Alternative 2 would continue through the 5 year permit term only, and would include power pole retrofits at a 1.2:1 (eagles conserved:eagles taken) ratio for eagle mortality attributable to the expansion. Power pole retrofits are intended to protect eagles from electrocution. Between 33 and 74 utility pole retrofits would be completed by agreement between PSE and Kittitas

PUD prior to January 1, 2021, with the applicant providing assurances, if needed, that the retrofitted poles would remain in compliance with APLIC (2006) over the agreed upon retrofit longevity. It is impossible to predict whether the birds saved will 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. Avoided electrocution fatalities will offset project-related 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 in the ECP.

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

Under this Alternative, the eagle preservation standard would be achieved. Based on the intensity and context of these effects and consideration of the elements associated with this alternative, Alternative 2 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 under this alternative due to the long-term monitoring, mitigation, and adaptive management measures as described in the ECP.

5.4.2. Raptors and Other Large Birds

We expect that there will be some benefit to raptors and other large birds under Alternative 2 because the power pole retrofits designed to reduce electrocution risk to eagles are likely to also 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. 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 eastern Washington.

5.4.3. Cultural and Historic Properties and Other Priority Uses

We do not anticipate that the take of eagles at Wild Horse under Alternative 2 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. Continued operation of the project under Alternative 2, including 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 will occur in Kittitas County, within the Kittitas County PUD service area and 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 2.

5.5. Alternative 3 – Issue a 30-Year Permit

Under this alternative, a 30-year eagle permit would be issued authorizing the incidental take of bald and golden eagles associated with the Wild Horse Project pursuant to 50 CFR § 22.26(f). The permit would be for the incidental take of up to 52 golden eagles and 16 bald eagles during the 30-year permit period. The 30-year permit would incorporate, as permit conditions, the avoidance and minimization measures, monitoring, compensatory mitigation, and adaptive management described in Chapter 3 – designed to be more appropriate for a longer-term permit.

5.5.1. EAGLES

Under Alternative 3 PSE would commit to implementing operational eagle fatality monitoring throughout the permit tenure and for the expected life of the project. This fatality monitoring method would be determined by PSE but would be required to achieve a site-wide probability of detection (g-value) of 0.35 (35%) and include carcass persistence and searcher efficiency trials as described in Chapter 3. Fatality monitoring at this temporal scale (life of project) would provide additional data, compared to Alternative 2, and would be provide better opportunity for updating the Bayesian fatality risk assessment model over the life of the project.

As described in detail in Chapter 3, compensatory mitigation implemented under Alternative 3 would be completed over the first year of the 5- year permit term, with any remaining predicted take for the life of the project being offset under one of a range of mitigation completion schedules and retrofit longevity proposals (Table 5). Under all scenarios in Table 5, Alternative 3 results in a greater number of power pole retrofits under Alternative 3 compared to Alternative 2, where no life-of-project mitigation is required. As such, compensatory mitigation required under this alternative would reduce electrocution risk past what would occur under Alternative 2.

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

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, and is expected to meet the Service's eagle preservation standard at the EMU or LAP scale for the first 5 years.

5.5.2. RAPTORS AND OTHER LARGE BIRDS

There would be a parallel effect on large birds as for eagles under this alternative. As a result, we expect there to be fewer electrocuted hawks and owls under this alternative than under the No Action Alternative or Alternative 2. 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 eastern Washington.

5.5.3. CULTURAL AND HISTORIC PROPERTIES AND OTHER PRIORITY USES

The take of eagles at Wild Horse under Alternative 3 is not anticipated to interfere with cultural practices and ceremonies related to eagles, or to affect the ability to utilize eagle feathers in a manner 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 2. This would result in a greater number of eagles collected and available to Native Americans for their use for ceremonial purposes.

Continued operation of the project under Alternative 3, 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 3, 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 2; 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.

Chapter 6 Cumulative Effects

Under both action alternatives, the Service's Fatality Model (USFWS 2013a) predicts that 1.72 golden eagles and 0.53 bald eagles will be killed annually (prediction at the upper 80th quantile) at the Project. We compared 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 2013a), using the most recent values for species-specific natal dispersal to delineate the LAPs.

