U.S. Fish and Wildlife Service

Final
Environmental Assessment

Horse Butte Wind Project Eagle Permit

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Abbreviations

ACP	Advanced conservation practices
AGL	above ground level
APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BLM	Bureau of Land Management
BMP	Best Management Practice
CET	Cummulative Effects Tool
CFR	Code of Federal Regulations
EA	Environmental Assessment
Eagle Act	Bald and Golden Eagle Protection Act
Eagle Permit	Eagle Incidental 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
FAA	Federal Aviation Administration
Fatality Model	Collision Risk Model
FCMR	fatalityCMR software
GIS	Geographic information system
Guidelines	Land-based Wind Energy Guidelines
ha	hectare
HBW	Horse Butte Wind I, LLC
IDFG	Idaho Department of Fish and Game
kph	kilometers per hour
km	kilometer
kV	kilovolt
LAP	Local Area Population
MET tower	Meteorological Tower
mph	miles per hour
MW	megawatts
NEPA	National Environmental Policy Act

NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance
PEIS	Final Programmatic Environmental Impact Statement for the Eagle Rule Revision
Project	Horse Butte Wind Project
REA	Resource Equivalency Analysis
RSA	Rotor Swept Area
Service	U.S. Fish and Wildlife Service
Take	Incidental mortality or injury
T&E	Threatened and Endangered
U.S.	United States
U.S.C.	United States Code
UAMPS	Utah Associated Municipal Power Systems
WMA	Wildlife Management Area

Chapter 1.0 Introduction

1.1 Environmental Assessment Overview

We, the United States (U.S.) Fish and Wildlife Service (Service), are proposing to issue an Eagle Incidental Take Permit (Eagle Permit) under the Bald and Golden Eagle Protection Act (Eagle Act) (16 United States Code [U.S.C.] §§ 668–668d and 50 Code of Federal Regulations [C.F.R.] § 22.26) for take of eagles that is incidental to otherwise lawful activities associated with operation of the Horse Butte Wind Project (Project). The Service's decision to issue an Eagle Permit constitutes a discretionary Federal action that is subject to National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.). This Final Environmental Assessment (EA) is tiered, where appropriate, to the Final Programmatic Environmental Impact Statement for the Eagle Rule Revision (PEIS) (USFWS 2016a). Our proposed action and preferred alternative is Alternative 2: issue a permit to the applicant based on their application and negotiated conditions. The alternatives to the proposed action are to deny the issuance of the permit, also called the No Action Alternative (Alternative 1) in this EA, or to issue a permit with additional mitigation requirements (Alternative 3). Denying the issuance of this Eagle Permit (Alternative 1) would result in no requirement for monitoring and adaptive management, and less mitigation to offset predicted impacts of the Project. This alternative would not meet the Service's preservation standard for eagles under the Eagle Act and implementing regulations. Requiring additional mitigation (Alternative 3) might result in additional benefits and offset to both species of eagles, but the benefits are less easily quantified, less certain, and not necessary to satisfy the Service's preservation standard.

Horse Butte Wind I, LLC (HBW) submitted an application for a 5-year Eagle Permit on October 25, 2012, which we received on November 1, 2012. The ownership of the Project changed from HBW to Utah Associated Municipal Power Systems (UAMPS) on March 5, 2018. (For simplicity, and unless clearly discussing project history, we use UAMPS hereafter to refer to the project owners despite that some documents referenced here were produced by HBW and matters and decisions were made while the Project was under HBW ownership.) Despite new permit regulations developed in 2016, UAMPS requested we process their application under the 2009 regulation (an option under the 2016 regulation). This Project is described in the Eagle Conservation Plan (ECP) (Appendix A), which is the foundation of the permit application. Subsequently, the Service provided technical assistance regarding measures to avoid, minimize, and mitigate adverse effects to golden eagles (*Aquila chrysaetos*) and bald eagles (*Haliaeetus leucocephalus*). This technical assistance resulted in alterations to many aspects of the ECP since its latest update in April 2013, described in detail under Alternative 2. Based on the Service's most recent fatality prediction for both species, UAMPS has amended their application to request a permit for the annual take of 3.5 golden eagles and 1.2 bald eagles over the 5-year duration of a permit.

1.2 Project Description

UAMPS currently owns and operates a commercial wind energy facility capable of producing 58 megawatts (MW) of energy on 7,243 hectares (ha) (17,897 acres) of private land located approximately 24 kilometers (km) (15 miles) east of Idaho Falls in Bonneville County, Idaho (Figure 1-1). Figure 1-1 shows the Project Leased Area and other special land use designations in the vicinity of the Project. A history of the Project's development is described in UAMPS's most recent ECP (Appendix A).

HBW began Project planning in 2007, and began biological surveys in February 2010 at the recommendation of the Service's biologists in the Southeast Idaho National Wildlife Refuge Complex office.

We published the Eagle Conservation Plan Guidance Module 1: Land-based Wind Energy Version 2 (ECPG) in April 2013 and the Land-Based Wind Energy Guidelines (Guidelines) in March 2012. The ECPG provides guidance for obtaining an Eagle Permit and recommends developers prepare an ECP. Similarly, the Guidelines recommends developers prepare a Bird and Bat Conservation Strategy (BBCS) to document actions taken to avoid, minimize, and compensate for adverse effects on birds and bats from wind facility development.

Construction of the Project began in the fall of 2011, and the Project became operational on August 15, 2012. The physical components of the Project include the following:

- 32 Vestas V-100 1.8-MW wind turbine towers/generators. Each turbine is 80 meters (262 feet) tall with 49-meter-long (161-foot-long) blades (100-meter [328-foot] rotor diameter).
- One electrical substation.
- One permanent and two temporary meteorological towers (MET towers).
- Approximately 11 km (7 miles) of access roads.
- Approximately 16 km (9.95 miles) of buried electrical energy collection system.
- Two short segments of overhead power line totalling approximately 46 meters (150 feet) long. The power lines run from (1) the Horse Butte substation to the Cattle Creek substation and (2) from the Cattle Creek collection substation to the existing Palisades-Goshen 115-kilovolt (kV) transmission line.
- Off-site Operation & Maintenance (O&M) facilities.

Figure 1-2 shows the Project's physical components within the Project Leased Area boundary. The size of the Project Leased Area is 17,897 acres.

The ECP and BBCS (Appendix F) were submitted in October 2012 in conjunction with an Eagle Permit application. In the original permit application, HBW predicted the annual take of 0.58 bald eagles and 1.94 golden eagles at the facility. Data collected since the original submission and negotiation between the Service and HBW have altered these predictions and, thus, analyses in these early documents have been revised. The current fatality prediction, reflected in this EA, is for 3.5 golden eagles and 1.2 bald eagles per year.

Figure 1-1. Horse Butte Wind Project Location

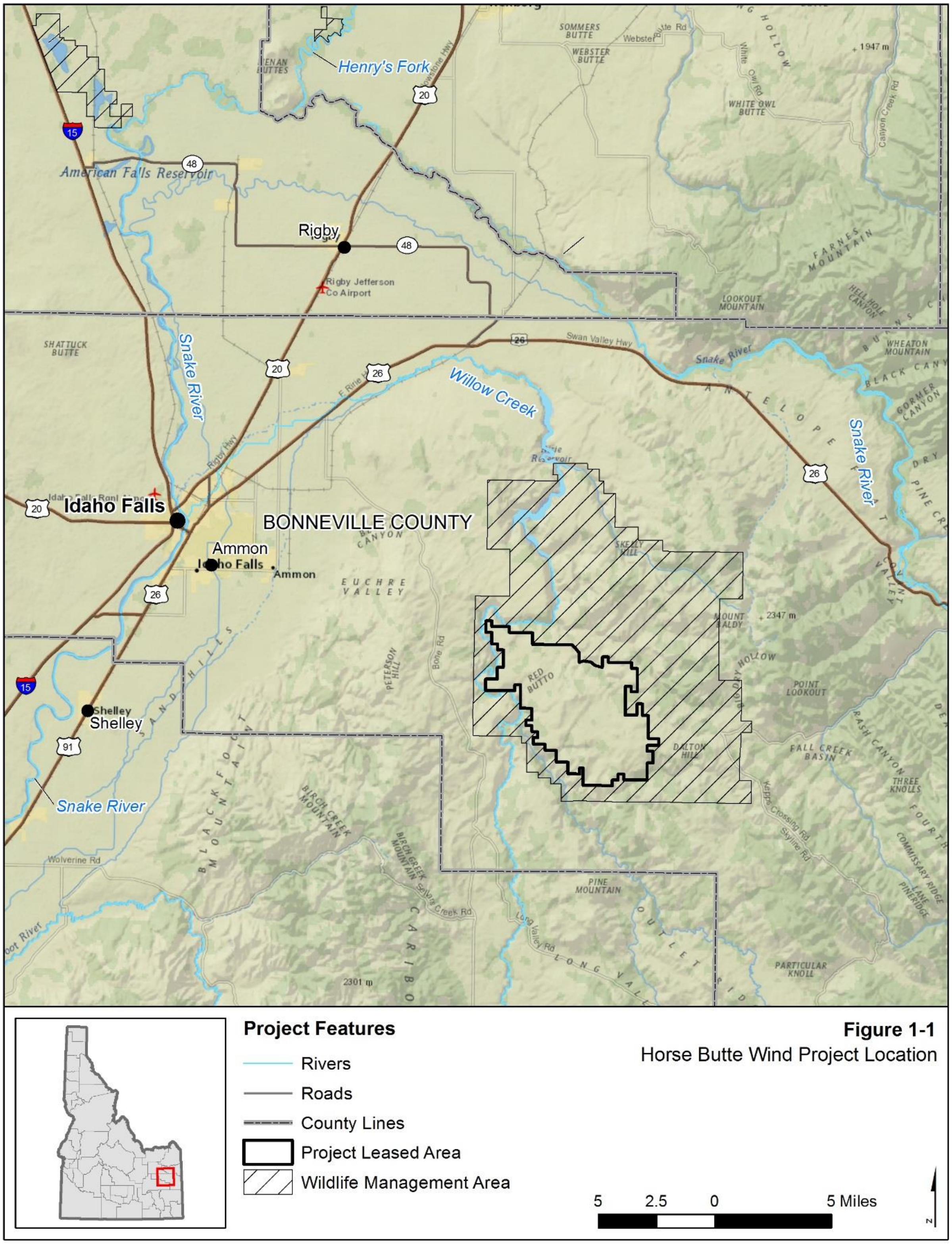
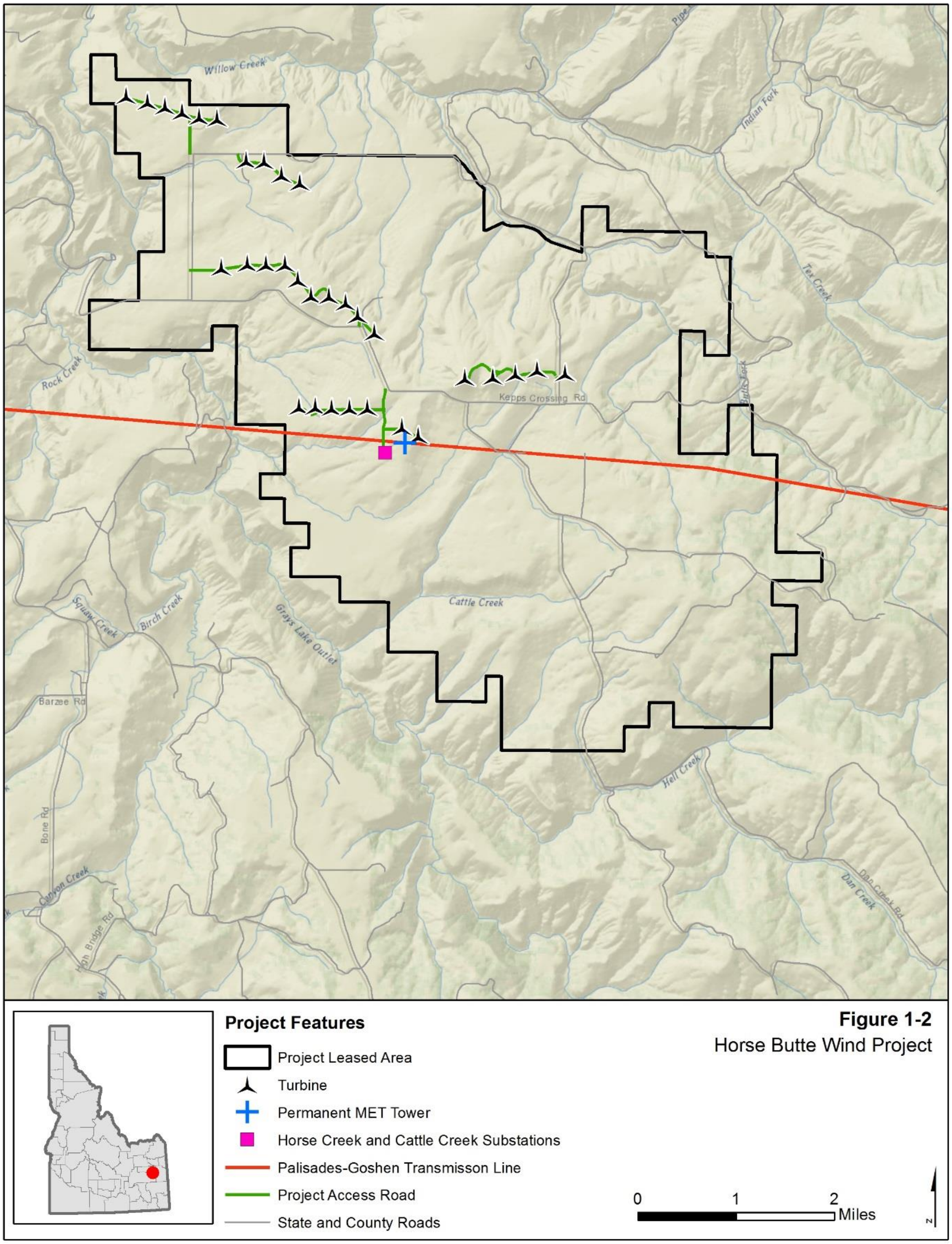


Figure 1-2. Horse Butte Wind Project



1.2.1 AVOIDANCE MEASURES

HBW developed and implemented measures during the design of the Project to avoid adverse effects on eagles, other birds and bats, and their habitat during construction of the Project. Avoidance measures are actions that are taken to avoid harm or mortality to birds and bats. The actions taken during Project planning and construction are listed in Table 1-1. These measures represent design features of the existing Project and will not change regardless of the alternative we select.