In the Service's PEIS (USFWS 2016b), we identified annual eagle take rates between 1 and 5 percent of the estimated LAP as of concern, with 5 percent being the upper threshold of what would be appropriate to authorize, or 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 in the vicinity of the project being analyzed. Considering this information, authorized take greater than 5 percent of the LAP, or qualitative indicators which 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 (Note: some of the mortality information on unpermitted take in the Service's database is generally sensitive information). 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 Wild Horse Project overlaps and is composed of eagles in three golden eagle Local Area Density Units (LADUs[6]) – the Northern Rockies, Great Basin and Northern Pacific Rainforest (Figure 3 and Table 8). We estimate this LAP to contain approximately 690 golden eagles; the 1%, 5% and 10% benchmarks for this estimate are approximately 7, 35, and 69 golden eagles, respectively) (Table 8).

[6] 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.

6.1.2. BALD EAGLES

The Bald Eagle LAP overlaps and is composed of eagles in only one bald eagle - the Pacific. We estimated this LAP to contain approximately 598 bald eagles (Figure 6-1 and Table 8). The 1%, 5% and 10% benchmarks of this estimate are approximately 6, 30, and 60 bald eagles, respectively (Table 8).

Table 7: Estimated Golden Eagle and Bald Eagle Local Area Population for the Wild Horse Wind Facility.

Bird Conservation Region	Estimated Number of Golden Eagles	Estimated Number of Bald Eagles
Great Basin (portion of LAP)	659.17	N/A
Northern Rockies (portion of LAP)	20.06	N/A
Northern Pacific Rainforest (portion of the LAP)	11	N/A
Pacific (portion of LAP)	N/A	598.18
Total Local Area Population	690.23	598.18
1% LAP Benchmark	6.90	5.98
5% LAP Benchmark	34.51	29.91
10% LAP Benchmark	69.02	59.82

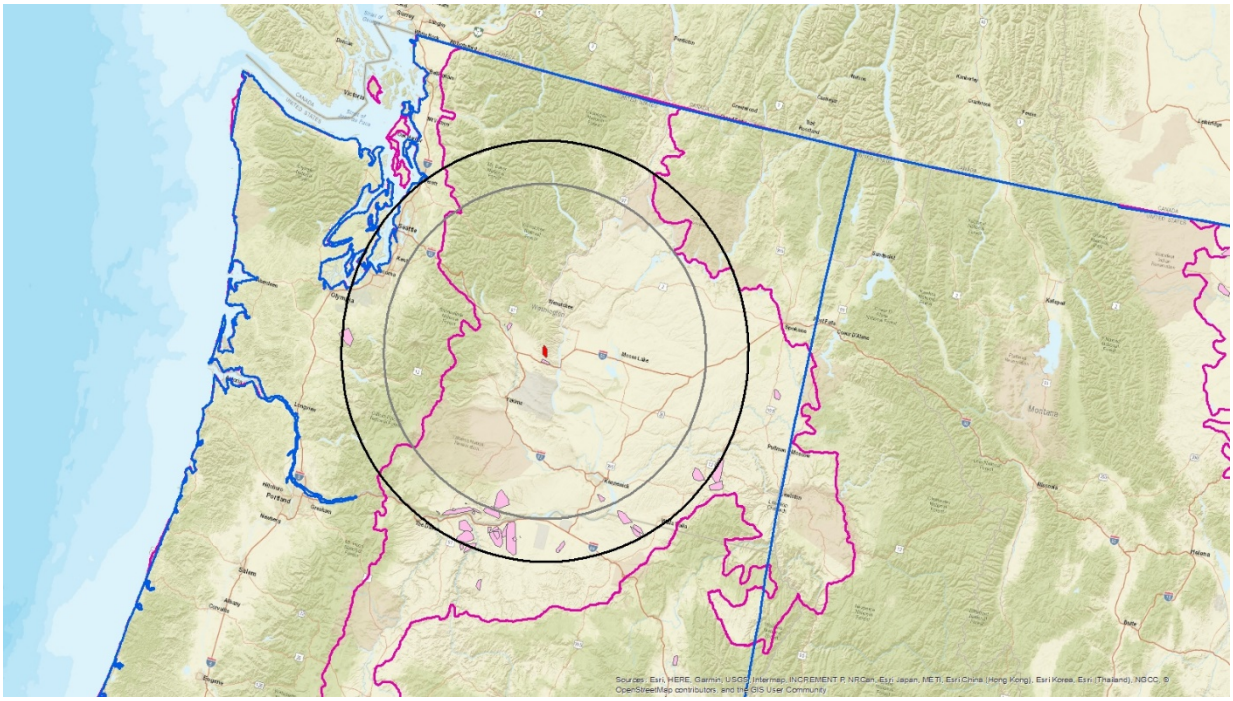

Figure 3: The Wild Horse Wind Facility Local Area Population (109 mi. radius circle (black) for golden eagles, 86 mi. radius circle (gray) for bald eagles). Golden eagle Local Area Density Unit boundary in magenta, bald eagles in blue.

6.2. Authorized Take

6.2.1. Golden Eagles

At the time of this EA, the Service has authorized no golden eagle take that overlaps the species-specific LAP for the Wild Horse Project. The Service has received applications for eagle take at other wind projects that have LAPs that overlap the Wild Horse 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.

The projected annual total of permitted golden eagle fatalities within the LAP is 1.72, including the focal project. 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 five bald eagle disturbance take permits that overlap the species-specific LAP for the Wild Horse Project. The Service has received applications for eagle take at other wind projects that have LAPs that overlap the Wild Horse 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.

The projected annual total of permitted bald eagle fatalities within the LAP is 7.87, including the focal project. This permitted take would be approximately 1.32% of the LAP, which is above the 1% threshold of concern, but still below the 5% threshold that would trigger additional environmental review.

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. Also, 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 Wild Horse Project LAP, we used eagle mortality records from the Service's database (Table 9) within 2 times the average species-specific natal dispersal distance for the most recent 10 year period (2008 – 2017). This distance (2x natal dispersal distance) was used because it is the largest distance within which an eagle mortality would be expected to impact 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 57 unauthorized anthropogenic golden eagle mortalities within 218 miles of the Wild Horse Project from 2009 to 2018 (Table 9). Of the known anthropogenic causes of mortality for golden eagles, 35 (61.4%) were due to collision with wind turbines, 9 (15.8%) were due to electrocution and 2 (3.5%) 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 no wind turbine collisions were included (B. Millsap, USFWS, pers. comm. 2018). We believe it is likely that eagle mortalities due to non-wind turbine collisions, shooting, or poisoning are underreported in the Wild Horse 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 5.7 (0.83%) golden eagle mortalities per year in the Wild Horse LAP. This conservative percentage is below the 10% benchmark and does not suggest that recurring anthropogenic take in the vicinity of the Project is negatively impacting the LAP.

6.3.2. BALD EAGLES

Based on the records in the Service's eagle mortality database there were 232 unauthorized anthropogenic bald eagle mortalities within 172 miles of the Wild Horse Project from 2009 to 2018 (Table 9). Of the known anthropogenic causes of mortality for bald eagles, 133 (57.3%) were due to electrocution, and 28 (12.1%) were due to collision with wires and other objects and 12 (5.2%) were due to poisoning (Table 9). The same biases may exist in the Service's bald eagle datasets as do with the golden eagle datasets.

With these potential biases in mind, we used all data available to the Service from 2009 to 2018 to calculate the annual unpermitted eagle take rate documented within the LAP. From this analysis, the Service calculates that approximately 23.2 (3.88%) annual bald eagle mortalities may influence the Wild Horse LAP. This conservative percentage is below the 10% benchmark and does not suggest that recurring anthropogenic take in the vicinity of the Project is negatively impacting the LAP.

Table 8: Known unauthorized Golden Eagle mortalities within 218 miles and Bald Eagle mortalities within 172 miles of the Wild Horse Project from 2009 through 2018.

	Golden Eagles		Bald Eagles	
Source	Number of Fatalities [1, 2]	Number of Fatalities (Annual)	Number of Fatalities [1, 2]	Number of Fatalities (Annual)
Electrocution	9	0.9	133	13.3
Poisoning[3]	0	0	12	1.2
Shooting	2	0.2	2	0.2
Collision with Wind Turbines	35	3.5	0	0
Collision with Vehicle	1	0.1	5	0.5
Trapped	0	0	1	0.1
Collision (Other)	0	0	28	2.8
All other anthropogenic sources[4]	10	1.0	51	5.1
Total	57	5.7	232	23.2
% of LAP	0.83		3.88	

[1] This is the minimum number of unpermitted eagle fatalities discovered and/or reported. There are likely more fatalities that were not discovered and/or reported.

[2] Reporting period is 2009-2018.

[3] Sources of poisoning include lead and other sources.

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

6.3.3. SUMMARY

Under both action alternatives, authorizing the take of both Bald 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 reach concerning levels. Should we issue a permit under either action alternative, PSE will compensate for Golden Eagle take with power pole retrofits, and Bald Eagle take will be within EMU take thresholds. In addition, PSE will be required to provide sufficient monitoring, adaptive management, and operational measures that should serve to keep any incidental eagle take at the Wild Horse Project within authorized levels and consistent with the Service's preservation standard for eagles.

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Appendices

Appendices A, B, and C 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

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