Table 1-1. Avoidance Measures Implemented during Project Design and Construction
Turbines were placed away from any edge of Willow Creek Canyon by at least 50 meters (164 feet) to establish and maintain a buffer between the canyon and ridge-line habitat and the Project.
The one permanent lattice MET tower was designed to be unguyed to avoid collision risk to birds and bats.
All electrical collection lines were buried underground. This eliminated the need to construct overhead power lines carrying power from the turbines to the electrical substation, and eliminated the risk of electrocution or collision to birds and bats. Two segments of power lines mentioned in Section 1.3.1 were not buried. Risk of collision and a relatively low risk of electrocution may exist from this unburied infrastructure.

1.2.2 MINIMIZATION MEASURES AND BEST MANAGEMENT PRACTICES

HBW developed and implemented several minimization measures and best management practices (BMPs). These actions, listed in Table 1-2, were implemented during construction and/or are currently being implemented during O&M to reduce the potential for harm or mortality to eagles and other birds, and to bats. Like the avoidance measures listed above, these measures will continue to be implemented, as appropriate, during O&M of the Project regardless of the alternative we select.

Table 1-2. Minimization Measures and Best Management Practices Implemented during Project Construction and O&M
Minimization Measures (Construction and O&M)
Maintenance vehicle movement within the Project Leased Area is restricted to pre-designated access, contractor-required access, and public roads.
Project personnel are required to drive 40 kilometers per hour (kph) (25 miles per hour [mph]) or less, be alert for wildlife, and use additional caution in low-visibility conditions.
Surface restoration of temporary disturbance areas and restoration of construction roads not needed for operations occurred after construction was complete, including re-contouring and reseeding with a seed mix approved by the Natural Resources Conservation Service (NRCS), including seeding with native species, as appropriate. Future disturbed areas will be similarly restored.
Fire hazards from vehicles and human activities are reduced through the use of spark arrestors on power equipment and the avoidance of off-road driving.
Actions that may indirectly result in raptors being attracted to turbines, such as seeding forbs or maintaining rock piles that attract small mammals, was and will be avoided.

Table 1-2. Minimization Measures and Best Management Practices Implemented during Project Construction and O&M
Carcasses/carrion, as well as garbage and waste at the facility, are collected and disposed of off site to avoid creating scavenging opportunities for eagles and other wildlife.
Parts and equipment are stored off site at the Project O&M building in Ammon, Idaho, to minimize potential sources of cover for small mammals.
Surface disturbance was minimized by using existing roads, power lines, fences, and other infrastructure to the greatest extent practicable.
Avian diverters were placed on the guy lines of all temporary MET towers to reduce the ability of birds and eagles to perch, and reduce the potential for collisions.
Federal Aviation Administration (FAA) minimum lighting was installed on the turbines and MET towers to reduce night sky lighting and effects on birds and bats.
Motion-activated lights that cast light down to the ground were installed and are maintained on all auxiliary buildings to reduce night sky lighting and effects on birds and bats.
All above-ground power lines were constructed to the Avian Power Line Interaction Committee's (APLIC) (APLIC 2006) standards to reduce the likelihood of avian electrocution.
Maintenance activities during winter months were and will be minimized to reduce displacement of big game.
Non-emergency maintenance will be restricted between 6 pm and 9 am within 1 km (0.6 mile) of active greater sage-grouse and Columbian sharp-tailed grouse leks during the lekking season, which occurs between March 1 and May 1.
Best Management Practices (Construction and O&M)
A Worker Education Class was provided to Project employees in 2013 and 2017. The program provided instruction on avoiding harassment and disturbance of eagles and other wildlife, and how to identify wildlife species that may occur in the Project Leased Area. Methods for recording incidental observations of avian carcasses and protocols for handling dead or injured birds and bats were also provided. This class will be held at least once every 3 years over the life of the Project.
UAMPS will continue to implement an invasive species management and weed abatement plan that includes an NRCS-approved seed mix to be used in the Project area in conjunction with the Conservation Reserve Program requirement. UAMPS will also continue to consult with Bonneville County to manage invasive species.
Snow management is conducted by UAMPS to reduce potential collisions between big game and vehicles. This measure is intended to reduce the prevalence of big carcasses along roads, thus preventing eagles from being attracted to the site and reducing the potential for eagle/raptor collisions.

1.2.3 Voluntary Mitigation and Post-Construction Monitoring

Compensatory Mitigation

HBW voluntarily attempted to offset take of one bald eagle and one golden eagle by retrofitting 26 high-risk power poles within a 225-km (140-mile) radius of the Project. In 2014, HBW partnered with a local utility company and, in 2015, completed these 26 power pole retrofits.

Post- Construction Monitoring

HBW conducted post-construction monitoring of avian mortality during operating years 1, 2, and 3 (2012 to 2014). For the purposes of this monitoring, an operating year is defined as beginning August 16 and ending the following August 15. In general, post-construction monitoring in these three years included the following:

- Carcass searches at 10 turbines (approximately 30 percent of the total number of turbines).
- Searcher efficiency studies conducted 4 times per year, once each season.
- Carcass removal studies conducted 4 times per year, once each season.
- After operating year 3, HBW implemented a less rigorous monitoring program using on-site personnel.

Additional details on the post-construction monitoriong already conducted are included in Appendix B.

1.2.4 Reporting

Incidental Mortality or Injury (Take) Reports

UAMPS has committed to report all eagle takes to our Eastern Idaho Field Office and the Migratory Bird Permit office via email, within 24 hours of discovery. Reporting will be done for each fatality that is discovered, whether recorded by a qualified biologist during post-construction monitoring or by Project personnel during routine O&M of the Project. 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.

1.2.5 Decommissioning

The Project may reach a point where it is no longer economical to continue operation. Decommissioning or repowering of the Project could occur in the future but will occur beyond the tenure of an Eagle Permit, if issued. As such, decommissioning is not addressed as part of the Eagle Permit application and associated EA.

Chapter 2.0 Purpose and Need

2.1 Purposes and Need for Federal Action

The need is for the Service to make a decision on UAMPS' Eagle Permit application. The proposed Federal action considered in this EA is issuance of an Eagle Incidental Take permit (50 CFR 22.26) in response to a permit application submitted in accordance with the requirements of the Eagle Act (50 CFR Part 22). If approved, the permit would authorize incidental take of bald eagles and golden eagles caused by operation of the Horse Butte Wind facility. The Service's purposes are to ensure that its decision on the application is consistent with the Eagle Act and implementing regulations (50 CFR 22.26); general permit issuing criteria (50 CFR Part 13); and is consistent with our legal authorities, ensuring 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 around our decision to issue, or not, a permit to allow the take of bald eagles and golden eagles incidental to the operation of the Horse Butte Wind facility. The issues related to this decision are whether or not: 1) the taking is necessary to protect a legitimate interest in a particular locality, 2) is associated with, but not the purpose of, the activity, 3) 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 not 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). (The Service published this 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; UAMPS chose to be administered under the provisions of the prior regulations.)

2.3 Tiered EA

This EA tiers from 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 tier to it, and provided criteria that must be met for any tiered analysis to be consistent with it. The criteria are as follows:

- Projects will not take eagles above the eagle management unit (EMU; defined in Section 2.4) 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 2.4.1) that exceeds 5 percent of the LAP, whether offset by compensatory mitigation or not.
- If compensatory mitigation is required (bullet 1), it is implemented by methods that will offset all predicted 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 percent.
- 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 EA incorporates the PEIS by reference when possible.

2.4 Authorities, 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 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 the evaluates the effects of this permit issuance 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 operational life of the Project. 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).

2.5.1 Geographic Extent

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

1. **Eagle management unit (EMU)** – The EMU is the geographic scale over which permitted take is regulated to meet the management objective. (USFWS 2016a). 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 would be 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 would be combined as one EMU. (USFWS 2016a).

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 2016a).

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

2.6 Scoping and Public Participation

2.6.1 Internal Scoping

We engaged in an internal scoping process in the Pacific Region in January 2014. We worked with regional program leaders to determine the appropriate level of NEPA analysis for the Project Eagle Permit application.

2.6.2 Public Scoping

The EA was made available to the public for a 30-day comment period, allowing the public opportunity to provide comments on the content and scope of the document. We received no comments from the public during this 30-day comment period.

2.7 Tribal Consultation

Four federally recognized Indian Tribes (the Shoshone-Bannock Tribes, Eastern Shoshone Tribe, Nez Perce Tribe, and Northern Arapaho Tribe) could have special interests that may be affected in the area surrounding the Project based on their proximity to the Project and previous communication. Letters were sent to these Tribes on January 28, 2014 to inform them about the Eagle Permit application, and to provide them the opportunity to review the application and consult on the potential issuance of an Eagle Permit. We received a response from the Shoshone-Bannock Tribes requesting formal government-to-government consultation.

We met with the Shoshone-Bannock Tribes on March 17, 2014 in Fort Hall, Idaho, to discuss their concerns regarding revisions to the regulations for permits for the take of eagles, and their concerns over the UAMPS application for an Eagle Permit. Because comments on our, then proposed, rule revision are outside the scope of this analysis, only the comments related to the permit application for the Project are summarized here.

The Shoshone-Bannock Tribes submitted a letter to us on April 2, 2014, detailing their concerns about the Project's Eagle Permit application. In this letter, the Tribes recommended that any Eagle Permit issued for a wind development project be reviewed every 5 years and that additional measures be added to reduce eagle mortality. Further, they recommended that post-construction monitoring be a requirement of a permit to inform future management of eagle mortality.

Consistent with these comments, if we were to issue an Eagle Permit for this Project, we would require a) an adaptive management protocol that outlines measures to reduce take, and b) post-construction fatality monitoring which allows the Service and UAMPS to evaluate whether or not observed levels of take are consistent with levels authorized on the permit. Further, the maximum tenure of the permit would be 5 years. As such, a 5-year review of the take levels at the Project will naturally occur, in the form of another application review, should UAMPS wish to receive additional authorization beyond the initial 5-year permit. Through another formal application process, tribes will again have opportunities to request consultation or provide input on the issuance of a potential Eagle Permit for this Project.

Chapter 3.0 Alternatives

3.1 Introduction

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

3.2 Key Elements of Alternatives

Our decision is between three alternatives analyzed in this EA. The primary elements of each alternative are the predicted take, compensatory mitigation, minimization measures (including BMPs), adaptive management and conservation measures, post-construction monitoring, and reporting. A summary of these elements for each alternatives is provided in Table 3-1, and detailed descriptions of the alternatives is provided in Section 3.3.

Table 3-1. Summary of Key Components of Each Alternative

	Alternative 1: Deny the Permit Application	**Alternative 2: Issue 5-Year Permit Based on the Application and Negotiated Conditions**	**Alternative 3: Issue Permit with Additional Mitigations**
Predicted Annual Take	Bald Eagle 1.2 Golden Eagle 3.5	Bald Eagle 1.2 Golden Eagle 3.5	Bald Eagle 1.2 Golden Eagle 3.5
Predicted 5-Year Take	Bald Eagle 6 Golden Eagle 18	Bald Eagle 6 Golden Eagle 18	Bald Eagle 6 Golden Eagle 18
Compensatory Mitigation	26 power poles retrofitted (total – completed in 2015)	322 power poles retrofitted to be raptor friendly (total)	322 power poles retrofitted (total) and carcass removal / hunter education to reduce lead exposure potential to eagles
Minimization Measures and BMPs	Yes	Yes	Yes
Adaptive Management / Conservation Measures	No	Yes	Yes

Table 3-1. Summary of Key Components of Each Alternative

	Alternative 1: Deny the Permit Application	Alternative 2: Issue 5-Year Permit Based on the Application and Negotiated Conditions	Alternative 3: Issue Permit with Additional Mitigations
Post-construction fatality monitoring: Number of Years	None	Operating Years 1, 2, and 3	Operating Years 1, 2, and 3
Number of times per year searched/ frequency	None	Once Per Month	Once Per Month
Turbines Searched	None	100%	100%
Search Area	None	258 x 258 m	258 x 258 m
Fatality Reports	Per Occurrence	Per Occurrence	Per Occurrence
Annual Reports	None Required	Required Annually	Required Annually

3.3 Alternatives Analyzed in this EA

3.3.1 Alternative 1: Deny the permit application (No Action)

Under this alternative, no Eagle Permit would be issued because either (1) the application does not meet one or more of the issuance criteria in Section 2.2, 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 UAMPS'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 UAMPS would not have legal take coverage under the Eagle Act for any eagle take that would occur. UAMPS would not be legally required to implement the negotiated measures outlined under Alternative 2 or Alternative 3.

UAMPS has indicated that they would continue to implement some applicable minimization measures and BMPs, as well as mitigation, monitoring, and reporting listed in their ECP; however, we would have no way to require UAMPS to implement any of these measures, summarized below (sections 3.3.1.1 through 3.3.1.3).

3.3.1.1 Compensatory Mitigation

HBW, prior to UAMPS ownership, retrofitted 26 high-risk power poles in 2015 to compensate for the loss of one bald eagle and one golden eagle.

UAMPS made financial contributions to HawkWatch International to help fund its roadside carcass removal study, which seeks to better understand the risk posed to eagles when scavenging carcasses adjacent to roadsides, and to reduce the uncertainty in the effectiveness of this potential compensatory mitigation measure.

3.3.1.2 Post-Construction Monitoring

UAMPS has indicated that they would continue implementing their current fatality monitoring program, which uses on-site personnel. Monitoring and take reports would be submitted to us as take is discovered. Annual reports would be submitted to the Service each year.

3.3.1.3 Minimization Measures and Best Management Practices

UAMPS has indicated that they would continue to take actions listed in Table 1-2 to minimize harm, injury, or mortality to eagles in the Project footprint. Many of these actions also minimize adverse effects on other birds and bats.

3.3.2 Alternative 2: Issue a 5-Year Permit Based on the Application and Negotiated Conditions

Under Alternative 2, we would issue a permit to authorize take of 6 bald eagles (1.2 per year) and 18 golden eagles (3.5 per year) over the 5-year permit term, with associated conditions, as allowed by regulation. A Collision Risk Model (Fatality Model) provided in our ECP Guidance (USFWS 2013a) was used to predict the number of annual eagle fatalities resulting from operation of the Project. The Fatality Model predicts eagle fatalities in a Bayesian framework using eagle use, hazardous area, and daylight operational hours (USFWS 2013a). The details of our general Fatality Model are provided in Appendix C. It is important to note that we have decided to use this model's output at the 80th quantile as the take prediction for a given project. This decision is conservative, and likely results in an over-prediction of take. At this quantile, actual fatalities at a project are expected to be lower than our predicted take 80 percent of the time. The 5-year permit under this Alternative would incorporate all conservation commitments negotiated with HBW/UAMPS during application review, described in greater detail in this section, including avoidance/minimization measures, mitigation measures, and adaptive management measures. UAMPS may submit a permit renewal request for future years. We will evaluate each additional application upon submittal. Evaluation will include updating take predictions and ensuring all permit issuance criteria are met for fulfillment of all regulatory requirements.

3.3.2.1 Compensatory Mitigation

Electrocution of eagles at infrastructure-associated electrical power lines is one of the leading sources of anthropogenic mortality in the western United States (Millsap et al. 2013). These electrocutions generally occur at poles that do not have adequate spacing between energized equipment and another energized phase (or between energized equipment and grounded equipment) or that have additional hardware such as transformers, switches, jumper wires, etc. (APLIC 2012). Therefore, retrofitting power poles that are considered to be high-risk to eagles to be raptor-friendly is an effective way to increase surviorship in eagle populations and compensate for losses (USFWS 2013a). Further, literature exists that gives us confidence in our ability to predict how many eagles would be saved from retrofiting high-risk power poles. Under Alternative 2, UAMPS would provide compensatory mitigation for predicted take of both eagle species, by retrofitting high-risk electrical distribution poles, to ensure no net loss to the local bald and golden eagle populations from any authorized eagle fatalities. The number of poles that would be retrofitted or rebuilt is derived using our Resource Equivalency Analysis (REA), which is based on the predicted number of annual eagle fatalities (USFWS 2013a) and literature-accepted values for how many eagles are killed at high-risk power poles. When running the REA, we assumed that a power pole retrofit is effective at preventing eagle deaths for 30 years. This assumption is supported by a Power Pole Retrofit

Reimbursement Agreement between UAMPS and the utility owning and managing the power poles to be retrofitted. The details of our REA are provided in Appendix D.

UAMPS's compensatory mitigation commitment under Alternative 2 is summarized in Table 3-2.

Table 3-2. Compensatory Mitigation Commitment for Alternative 2

	Bald Eagle	Golden Eagle
Predicted Take (Annual / 5-year Permit Term)	1.2 / 6	3.5 / 18
Longevity of pole retrofit effectiveness	30 years	30 years
Number of poles to be retrofitted	81 poles	241 poles

UAMPS will contract with partner/member utilities to retrofit power poles. Priority would be given to identifying high-risk poles within the species-specific LAP. High-risk poles would be identified using the criteria and a system developed by Hawkwatch International (method described in Appendix E), which considers the configuration of the poles in question, and other local factors to determine the relative risk of a pole to eagles. Such local factors may include proximity of the pole to a known eagle nest, or known eagle habitat, and proximity of the pole to key foraging spots (e.g., water for bald eagles and cliff lines for golden eagles). Analysis of these and other factors would consist of scoring candidate poles for each species, setting a minimum score for poles to qualify for retrofitting, and prioritizing the poles with the highest score/risk. To count as compensatory mitigation, the power poles to be retrofitted must be in addition to whatever the power company already had plans to do; that is, poles retrofitted under this compensatory mitigation package must be an entirely new set of poles, not already scheduled for retrofitting or replacement by the power company in the foreseeable future.

As part of its annual report, UAMPS would provide an accounting of the poles retrofitted in the previous year, and monitoring data analyzing the efficacy of those retrofits.

All compensatory mitigation listed in Table 3-2 would be implemented, as described above and as determined using the method outlined in Appendix E, before the beginning of the 2020 breeding season.

3.3.2.2 Conservation Measures

Eagle take at wind energy facilities is a recurrent and relatively unpredictable event in time and location. For Eagle Permits, regulations under which this permit would be issued require that any authorized take be unavoidable after the implementation of Advanced Conservation Practices (ACPs)[1]. To date, no ACPs have been scientifically shown to reduce blade-strike mortality at wind projects (although some conservation measures are currently being tested). As such, under Alternative 2, experimental conservation measures would be required under an adaptive management framework.

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[1] Prior to the 2016 revision of 50 CFR 22.26, ACPs were defined as "… scientifically supportable measures approved by the Service that represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable." The requirement that permittees develop and use ACPs to avoid and minimize eagle mortalities under eagle take permits was removed in the 2016 revision of 50 CFR 22.26; we retain it here because UAMPS has chosen to have this permit application evaluated under the previous regulation.

Table 3-3 outlines triggers and conservation measures that have been identified through discussions with UAMPS, as ways to ensure realized eagle take at the Project does not exceed our fatality prediction and the permitted amount of take for each eagle species. All conservation measures implemented after reaching or exceeding a threshold or trigger will be preceded by a brief desktop analysis (completed within 4 weeks of reaching or exceeding the threshold or trigger) of all existing data and information surrounding the known eagle mortalities and any other eagle use information. This will ensure the actual conservation measure implemented at any given trigger responds most appropriately to the specific circumstances that contributed to reaching or exceeding the threshold or trigger. Furthermore, recent studies or technological advancements that may provide a better, more effective conservation measure will be taken into consideration during coordination with UAMPS after reaching or exceeding the threshold or trigger.

Key Adaptive Management Assumptions

The adaptive management triggers (determine when conservation measures would be implemented), although written in terms of number of eagles found, are based on the number of eagles we estimate to have been taken in any permit year. These estimates are calculated using an unbiased estimator that accounts for infrequent fatality detection. In this instance, fatalityCMR (FCMR) software was used (https://www.mbr-pwrc.usgs.gov/software/fatalityCMR.shtml). A detailed description of eagle fatality estimation, as well as fatality predictions using the Service's Fatality Model, can be found in Appendix C. The following assumptions were used when running FCMR and developing the triggers.

- Proposed post-construction monitoring searched all 32 turbines, over an area 258m x 258m (97.5 percent of turbine area), monthly; assumed 94 percent searcher efficiency; 97 percent daily carcass persistence probability.
- Under the currently proposed post-construction monitoring, 1 eagle fatality found = 1.24 estimated eagles taken; 2 found = 2.24 estimated eagles taken; and 3 = 3.28 estimated eagles taken.
- Without adaptive management, post-construction monitoring will be conducted for 3 years—during years 1, 2, and 3.

Table 3-3. Anticipated Conservation Measures using Adaptive Management

Golden Eagles		**Bald Eagles**	
Threshold or Trigger[1]	**Anticipated Conservation Measure**	**Trigger**	**Anticipated Conservation Measure**
Remains of ≥ 2 individual GOEA are found[2] in any Permit-Year	Conduct 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.	Remains of ≥ 1 individual BAEA are found in any Permit-Year	Conduct 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.
Remains of ≥ 4 individual GOEA are found in any Permit-Year OR Remains of ≥ 5 individual GOEA are found over a two Permit-Year period	Based on the analysis described above, and any new information, design and immediately implement visual deterrence methods for reducing eagle fatalities. Visual deterrence methods would include painting blades on 50% of turbines within turbine strings associated with fatalities. Another visual and/or audial deterrence method for reducing eagle fatalities may be implemented, in lieu of blade painting, following desktop analysis and consultation with the Service. A protocol to evaluate the effectiveness of the measures employed would also be implemented, designed in consultation with the Service upon achievement of this trigger.	Remains of ≥ 2 individual BAEA are found in any Permit-Year OR Remains of ≥ 3 individual BAEA are found over a two Permit-Year period	Based on the analysis described above, and any new information, design and immediately implement visual deterrence methods for reducing eagle fatalities. Visual deterrence methods would include painting blades on 50% of turbines within turbine strings associated with fatalities. Another visual and/or audial deterrence method for reducing eagle fatalities may be implemented, in lieu of blade painting, following desktop analysis and consultation with the Service. A protocol to evaluate the effectiveness of the measures employed would also be implemented, designed in consultation with the Service upon achievement of this trigger.

Remains of > 5 individual GOEA are found in any Permit-Year OR Remains of > 6 individual GOEA are found over a two Permit-Year period	Conduct additional eagle-use monitoring to further define seasonal, diurnal, and spatial flight patterns within the Project footprint. Also, develop and implement a robust incidental post-construction monitoring program as follows (to be implemented in the first year that post-construction monitoring is not already required), or implement another similar method following consultation with the Service. While driving to each turbine for monthly turbine checks, UAMPS staff will scan the left and right of the roadside for raptor carcasses; to improve roadside monitoring effectiveness, staff will drive at or below 15 mph. At each turbine location, staff will scan the ground for dead raptors at each of four (4) pre-designated, equally separated points, 40 meters from the base of the turbine. Staff will completely scan all visible area within the 90-degree quadrant associated with their observation point from each of 4 pre-designated points; scan the foreground with the naked eye; scan the rest of the quadrat with binoculars. When maintenance activities involve scaling turbines and when it is safe to do so; UAMPS staff will scan, from the top of the turbine, the entire area surrounding that turbine with binoculars as far as they can reasonably detect a dead bird. The permittee would conduct and report the results of searcher efficiency trials			

Table 3-3. Anticipated Conservation Measures using Adaptive Management

Golden Eagles			Bald Eagles	
Threshold or Trigger[1]	**Anticipated Conservation Measure**		**Trigger**	**Anticipated Conservation Measure**
	associated with this protocol. These trials would be done using the same method as in permit-years 1 through 3. The Service may then evaluate the effectiveness of this monitoring method,			
Remains of > 9 individual GOEA are found over a three permit-year period OR Remains of > 11 individual GOEA are found during the permit term (5 years)	Employ a biological monitor on site with the ability to issue immediate curtailment orders on an as-needed basis when eagles are present, or implement another similar curtailment strategy following consultation with the Service. This conservation measure is to be performed in concert with other measures described above as appropriate. A protocol to evaluate the effectiveness of the measures employed would also be implemented, designed in consultation with the Service upon achievement of this trigger.		Remains of > 4 individual BAEA are found over a three Permit-Year period OR Remains of > 5 individual BAEA are found during the permit term (5 years)	Employ a biological monitor on site with the ability to issue immediate curtailment orders on an as-needed basis when eagles are present, or implement another similar curtailment strategy following consultation with the Service. This conservation measure is to be performed in concert with other measures described above as appropriate. A protocol to evaluate the effectiveness of the measures employed would also be implemented, designed in consultation with the Service upon achievement of this trigger.

Table 3-3. Anticipated Conservation Measures using Adaptive Management

Golden Eagles			Bald Eagles	
Threshold or Trigger[1]	**Anticipated Conservation Measure**		**Trigger**	**Anticipated Conservation Measure**

[1] For purposes of identifying when a given threshold or trigger is reached or exceeded, eagle carcasses found will count towards reaching or exceeding the threshold or trigger for up to one, two, or three, or five (depending on the threshold or trigger) years following the date of detection of the fatality. If any new threshold or trigger is reached or exceeded between 1 and 28 days prior to the "expiration" of any fatality (i.e., if the most recent fatality would not have caused reaching or exceeding the threshold or trigger, had it been discovered >28 days later), the threshold or trigger in question will not be immediately reached or exceeded, and will be reached or exceeded instead, if there is another new fatality within the 84 days (12 weeks) following the most recent fatality. So it is clear, if the implementation of a threshold or trigger is "put-off" and not reached or exceeded in the 12-week grace period, it still may be reached or exceeded subsequently if additional fatalities occur and the threshold or trigger is met again.

The purpose of this caveat is to allow some flexibility in when a threshold or trigger is reached or exceeded. For example, if an eagle is killed in the fall of 2018 (e.g., on September 17, 2018), and another in the fall of 2019 (e.g., on September 9, 2019); according to the above table, the first threshold or trigger would be reached as of September 9, 2019. However, had that fall 2018 fatality happened after September 18th (just a couple weeks later), and no other fatalities occurred until after September 9, 2019, no threshold or trigger would have been reached. Such a condition is being built in to this adaptive management process to allow flexibility for the exact dates of what might be seasonal mortalities to fluctuate slightly and not cause the immediate reaching or exceeding of the threshold or trigger.

[2] Term "found" refers to eagle remains discovered during formal survey or incidentally, and should have cause of death attributed to (or suspected to be attributed to) turbine strike.

3.3.2.3 Post-Construction Monitoring

Under Alternative 2, UAMPS would conduct post-construction monitoring for 3 years after the Eagle Permit is issued as described below. Monitoring would consist of three primary field components – Fatality Surveys, Searcher Efficiency Trials, and Carcass Persistence Trials:

Fatality Surveys

The goal of these surveys is to search for the remains of eagles killed by turbines. As negotiated during application processing, UAMPS has agreed to search all 32 turbines (100 percent) monthly for eagle carcasses in permit-years 1, 2, and 3. The surveyed area around each turbine would consist of a 258 x 258-meter (846 x 846-foot) square search plot centered on the wind turbine mast, and search transects within this area would be spaced no more than 20 meters apart. All searches would be conducted during daylight hours.

Searcher Efficiency Trials

The goal of these trials is to estimate the percentage of eagle fatalities that searchers observe, assuming remains are present to be observed during Fatality Surveys. As negotiated during application processing, UAMPS has agreed to conduct four trials per year (one in each season) in permit-years 1, 2, and 3. Each trial would consist of the placement of five surrogate carcasses at randomly generated locations within the area to be searched during Fatality Surveys. Locations would be screened before each trial to ensure that no more than one surrogate carcass would be located at any one turbine at any time. Carcass placements would be unknown to individuals conducting Fatality Surveys. Surrogate carcasses would constist of species that are the approximate size and share charactaristics of eagles – including turkey vultures (*Cathartes aura*), red-tailed hawks (*Buteo jamaicensis*), and great-horned owls (*Bubo virginianus*). Other species of large birds may be used if seasonal samples sizes cannot be achieved with these species.

Carcass Persistence Trials

The goal of these trials is to estimate the persistence of eagle remains in the Fatality Survey area and are available to be observed during Fatality Surveys. UAMPS has agreed to to conduct four trials per year (one in each season) in permit-years 1, 2, and 3. Each trial would consist of the same five surrogate carcasses placed for Searcher Efficiency Trials. Each surrogate would be checked on days 1, 2, 3, 5, 6, 7, 10, 14, 21, and 30 following their placement or until they are completely removed. After day 30, carcasses will be checked once each month during Fatality Surveys until all carcasses are removed.

Results of these field studies would be used to estimate the number of eagle fatalities at the Project, to determine the effectiveness of mitigation measures, and to determine which, if any, turbines produce disproportionately high levels of mortality. As illustrated in Table 3-3, more than 3 years of post-construction monitoring may be required under this alternative, with additional post-construction monitoring potentially being triggered under adaptive management.

Reporting

<u>Take Reports</u>

UAMPS would report all eagle fatalities to our Eastern Idaho Field Office and the Migratory Bird Permit office via email, within 48 hours of discovery, whether recorded during post-construction monitoring or by Project personnel during routine operation of the facility. Reports of eagle fatalities would be documented using a standardized form and include the date of discovery, the species and estimated age of the eagle, the location, the suspected cause and date/time of death or injury, and any other pertinent details of the circumstances of the fatality (e.g., turbine location, wind conditions, etc.).

Annual Reports

UAMPS would submit written reports each year during the 5-year permit term. Reports will be submitted to us by January 31 of each year. A summary of some of the the key components of each annual report is provided below.

- Observed and estimated incidental annual take rates (and the level of uncertainty of the estimates (e.g., confidence intervals).
- Disposition (alive/dead), location, species, sex, age, and dates of each observed fatality .
- Maps or graphical representations illustrating the geographic distribution and location of all observed fatalities (relative to turbine locations).

3.3.2.4 Minimization Measures and Best Management Practices

UAMPS would take the actions listed in Table 3-4 to minimize harm, injury, or mortality to eagles, in addition to the actions under Alternative 1. Many of these actions would also minimize adverse effects on other birds and bats.

Table 3-4. Minimization Measures and Best Management Practices

Minimization Measures
Marking balls and painted avian diverters on guy lines of any future MET towers.
Perform risk assessments on post-construction monitoring data.
Non-emergency maintenance or other activities at the Project (such as future MET tower removal) will be restricted to outside the critical periods of the eagle nesting season if eagle nests of any species are discovered or reported to UAMPS within 1 mile of the activity.
Best Management Practices
Wildlife carcasses attract vultures, eagles, and other scavengers; therefore, the likelihood of collision increases when carcasses are present at a project site. UAMPS will work with local and state agencies to ensure the regular removal of any dead medium- and large-sized mammals from the area of the Project. If possible, UAMPS will work with the Idaho Department of Fish and Game (IDFG) to designate appropriate disposal areas for these carcasses that are safer and that could benefit the local eagle population. This measure is aimed at preventing eagle attraction to the site, reducing the potential for collision and impact to the regional eagle population. To reduce the likelihood of attracting eagles within the Project footprint, Project personnel will do the following: ▪ Look for animal carcasses while traveling through the site. All carcasses identified will be reported to the site manager within 8 hours and removed from the site within 48 hours of notification. ▪ Look for kettles of vultures, eagles, or other scavenger birds that are circling in one area. Any kettles observed will be reported to the site manager within 8 hours, and the area below the kettle will be searched for carcasses within 24 hours. Any carcass found will be removed from the site within 48 hours of identification.

Table 3-4. Minimization Measures and Best Management Practices
Natural materials (e.g., rock piles, woody debris piles) and tall vegetation (e.g., tall forbs, grass, weeds) will be removed/maintained beneath turbines to reduce shelter and forage for small mammals, thereby reducing prey availability for raptors and minimizing raptor foraging in proximity to turbines.

3.3.3 ALTERNATIVE 3: ISSUE PERMIT WITH ADDITIONAL MITIGATION

This alternative is similar to Alternative 2, except compensatory mitigation options, in addition to power pole retrofits, would be required to offset eagle take. Post-construction monitoring, reporting, adaptive management, and minimization measures/BMPs would be identical to those described in Alternative 2.

In recent years, various entities have explored several compensatory mitigation options, beyond power pole retrofits, for adequacy in offsetting eagle morality at wind turbine sites (Allison et al. 2017). These options have generally aimed to reduce one of three of the most prevalent sources of anthropogenic mortality to eagles (in addition to electrocutions), which include shooting/poaching, vehicle collision, and lead toxicosis (USFWS 2016c). Under this Alternative, we consider mitigation to address vehicle collisions, lead toxicosis, and poaching under two categories: carcass removal on roadways and hunter education.

3.3.3.1 Compensatory Mitigation

Carcass Removal on Roadways

Road-killed animals (e.g., deer, elk, or small mammals) attract eagles to roadways; passing cars sometimes strike eagles that, because of their large body size, are slower to move out of the way. Analyses of eagle mortality in Arizona revealed that vehicle collisions caused the most reported eagle deaths in more than 12 years of data collection (Tetra Tech 2012). Vehicle collisions are also known to occur in Idaho and throughout the Pacific Northwest, although the extent and its relative impact to eagle populations is not well known.

Mohave County Wind Farm (BP Wind Energy North America, Inc., Mohave Co, AZ), and Elkhorn Valley Wind Farm (EDPR, Union Co, OR) have experimented with carcass removal as a means of offsetting eagle mortality at their facilities and have derived models that predict the number of miles of roadway required to reduce vehicle collision fatalities of golden eagles (Tetra Tech 2012).

Under this Alternative the Service would add a condition to the incidental eagle take permit that would require UAMPS to follow the example of BP Wind Energy North America, Inc. at their Mohave County Wind Farm, and analyze and then implement a carcass removal experiment in Idaho.

The model proposed by BP Wind Energy at their Mohave Valley Wind Farm facility includes nine steps to determine the number of miles of roadway needed to mitigate for one eagle (Table 15, Tetra Tech 2012). Ultimately, this model yielded an estimate that between 350 and 500 miles of roadway would need to be cleared of carcasses per year to offset one eagle mortality per year in Arizona. Several parameters that feed this model are likely specific to the geography of Arizona (e.g., number of carcasses available to eagles per mile). Under this alternative, the model would need to be re-evaluated for the geography of southeastern Idaho.

Hunter Education

Other relatively common sources of anthropogenic eagle mortality on the landscape include lead toxicosis and shooting/poaching. The Service estimates that mortality of golden eagles from these sources might account for about 32 percent of anthropogenic mortality across the western United States (USFWS 2016c). Educating the public might be key to reducing these threats.

The aim of hunter education as mitigation would be to reduce use of lead ammunition for game hunting and encourage proper disposal of lead-contaminated tissues that result from hunting activities. Hunter education classes could also include a component on wildlife protection laws; these may reduce incidental or intentional shooting of protected birds. However, the Service acknowledges that the act of poaching is not necessarily something carried out by hunters, especially those attending hunter education classes, most or all of whom are ardent conservationists.

Studies show that lead toxicosis from ingested bullet fragments is a pervasive and continuing threat to raptors. Hunters of big and small game traditionally use lead ammunition. Radiographs of hunter-killed animals reveal lead fragments scatter widely into tissues surrounding the bullet entry point (Pain et al. 2009; Stauber et al. 2010). A wide variety of scavengers such as condors, turkey vultures, hawks, and eagles inadvertently ingest lead when they consume either gut piles left by the hunters, or carcasses of animals not recovered by hunters (Golden et al. 2016; Haig et al. 2014; Katzner et al. 2017).

Evidence suggests that hunter education programs successfully reduce lead contamination in raptors. California requires that hunters use non-lead ammunition in the range of condors to reduce their exposure to lead. Within a year of the lead-ammunition ban in California, Kelly et al. (2011) found reductions in blood lead levels in both golden eagles and turkey vultures in the lead-free zones; in that time, there was a 100-percent reduction in elevated blood lead levels in resident golden eagles between pre-ban and post-ban periods. A small study in Wyoming found similar results on bald eagles where hunters used copper ammunition instead of lead (Bedrosian et al. 2012). Both Arizona and Utah have education programs and distribute free copper ammunition to hunters in condor range, both of which have effectively reduced lead contamination in condors.

Considering the consequences of lead toxicosis to eagles, Cochran et al. (2015) devised a model to estimate the benefits to eagles that might be derived from gut-pile removal and by using solid copper ammunition instead of lead. It would be possible to use this model as a starting point to determine the level of investment in hunter education necessary to save a golden eagle from lead toxicosis. To our knowledge, the Service has not used this model, nor has a wind power company come to the Service proposing to use this model, as a compensatory mitigation option.

The model proposed by Cochran et al. (2015) addresses only the likely effect on eagles of either gut-pile removal or hunters converting to non-lead ammunition. The Service is unaware of models to estimate the effectiveness of public education programs at reducing either use of lead-based ammunition (which we estimate is the cause of death for 5 percent of eagles that die from anthropogenic sources, with a 95-percent confidence interval of 3–25 percent; USFWS 2016c), or at reducing poaching (which we estimate is the cause of death for 27 percent of anthropogenic mortality, with a 95-percent confidence interval of 10–60 percent; USFWS 2016c). Nonetheless, UAMPS might engage in developing outreach to address these issues where these problems are the most persistent. Under this alternative, the Service would add conditions to the eagle incidental take permit directing UAMPS to design a study to estimate the prevalence of poaching and lead toxicosis, develop public education and outreach programs to reduce hunter use of lead and reduce poaching, and measure the effectiveness of those measures on eagles. A study evaluating the effectiveness of an outreach program could measure the blood lead levels of eagles over time, numbers of eagles and other raptors with elevated blood lead levels that are admitted to wildlife rehabilitation facilities, and the number of eagles reported as shot. The goal of an effective outreach program would be to reduce mortality from these anthropogenic sources by 30 percent, assuming the sources of mortality in this region match national rates (USFWS 2016c).

3.4 Alternatives Considered but Eliminated from Further Study

These alternatives either do not meet either the purposes or need of this permit action, or are technically or economically infeasible for the applicant.

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 5 years. However, UAMPS has requested a 5-year permit even though Project operations might continue for another 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 UAMPS applied. Therefore, this alternative was dismissed from further consideration.

3.4.2 Issue a 30-Year Permit

Under current regulations, an Eagle Permit can be issued for a maximum of a 30-year term. Although a 30-year permit may best meet the Service's Purpose, UAMPS has elected not to seek a 30-year permit, despite being given the option to pursue one. Because the applicant opted out of the 30-year permit, the maximum tenure for a permit under this application must be 5 years. This decision is up to the applicant; therefore, this alternative was also dismissed from further consideration. However, it should be noted that the effects analysis in this EA considers impacts over the operational life of the Project.

3.4.3 Operational Modifications

3.4.3.1 Reduce Turbine Cut-in Speed

Wind power operators can adjust the point at which turbines begin producing power relative to the speed of prevailing winds, termed "cut-in speed." Turbines set to higher cut-in speeds will have fewer operating hours than those with lower cut-in speeds. The Service considered adding an alternative requiring UAMPS to institute protocols to change their turbine cut-in speed from wind speeds of 3 meters/second to 4 meters/second, reducing the turbine operation by 8,594 hours/year relative to Alternatives 2 and 3. Reducing the number of hours of operation would also reduce eagle exposure risk and thus the predicted annual eagle mortality rate. The Service eliminated this alternative from further analysis after discussions with UAMPS, because this reduction in the number of hours of operation would be economically unsustainable and infeasible for UAMPS.

3.4.3.2 Turbine Removal

The Service considered adding an alternative that would have required UAMPS to remove a certain number of turbines to reduce exposure risk to and predicted annual mortality of eagles. The Service eliminated this alternative from further analysis, because the effect of this scenario on the power output by the facility essentially would be the same as or greater than reducing cut-in speeds; that is, reducing the number of Project turbines would reduce the number of hours of operation at the facility, which is economically unsustainable and infeasible for UAMPS.

3.4.3.3 Change Turbine Design

There are experimental turbine designs available that would appear to pose less risk to eagles than the industry standard, 3-blade horizontal axis design. The Service considered an alternative that would have required UAMPS to replace the current turbines with turbines of a different type or size, which might have reduced exposure risk to and estimated annual mortality of eagles. The Service eliminated this alternative from further analysis because we are not aware of alternative turbine designs available for purchase that have been shown to reduce risk to eagles, and the cost of replacing the current turbines in operation with alternative designs would be economically unsustainable and infeasible for UAMPS.

3.4.4 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. Traps set for larger mammals, baited with meat, also attract and trap and either kill or injure eagles. Eagles might benefit from campaigns instituted by UAMPS to publicize the risks of these activities and educate people conducting these activities how to peform them to minimize risks to eagles. However, we are unaware of any efforts, data, or methods that would allow us to quantify the benefit to eagles from campaigns made to reduce these threats. Poisoning incidents might be reduced by monitoring and enforcement of label restrictions by agencies with that responsibility. However, 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 conservation efforts, 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.

Chapter 4.0 Affected Environment

4.1 Introduction

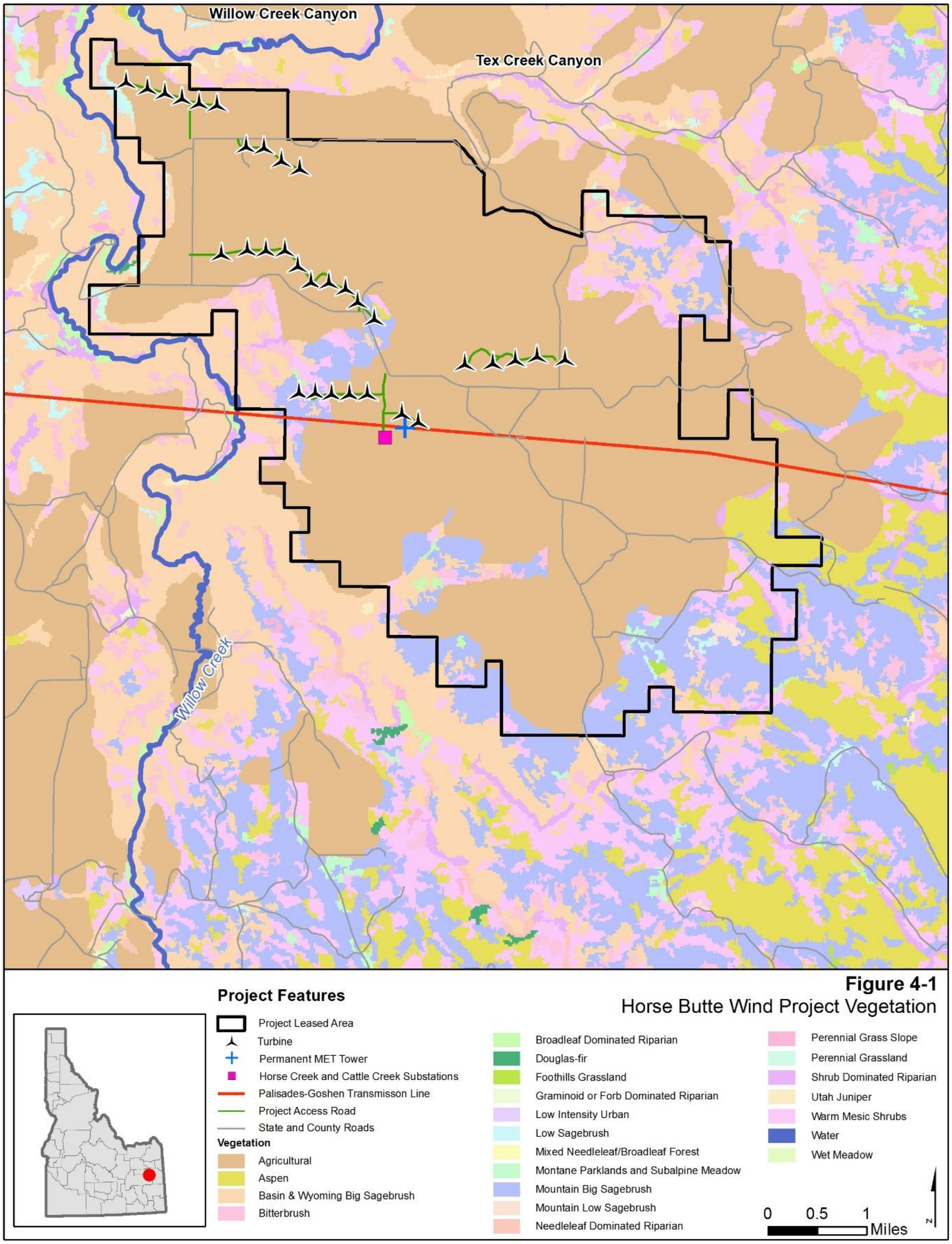
Bald and golden eagles are the primary resources affected by the permit decision evaluated in this EA, but other species could also be affected. This chapter describes the presently known condition of these species in the Project area, and of potentially affected tribal interests.

4.2 Physical Environment

The Project is located in rolling terrain with ridgelines, valleys, small canyons, and open land. Elevation in the Project Leased Area ranges from 1,794 meters to 2,542 meters (5,886 feet to 8,342 feet). Vegetation in the Project Leased Area is dominated by cultivated agricultural crops, with small, isolated patches of sagebrush interspersed with perennial grassland habitats, and narrow stringers of aspen forest (Figure 4-1). Sagebrush-steppe habitat dominates the areas surrounding the Project. The sagebrush-steppe habitat consists of basin, Wyoming, and mountain big sagebrush (*Artemisia* spp.), with small patches of low sagebrush, bitterbrush (*Purshia tridentata)*, and warm mesic shrubs. Rocky cliff bands are present along the steeper ridges. Small wetland and forested riparian areas are also present, and are associated with drainage swales and ephemeral stream systems. Tex Creek Canyon and Willow Creek Canyon are prominent canyons to the north and west sides of the Project, respectively. Willow Creek and Tex Creek are perennial streams within canyons characterized by large cliff walls, vertical cliff faces, and ledges. Portions of these streams are within the Tex Creek Wildlife Management Area (WMA) (Figure 4-1).

Existing activities in the Project Leased Area and vicinity include farming, ranching, O&M of wind power facilities, livestock grazing, and year-round recreation. County roads are used to access the private farms and ranch lands, the wind power facilities, and the Tex Creek WMA, and are frequented by general vehicular traffic, farming machinery, and semi-trucks (seasonally to haul cattle), and less frequently by large vehicles hauling wind turbine components. The area is used extensively in the winter for snowmobiling, with Bonneville County maintaining access trails and trailheads. The area is also popular for recreation in the summer, due to the proximity to Idaho Falls and Swan Valley. Recreationists use the county roads through the Project Leased Area to access the hills and the Caribou National Forest trails. A limited amount of hunting for deer and upland birds occurs within the Project Leased Area. The Project Leased Area is all private property with limited access by the landowners. Some public access has been obtained by the IDFG thru cooperative partnerships.

Figure 4-1. Horse Butte Wind Project Vegetation



4.3 Bald and Golden Eagles

4.3.1 BALD EAGLE

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. In Idaho, bald eagles are classified as a protected nongame species (Groves et al. 1997).

4.3.1.1 Population

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 2016a). The Project is located in the Pacific Flyway North EMU Flyway.

The estimated median population size of bald eagles in the Pacific Flyway North EMU is 14,792 (USFWS 2016b). We used the estimated number of occupied bald eagle nesting territories in the coterminous United States and conservative estimates of the proportion of the population that consisted of breeding adults to estimate the median bald eagle population size (USFWS 2016b). 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 2016b).

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 2016a). 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 2016a).

The population size of the LAP is estimated by applying the density estimates for EMUs to the LAP area (USFWS 2016a). Using these densities, we estimate the LAP of bald eagles (i.e., those birds within 138 km [86 miles] of the project) to be 54 bald eagles.

4.3.1.2 Nesting and Breeding

UAMPS conducted project-specific surveys for nesting raptors in 2010, 2011, and 2013. The surveys documented bald eagles nesting and breeding within a 16-km (10-mile) radius of the Project footprint. Between 2010 and 2013, a total of five occupied bald eagle nests were documented within the survey area, although not all nests were occupied in all years (Appendix A). Three of the nests are located in trees and two are on cliffs. The nearest known bald eagle nest to the Project is 1.6 km (1 mile) away from the nearest turbine. The farthest known nest is 13.8 km (8.6 miles) away from the nearest turbine. A more detailed summary of the surveys is provided in the ECP (Appendix A).

Although other territories may exist that were not discovered during surveys, the locations of the five known occupied bald eagle nests within a 16-km (10-mile) radius of the Project footprint were used to calculate the mean inter-nest distance of bald eagles (USFWS 2013a). The project-specific mean inter-nest distance for bald eagles is 6.1 km (3.8 miles). One-half of this distance is 3 km (1.9 miles). As explained in the ECPG, “eagle pairs at nests within ½ the mean project area inter-nest distance of the project footprint are potentially susceptible to disturbance take and bladestrike mortality, as these pairs and offspring may use the project footprint” (USFWS 2013a). The mean inter-nest distance is also used to define the boundary of the **project area**. Figure 4-2 shows the location of all five bald eagle nest locations, the Project Leased Area, and the Project footprint.

4.3.1.3 Migration

The Project area does not contain habitat features known to concentrate bald eagles during migration or during the winter months. In addition, there are no large waterbodies or known concentrations of upland prey-like burrowing mammals and carrion in the Project area. Landscape features that could concentrate migrating bald eagles are located east, west, and north of the Project area. The Snake River corridor is east of the Project area, and Ririe Reservoir is to the north.

To assess bird use near the Project over different seasons and among different habitat types, raptor migration studies were conducted in 2009, 2010, and 2011 (SWCA 2010a, 2011a, 2012). Survey results are summarized in Table 4-1. The results show that although not a high level of use, bald eagles do use the Project area to some extent in the winter. A more detailed summary of the surveys by date, type, and location is provided in the ECP (Appendix A). Flight heights were recorded during the raptor migration surveys to determine if birds may be at risk of flying in the turbine rotor swept area (RSA). The RSA is defined as the area of the circle delineated by the rotating blades of the wind generator. For UAMPS, the RSA is between 37.5 and 160.0 meters (123 and 525 feet) above ground level (AGL). Seven of the eight bald eagles documented during the raptor migration surveys were observed within the RSA (SWCA 2013a).

Figure 4-2. Horse Butte Wind Project Bald Eagle Nest Locations

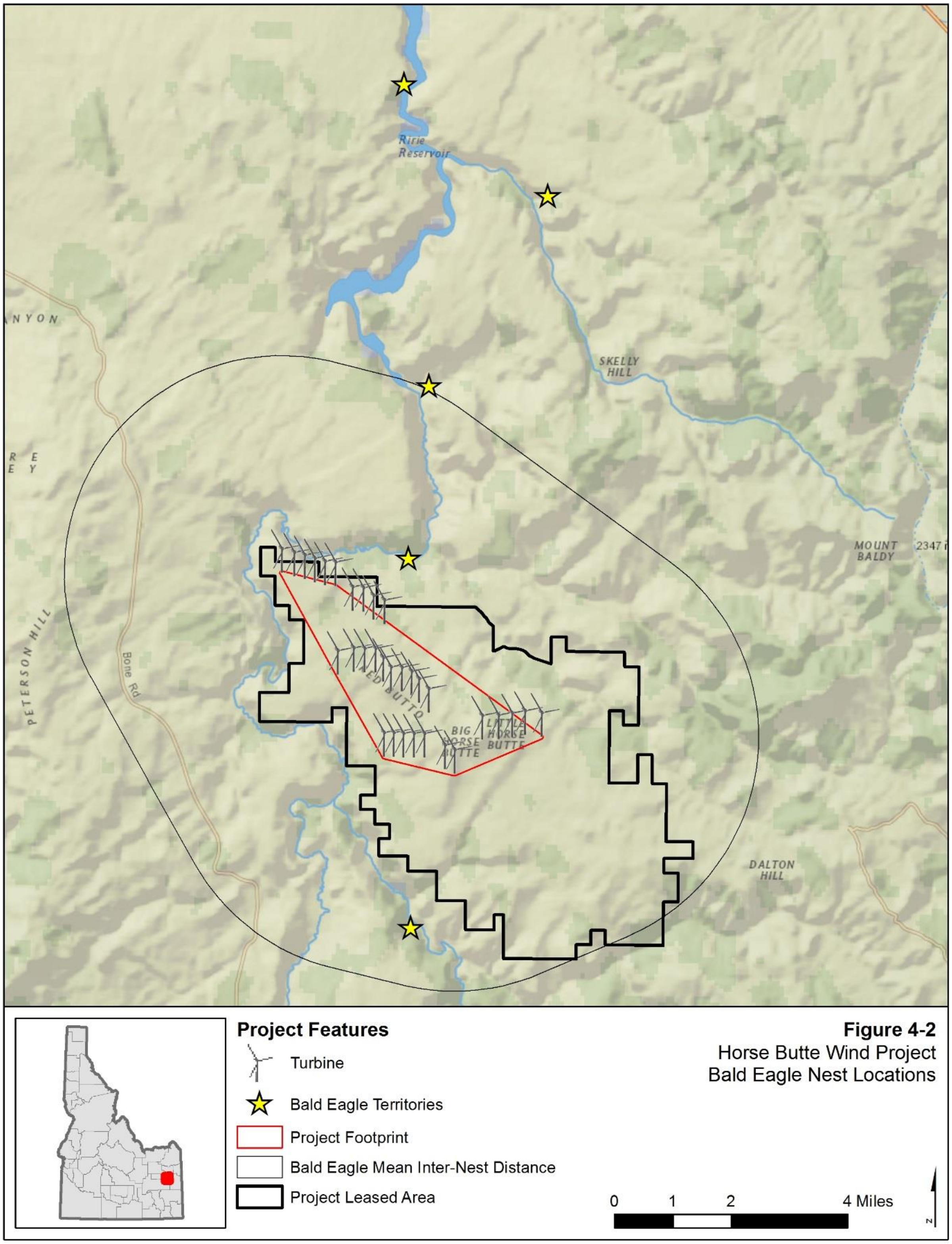


Table 4-1. Bald Eagle Passage Rates

Survey	Number of Bald Eagles Observed	Passage Rate[a]
Fall 2009	3	0.12 bald eagles per hour
Spring 2010	2	0.08 bald eagles per hour
Spring 2011	1	0.02 bald eagles per hour
Fall 2011	2	0.02 bald eagles per hour

[a] SWCA 2013b.

Bald eagles were also observed during other bird surveys conducted year-round in the Project area between December 2011 and June 2013. Results of these surveys, combined with knowledge of **occupied nests**, suggest that bald eagles are present year-round in the area. The greater numbers of bald eagle observations in the fall suggests that some bald eagles, likely migrants and other non-breeders, are drawn to the area during this season (SWCA 2013c).

4.3.2 Golden Eagle

Because of their protection under the Eagle Act, golden eagles remain on our *Birds of Conservation Concern 2008* list for BCR 9 (USFWS 2008), which overlaps the Project. In Idaho, golden eagles are classified as a protected nongame species (Groves et al. 1997).

4.3.2.1 Population

We updated estimates of golden eagle population size and trend for the western United States between 1967 and 2014 (USFWS 2016a). The updated analysis indicated a total coterminous western U.S. population of 30,000 (20th quantile = 27,000) for 2009 (USFWS 2016a).

The estimated median population size of golden eagles in the Pacific Flyway EMU is 15,927 (USFWS 2016a). The population size of the LAP is estimated by applying the density estimates for EMUs to the LAP area (USFWS 2016a). Using these densities, we estimate the LAP of golden eagles (i.e., those birds within 175 km [109 miles] of the project) to be 877 golden eagles.

4.3.2.2 Nesting and Breeding

UAMPS conducted project-specific surveys for nesting raptors in 2010, 2011, and 2013. The surveys documented golden eagles actively nesting and breeding within a 16-km (10-mile) radius of the Project footprint. Between 2010 and 2013, a total of 13 golden eagle nests were documented within this area, although not all nests were occupied in all years. No golden eagle nests were occupied in 2010, five in 2011, one in 2012, and four in 2013. All nests except one were found to be on cliffs, the other was in a tree. The nearest known golden eagle nest is 1.3 km (0.8 mile) away from the nearest turbine at the Project. The farthest known nest was 9 km (5.6 miles) away from the nearest turbine. A more-detailed description of the surveys and their findings is provided in the ECP (Appendix A).

Although other territories may exist that were not discovered during surveys, UAMPS used the locations of the seven known occupied eagle nests within a 16-km (10-mile) radius of the Project footprint to calculate the mean inter-nest distance of golden eagles (USFWS 2013a). The project-specific mean inter-nest distance for golden eagles was determined to be 7.7 km (4.8 miles). One-half of this distance is 3.8

km (2.4 miles). As explained in the ECPG, “eagle pairs at nests within ½ the mean project area inter-nest distance of the Project footprint may be especially susceptible to disturbance take and bladestrike mortality, as these pairs and offspring may use the project footprint” (USFWS 2013a). The mean inter-nest distance is also used to define the boundary of the Project area. Figure 4-3 shows the location of all seven golden eagle nest locations, and the Project Leased Area and Project footprint.

4.3.2.3 Migration

Eagle and raptor use survyes were conducted by UAMPS in the fall and spring of 2009, 2010, and 2011 to assess bird use near the Project over different seasons and among different habitat types. Survey methods are summaried in the ECP (Appendix A) and results are summarized in Table 4-2. The results show that golden eagles do migrate through the Project area. A more detailed summary of the surveys by date, type, and location is provided in the ECP (Appendix A).

Flight heights were recorded during these surveys to determine if birds may be at risk of flying in the turbine RSA. Only eagle observations during spring of 2011 occurred in the RSA; none of the fall observations occurred within the RSA (SWCA 2013a). Eagles were observed below, within, and above the RSA.

Figure 4-3. Horse Butte Wind Project Golden Eagle Nest Locations

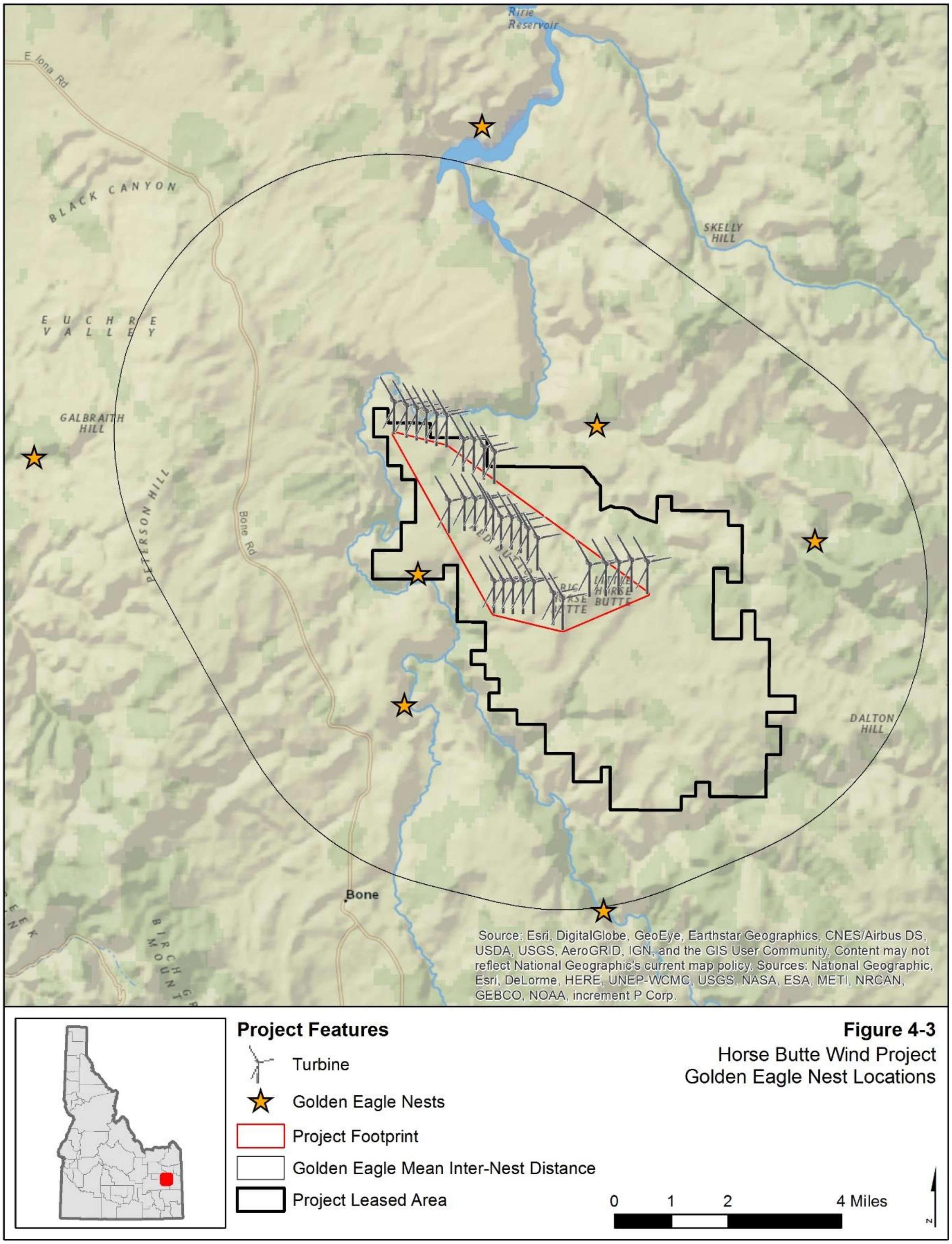


Table 4-2. Golden Eagle Passage Rates

Survey	Number of Golden Eagles Observed	Passage Rate[a]
Fall 2009	4	0.16 golden eagles per hour
Spring 2010	1	0.04 golden eagles per hour
Spring 2011	4	0.09 golden eagles per hour
Fall 2011	1	0.02 golden eagles per hour

[a] SWCA 2013b.

4.4 Migratory Birds

Species most likely to be affected by our permit decision are evaluated here. Should adaptive management of UAMPS include curtailment (Table 3-3), then there might be benefit as well to raptors, other species of birds, and potentially to bats. The yellow-billed cuckoo (*Coccyzus americanus*) is the only species listed under the Endangered Species Act (ESA) known to occur in the area (USFWS 2013b).

Twenty-eight Birds of Conservation Concern (BCC) species have been identified for BCR 9. The complete list is found in Appendix F. Seven BCC species on this list, in addition to the bald eagle and golden eagle, have been documented during breeding bird, bird migration, and other avian surveys conducted in the Project Leased Area. Of these, Brewer's sparrow (*Spizella breweri*) was the most abundant BCC species recorded. In addition to the BCC species recorded during the surveys, there is the potential for the black rosy-finch (*Leucosticte atrata*), ferruginous hawk (*Buteo regalis*), piñon jay (*Gymnorhinus cyanocephalus*), and long-billed curlew (*Numenius americanus*) to occur, based on available habitat and/or known geographic range information. Additional bird species not on the BCR 9 BCC list were recorded in the Project Leased Area and are summarized in Appendix F and in individual bird survey reports (SWCA 2010a, 2010b, 2010c, 2011a, and 2012).

4.4.1 Raptors

UAMPS conducted raptor migration and nest surveys, and large-bird use surveys in 2009, 2010, and 2011. They recorded 14 raptor species, primarily diurnal (active during the day), in the Project Leased Area. The red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), and turkey vulture (*Cathartes aura*) were the most common raptor species recorded during the surveys.

Raptor nest surveys were conducted by UAMPS in 2010 and 2011 (SWCA 2011b). They recorded a total of 80 raptor nests, including bald and golden eagles (SWCA 2011b). Nests from six species of raptors (mostly diurnal), including bald and golden eagles, were identified (SWCA 2011b). Red-tailed hawks and Swainson's hawks (*Buteo swainsoni)* were the most common raptors nesting in the Project Leased Area. Although not raptors, common ravens (*Corvus corax*) were also noted as common during this survey. A more-detailed summary of the survey's results, including a map of raptor nest locations, is found in the BBCS (Appendix F).

4.4.2 ESA-listed Birds

The yellow-billed cuckoo (*Coccyzus americanus*) in the western portions of the United States, Canada, and Mexico is listed as a threatened distinct population segment under the ESA (USFWS 2013b). The yellow-billed cuckoo has not been recorded in the Project Leased Area, and habitat for this species is lacking; however, it is possible that this species moves through the area during migration. Proposed critical habitat for yellow-billed cuckoo is located approximately 13–15 miles north of the Project along the South Fork of the Snake River and approximately 25 miles north along the lower Henry's Fork of the Snake River (USFWS 2013b). One yellow-billed cuckoo was recorded within approximately 12.8 km (8 miles) to the west of the Project Leased Area. This record was in 2001 of a "window kill" found on a private resident's porch (IFWIS 2013). Yellow-billed cuckoos have been recorded along the Snake River north of Ririe Reservoir, more than 24 km (15 miles) from the Project Leased Area (unpublished IDFG data 2013). Potentially suitable habitat is present closer to the Project footprint in the riparian habitat next to Willow Creek (approximately 0.6 km (0.4 mile) from the Project footprint), and it is possible that this area could be used as stopovers on their way to the Snake River.

4.5 Bats

Acoustic bat surveys were conducted to estimate the presence and activity levels in the Project Leased Area by bats (SWCA 2011c). Ten species of bats, out of the fourteen known to occur in Idaho, were identified during these surveys, with the highest activity levels recorded for the little brown bat (*Myotis lucifugus*), hoary bat (*Lasiusus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*). Six of the species identified were recorded within the turbine RSA (SWCA 2011c). The hoary and silver-haired bats showed the highest levels of activity in the RSA, with 64 percent and 43 percent of recorded data within the RSA for these species, respectively. Bat activity was highest for all species in July, August, and September, corresponding primarily to summer foraging activities, swarming, and the beginning of fall migration. Bat activity was greater at the low position on the tower than at the high position.

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.

A records survey associated with adjacent lands administered by the Bureau of Land Management (BLM) did not identify any traditional cultural properties, sacred sites, or other areas used for traditional cultural purposes immediately west of the Project footprint (BLM 2011b). However, in correspondence between the BLM and the Shoshone-Bannock Tribes, the Tribes indicated that natural, permanent water sources are important for the maintenance of traditional cultural lifestyles and beliefs (BLM 2009). Therefore, Willow Creek and Tex Creek may be culturally important to the Shoshone-Bannock Tribes. Additionally, during government-to-government consultation on March 17, 2014, between the Service and the Fort Hall Business Council of the Shoshone-Bannock Tribes, the Tribes indicated that golden eagles are a culturally significant species, and that golden eagle parts are of religious/cultural importance.

Chapter 5.0 Environmental Consequences

5.1 Introduction

This chapter addresses the potential environmental consequences of implementing each alternative. The actions being analyzed under each alternative are operation and maintenance of the Project as described in Chapter 3. Under Alternatives 2 and 3, the permit term would be 5 years so the direct and indirect effects analyzed in this EA are considered over a 5-year term. However, because the Project is anticipated to continue for 30 years, the cumulative effects analysis considers effects extrapolated out over 30 years. If an Eagle Permit is issued, it may be renewed after the initial 5 years, following our review. That 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 current status and trends of eagle populations, and the continued accuracy of the potential effects analyzed in this NEPA document. Decommissioning or repowering the facility with new turbines at the end of the lifespan of the existing facilities is not addressed in this analysis, because it would occur after the permit term, and because there are many unknowns about future technology, energy markets, and other factors that would affect UAMPS's decision to decommission or repower and the environmental impacts of such a decision.

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). Given that the Project is currently operational, some existing effects from O&M of the Project would continue to occur under each alternative. Effects common to each alternative are addressed first in the sections below, followed by analysis of potential effects that would differ by alternative. Project design and construction have already occurred, and the associated effects are not considered in this chapter.

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 three alternatives (i.e., will occur regardless of the alternative chosen). These effects are used to 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). Direct and indirect effects on bald and golden eagles are addressed in the context of these two scales and the criteria listed above (see Section 5.2). All three alternatives have the potential to result in the take of eagles, whether or not permitted. Adverse effects to bald and golden eagles related to injury and mortality are considered long-term, as the possibility for collisions with Project components would continue for the life of the Project.

5.2.1.1 Collisions with Wind Turbine Blades

Under the alternatives, collision with rotating turbine blades is the primary risk to eagles from O&M of the Project. Mortality or long-term injury is the direct adverse effect of eagles colliding with turbine blades. Two golden eagle fatalities have been documented since the Project became operational and 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 Fatality Model (Appendix C). The Fatality Model predicts only the number of eagles likely to be killed by collision with the turbine blades 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 3-1, and see Appendix C) is moderate as defined in the ECPG (USFWS 2013a). Additionally, the Project footprint does not contain a known important eagle-use area, such as a nest or migration corridor. Further, concentrations of small mammals, potential prey for golden eagles, appear to be low in the Project footprint (SWCA 2013d). However, the Project footprint is surrounded on three sides by areas with canyons and ridgelines, including Willow Creek Canyon and Tex Creek WMAs, and small water bodies. These features may attract both species of eagle to some degree.

5.2.1.2 Collision with Other Project Infrastructure

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 that could pose collision risk to eagles and the reasons why we believe this risk is relatively low.

- One permanent MET tower is part of the Project. It does not have guy wires and thus does not pose a high risk of collision. However, its lattice structure provides perch opportunities that may attract eagles, particularly if prey is available, thus putting eagles at risk of colliding with nearby turbines.
- Electrical collection lines are located on site. However, all collection lines are buried and thus do not pose any collision risk to eagles.
- There is a 152-meter-long (500-foot-long) overhead power line adjacent to the permanent MET tower. Data suggest that eagle mortality due to collisions with these types of lines does occur (USFWS 2016c), but has not been well quantified. We believe eagle collisions with this short section of overhead power line at the Project will occur rarely, if at all, because these lines were constructed according to APLIC (2012) guidelines, which reduces the likelihood of collision.
- 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 very low.

5.2.1.3 Human Disturbance

Maintenance of turbines and other infrastructure during the O&M of the Project have the potential to disturb nesting eagles, depending on nature of the activity, the species of eagle, the distance between the activity and the nest, and the local topography. For human disturbance, we typically recommend a spatial buffer of 201 meters (660 feet) to bald eagle nests and between a 0.8 km and 1.6 km (0.5 mile and 1 mile) for golden eagle nests, depending on topography (Richardson and Miller 1997; Spaul and Heath 2016; Suter and Jones 1981), although our recommendations can vary by situation. The closest bald eagle nests are more than 1.6 km (1 mile) from the operating turbines and other infrastructure, and therefore are unlikely to be disturbed by maintenance activities at the Project. Two raptor nests within 0.5 km (0.3 mile) of a turbine were identified during surveys as either golden eagle or buteo nests. These nests were unoccupied when monitored, and thus the species that historically used the nest was not verified. If, in the future, golden eagles occupy these nests or build new ones in the vicinity of the Project footprint, maintenance activities for turbines, powerlines, and roadways during the nesting period could create intermittent disruptions to eagle breeding activities.

Under all alternatives, UAMPS would continue to provide a worker education class to all employees to teach on-site personnel how to minimize the potential of disturbing and otherwise altering the natural behavior of eagles from human activities associated with the Project (Table 1-2).

5.2.1.4 Electrocution

The Project includes two short segments of overhead power line, approximately 152 meters (500 feet) in total length. Eagles have large wingspans and therefore are at risk of electrocution because they are large enough for their wings to contact different parts of charged power pole structures and complete an electrical circuit. Electrocution typically results in mortality but could also result in long-term injury. These power lines were constructed according to APLIC (2006) guidelines, which reduces the likelihood of electrocution. All other electrical collection lines associated with the Project are buried underground and do not pose a risk of electrocution.

The number of potential fatalities associated with power lines and substations in the analysis area is difficult to estimate, but is likely small because of the relatively short length of overhead power lines present and the implementation of APLIC guidelines.

5.2.2 MIGRATORY BIRDS

5.2.2.1 Collision with Turbine Blades

Project O&M is likely to kill and injure migratory birds through collisions with rotating turbine blades (Kunz et al. 2007; Winegrad 2004). Estimates of the number of birds killed annually at wind facilities in the United States vary by project.

Avian mortality, a direct adverse effect, from colliding with Project turbine blades likely would occur under each alternative. Based on the first year of post-construction avian fatality monitoring at the Project (September 2012–September 2013), mortalities of seven small birds (primarily passerines) potentially attributed to turbine collision were recorded (SWCA 2013e). UAMPS's adjusted fatality estimates of small birds is 1.4 per MW per year (0.3–3.4 with a 95-percent confidence interval) (SWCA 2013e), or about 80 small birds across the Project each year.

In addition to passerines, mortalities of waterfowl/waterbird species (American coot, eared grebe, and two unknown species), upland game bird species (gray partridge and sharp-tailed grouse), and raptor species (rough-legged hawk) have been recorded at the Project (SWCA 2013e). We anticipate that some amount of mortality of waterfowl/waterbirds, upland game birds, and raptors likely will occur under each alternative. UAMPS adjusted fatality rate for the first year of operation of the Project for large birds, which includes waterfowl/waterbirds, raptors, and upland gamebirds, was 0.5 per MW per year, or about 29 birds per year across the whole Project (0.1–1.1 with a 95-percent confidence interval) (SWCA 2013e).

The fatality estimates for raptors, passerines, waterfowl/waterbird species, and upland game bird species appears to be relatively low when compared with similar size wind facilities described in one paper (Erickson et al. 2014), but estimates vary widely across the region and across the country and can fluctuate greatly across projects depending on methods of carcass searching and assumptions made during estimation . The methodology used to date at the Project may underestimate the number of non-eagle fatalities because of the relatively small area searched. Consequently, this estimate is likely the low end of the range of rates at which fatalities from collision with turbine blades would continue for the duration of Project O&M. Not enough is known about the local populations of waterfowl/waterbirds, upland game birds, and raptors to determine the populations level effects of sustaining that level of mortality.

Lighting on the turbines and other Project infrastructure likely affects the number of birds killed or injured from collisions with the Project's infrastructure. At the Project, 18 of the 32 turbine towers are equipped with lights to meet FAA requirements. The types of lights installed were selected by UAMPS to meet FAA requirements and to reduce potential effects on birds. It is possible that the FAA lighting at the Project may attract or disorient migrating birds at night leading to a risk of colliding with turbine blades and being killed or injured. However, the types of lights being utilized are among the better options for both meeting FAA requirements and minimizing the attraction of birds to these towers compared to other types of lights.

At modern wind-energy facilities in the Pacific Northwest, raptors account for approxmately 8.6 percent of avian mortalities (Johnson and Erickson 2008). The percent of raptors recorded flying at altitudes within the RSA during migration surveys in the Project Leased Area ranged from 0 to 57, depending on the year and season, indicating a higher risk of collision with wind turbine blades than raptors not recorded flying at altitudes within the RSA. Red-tailed hawks were the most common raptors observed during both spring migration and one of the fall migration pre-construction surveys conducted by UAMPS. To date, non-eagle raptor fatalities have occurred at the Project. Specifically, rough-legged hawk (2) and red-tailed hawk (2) fatalities have been recorded. Relatively high numbers of red-tailed hawk mortalities have been reported at other wind facilities, so it is expected that this species would be at risk of collision with turbine blades in the future, perhaps even more so than other raptor species. Other buteos such as rough-legged hawk, Swainson's hawk, and ferruginous hawk, a BCC species, may also be at risk, albeit slightly reduced because of a likely lower relative abundance at the Project.

5.2.2.2 Collision with Other Project Infrastructure

As described previously, this Project includes 152 meters (500 feet) of new overhead transmission line and MET towers that pose some collision risk to birds. The overhead power line and its poles comply with APLIC (APLIC 2012) guidance, which reflects the best available measures to avoid and minimize collision risk to birds. Regardless, collisions might still occur (APLIC 2012). Collisions are most likely when bad weather changes flight patterns. However, the power lines are not adjacent to any major bodies of water or wetlands that attract birds such as cranes (*Grus* spp.) or other large waterbirds most prone to collisions. The power lines also do not cross a saddle or other topographical features which serve as migratory funnels. Consequently, we expect that few if any birds will collide with the Project's power lines.

A few species of migratory birds, mostly raptors, are at risk of colliding with vehicles, similar to what was described for eagles (Section 5.3.1.1). Birds that are scavengers (i.e., eat dead animals), like turkey vultures, might be at a higher level of risk of vehicle collision than other species. However, for scavenging birds, the likelihood of colliding with vehicles at the Project is also still low, due to enforced speed limits, implementation of BMPs designed to remove roadkill and other attractants to eagles, and low vehicle use on the Project site during winter, when raptors are most likely to feed on roadkill carcasses.

For the same reasons as described for eagles, other Project infrastructure (MET tower and power lines) are not likely to be a frequent source of morality or injury for raptors. The risk of mortality or injury from collision with other Project infrastructure is the same under each alternative. As described above, raptors that scavenge on roadkill are at risk of death from being struck by Project vehicles. This risk is low due to enforced speed limits, implementation of BMPs designed to remove roadkill and other attractants, and low vehicle use on the Project site during winter, when raptors are most likely to feed on carcasses. The risk of collision with vehicles is the same across the alternatives.

Electrical collection lines are located on site. However, all collection lines are buried and thus do not pose any collision risk to migratory birds.

5.2.2.3 Human Disturbance

During Project O&M, relatively few people are on site at the Project. Human activity outside of the areas of disturbance will be infrequent, so the chances of potential disturbance to nesting migratory birds in these areas are low. Further, turbine monopoles and the nacelles are shaped such that the potential for a bird to nest on top of turbine infrastructure is discountable. As such, disturbance of nesting birds from human presence would likely be minimal. However, it is plausible that birds such as swallow or barn owl would find their way into turbine structures and nest inside the tower or on small external ledges (i.e., motion lights, underneath stairs, etc.). If these nesting attempts are discovered, UAMPS will immediately contact the local Service field office to discuss how best to resolve the issue.

Unplanned repair of turbines has the potential to temporarily disturb migratory bird foraging habitat and behavior by removing vegetation. Removal of vegetation could potentially adversely affect nesting if the work was conducted in the breeding season.

Raptor nesting rates near wind-energy facilities is not well studied, but a marked difference was identified in raptor nesting density between a wind-energy facility (0 nests/100 km^2 [39 square miles]) and adjacent lands within similar habitat (5.94 nests/100 km^2 [39 square miles]) (Higgins et al. 2007). Occupied raptor nests could be directly affected by visual disturbances and noise from turbines and human activity during O&M activities. Additionally, raptors may be indirectly affected through reductions in the quality of foraging habitat. These effects could result in avoidance behavior (movement to lower-quality habitat) and disruption to breeding activities, as described for eagles. The risk of disturbance is the same under the alternatives.

5.2.2.4 Electrocution

Birds with large wingspans, such as raptors, face a threat of electrocution comparable to that described for eagles because they are large enough for their wings to contact different parts of charged power pole structures and complete an electrical circuit. Raptors and other birds, such as ravens, with large wingspans and that tend to perch on power poles are at highest risk of electrocution. Other species of migratory birds are likely not at risk because of their smaller size and/or because they do not perch on power poles. The risk of electrocution is low because the electrical infrastructure at the Project is either buried or APLIC-compliant and, thus, represents the best available measures to avoid electrocuting birds.

5.2.3 BATS

5.2.3.1 Collision with Turbine Blades

Several hypotheses propose that bats are attracted to wind turbines (Cryan and Barclay 2009). Bats have been observed feeding and foraging around and in the RSA of turbines, as well as landing on and investigating monopoles, and both motionless and moving turbine blades (Horn et al. 2008). Bat fatality rates are affected by tower height, wind speed, and weather conditions (NWCC 2010; Arnett et al. 2008; Barclay et al. 2007). The RSA of all Project turbines is 100 meters in diameter and extends vertically from 30 to 130 meters (approximately 98 to 427 feet) AGL. Six of the ten species of bats identified during pre-construction surveys conducted by UAMPS were recorded within the RSA (hoary, silver-haired, big brown, western red [*Lasiusus blossevillii*], little brown, and Yuma myotis bats [*Myotis yumanensis*]), suggesting these species are the most susceptible to mortality from colliding with Project turbine blades. Hoary and silver-haired bats had the highest levels of activity in the RSA, indicating that these species may be at higher risk of mortality from colliding with Project turbine blades than other bat species in the area. Western small-footed myotis, Long-eared myotis, Townsend's big-eared bat, and Pallid bat were not recorded within the RSA, and are therefore at lower risk of colliding with Project turbine blades.

Based on the first year of post-construction monitoring, fatalities of hoary bats, silver-haired bats, and unknown myotis and vesper bat species have been recorded at the Project (SWCA 2013e). The majority of bat fatalities found (88 percent) were migratory tree bats with hoary and silver-haired bats representing the majority of bat fatalities documented at the Project (SWCA 2013e). Sixty-five percent of all fatalities occurred during the fall migration period, which is consistent with patterns observed at adjacent wind energy facilities. Because four other species (big brown, little brown, Yuma myotis, and western red) were recorded in the RSA, fatalities to these species could occur and may have occurred at the Project; however, fatalities of these species would likely be relatively low due to low levels of activity documented in the RSA for each species. Fatalities of western red bats may be even lower because their activity in the area is generally limited to the early summer. To date, bat mortality at the Project is estimated to be 7.8 bats/MW/year, or about 14 bats/turbine/year and 449 total individuals (SWCA 2013e). This estimate is likely the approximate rate of bat fatalities from collision with the turbine blades that would continue for the duration of Project operations.

5.2.3.2 Collision with other Project Infrastructure

We are not aware of bats regularly colliding with other stationary structures or vehicles, so we expect risk of collision with any other structure or vehicle at the project to be low.

5.2.3.3 Human Disturbance

The Project footprint does not have high quality habitat features for bats, such as caves, roost sites, trees, and tall structures used by migratory tree bats, or water sources. In addition, most bat activity is at night, when there is no human activity at the Project, and if it must occur, is generally minimal. Therefore, the potential for direct and indirect disturbance to bats from human activities associated with Project O&M would be low.

5.2.4 THREATENED AND ENDANGERED SPECIES

We conducted intra-Service Section 7 consultation regarding this permit decision and found there to be no effects on an listed species or their habitats. The footprint of the Project may include habitat for the North American Wolverine (*Gulo gulo luscus*) (IPaC; https://ecos.fws.gov/ipac/). However, our permit decision will not affect wolverines, should they occur in the vicinity of this facility, which is already operational.

5.2.5 TRIBAL TRADITIONAL USES/NATIVE AMERICAN RELIGIOUS CONCERNS

Eagles, eagle parts and feathers, and eagle nest sites are revered and considered sacred in many Native American traditions. Project O&M and associated take of eagles is not expected to interfere with cultural tribal practices and ceremonies related to eagles, or to affect any tribe's ability to utilize eagle feathers; tribal members acquire feathers from the Service's National Eagle Repository (Service's eagle repository) and this process would be unaffected. In addition, as required by our policy, eagle mortalities that are found would be sent to the Service's eagle repository, where eagle remains, if in good condition, are made available to members of federally recognized tribes for traditional practices.

Based on consultation to date with the Shoshone-Bannock Tribes, there is no indication cultural or religious interests would be adversely affected under any alternative.

5.2.6 OTHER PRIORITY USES

Other priority uses described in our regulations include safety emergencies, Native American use of eagles and their parts and feathers for rites and ceremonies, renewal of other programmatic take permits, and non-emergency activities necessary to ensure public health and safety Authoization of eagle take at the Project is not expected to interfere with other priority uses or permits because a no-net-loss standard is expected to be achieved under the action alternatives.

5.3 Alternative 1 – Deny the Permit Application

Under Alternative 1, an Eagle Permit would not be issued for the Project and associated mitigation would not be required. Under this alternative, implementation of new minimization measures, BMPs, post-construction monitoring, compensatory mitigation, and adaptive management would be strictly voluntary. It is assumed for this analysis that measures described above under Alternative 2 and 3 (Sections 3.3.2 and 3.3.3) would not be implemented as a voluntary action by UAMPS.

5.3.1 BALD AND GOLDEN 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 3.5 golden eagles per year, and 1.2 bald eagles per year (Appendix C). This equates to 18 golden eagles and 6 bald eagles over 5 years. 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 lived a normal lifespan (USFWS 2016c). The predicted eagle fatality rates under Alternative 1 is the same as Alternatives 2 and 3.

Under Alternative 1, UAMPS has implemented voluntary compensatory mitigation by retrofitting a total of 26 high-risk power poles to offset the take of one bald eagle and one golden eagle over the life of the Project. This compensatory mitigation by itself is not enough to offset the total predicted number of eagle fatalities associated with the Project, and no additional compensatory mitigation would be required. Consequently, with the rate of eagle mortality predicted due to this Project, we anticipate that under this alternative the Project would contribute to a decline in golden eagle populations at both the EMU and LAP scale and would not be consistent with the Service's population management objective of stable or increasing breeding populations of eagles. The predicted impacts to bald eagles are not large enough to require mitigation in order to achieve the Service's population management objective.

The potential risk of collision with Project vehicles would be higher under Alternative 1 compared to Alternatives 2 and 3, because big game carcasses in or adjacent to Project access roads would not be removed. Carcasses not removed from access roads could attract more eagles to the Project footprint to forage, which may in turn increase risk of collision resulting in long-term injury or mortality. Our Fatality Model cannot account for this increase in risk, as we cannot quantify the increase in eagle exposure from these measures.

Without issuance of an Eagle Permit, and the corresponding requirement to implement the conditons that would be required under Alternaives 2 and 3, conservation measures and the adaptive management protocol outlined herein would not be implemented. Additionally, voluntary post-construction monitoring beyond the 3 years that has already been completed would not be conducted. Although UAMPS has indicated that they would continue to report any dead eagles found incidentally during Project O&M as outlined in Section 3.3.1, this reduced monitoring effort would likely result in increased uncertainty about the direct and indirect impacts of the Project to eagles and will not help us validate the fatality prediction generated by the Fatality Model. This increased uncertainty negatively affects the opportunity to learn about eagle impacts from this Project and wind energy development in general.

Because an Eagle Permit would not be issued, UAMPS would not have legal take coverage should any eagle species be taken at the Project. If eagle fatalities occurred, UAMPS would be in violation of the Eagle Act, and could be subject to prosecution by the Office of Law Enforcement and U.S. Department of Justice.

5.3.2 MIGRATORY BIRDS AND BATS

Under Alternative 1, post-construction avian fatality monitoring would not be conducted, so actual fatality rates for migratory birds (including BCC species, threatened and endangered [T&E] species, and raptors) and bats would not be known beyond the data that have been collected through post-construction monitoring conducted in the first 3 years of Project operations (2012–2015) and through incidental finds.

Direct and indirect effects on migratory birds and bats described in Sections 5.2.2 and 5.2.3 would likely continue at current levels under Alternative 1. Voluntary compensatory mitigation to offset eagle take under Alternative 1 could benefit raptors and other birds with large wingspans by reducing the risk of electrocution elsewhere, although these efforts would not be as comprehensive as those included as part of Alternatives 2 and 3.

5.3.3 Tribal Traditional Uses/Native American Religious Concerns

Under Alternative 1, an Eagle Permit would not be issued. Therefore, the majority of concerns voiced by the Shoshone-Bannock Tribes specific to permit terms would not be addressed. Part of the Tribes' concerns would still be addressed because UAMPS has implemented limited compensatory mitigation in the absence of an Eagle Permit by retrofitting high-risk power poles to offset mortality of one bald eagle and one golden eagle. Also, under Alternative 1, post-construction monitoring would not be required and would likely not be conducted by UAMPS. This reduced fatality monitoring effort reduces the probability of eagle carcasses being found over the life of the Project, which would result in fewer eagle carcasses being distributed to the Service's eagle repository. Thus, Alternative 1 may reduce the number of eagle carcasses/parts for cultural use when compared to Alternatives 2 and 3.

5.4 Alternative 2 – Issue Standard 5-Year Permit Application and Negotiated Conditions

5.4.1 Bald and Golden Eagles

Under Alternative 2, we predict, at the 80th quantile, that 6 bald eagles and 18 golden eagles would be killed over a 5-year permit term (1.2 bald eagles and 3.5 golden eagles per year). This level of mortality would be experienced at both the LAP and EMU scales. The predicted eagle fatality rates under Alternative 2 is the same as Alternatives 1 and 3. UAMPS would provide compensatory mitigation at a 1:1 ratio and, thus, offset all predicted eagle take for both species by retrofitting 322 high-risk power poles within the EMU, but not necessarily within the LAP (distances defined in Section 2.4). This is consistent with the requirements in the Eagle Act and its regulations for permit issuance, including the objective of maintaining stable or increasing breeding populations of bald and golden eagles.

Post-construction monitoring under Alternative 2 would be conducted as described in Section 3.3.2.3. Implementation of post-construction monitoring will increase the probability that eagle fatalities are detected and will help us validate the fatality prediction generated by the Fatality Model. Eagle fatalities detected through post-construction monitoring would trigger the adaptive management measures listed in Table 3-3 and required under Alternative 2, as appropriate. Implementation of the adaptive management measures, if triggered, could result in a lower number of eagle fatalities under these Alternatives, and reduce the intensity of injury and/or mortality effects experienced at the LAP and EMU level.

Under Alternative 2, UAMPS would implement a vegetation management program and a carcass removal program as described in Section 3.3.2.4. Both of these activities reduce the likelihood that eagles are attracted to the Project, thereby reducing the risk of collision with turbine blades and Project vehicles relative to Alternative 1. Our Fatality Model cannot account for this reduction in risk, as we cannot quantify the reduction in eagle exposure from these measures.

5.4.2 Migratory Birds and Bats

Direct and indirect effects to migratory birds (including BCC species, T&E species, and raptors) and bats under Alternative 2 would be similar to those discussed in Section 5.2.2, but the intensity of mortality and injury impacts would likely be reduced due to the implementation of avoidance/minimization measures, monitoring, mitigation, and adaptive management measures. Adverse impacts to migratory birds and bats could be further reduced if conservation measures were implemented under the adaptive management framework. Specifically, if adaptive management triggered the application of visual and/or audial deterrence procedures for eagles, these could also potentially deter migratory birds and bats from the turbine RSA, thereby reducing the potential for fatalities and injuries associated with collisions with turbine blades. Additionally, compensatory mitigation required under Alternative 2 to offset eagle take could benefit raptors and other birds with large wingspans by reducing the risk of electrocution elsewhere.

5.4.3 Tribal Traditional Uses/Native American Religious Concerns

Under Alternative 2, an Eagle Permit would be issued with permit terms described in Section 3.3.2. Alternative 2 addresses the Shoshone-Bannock Tribes' concerns related to eagle mortality and monitoring through implementation of post-construction monitoring to detect eagle fatalities, and managing eagle mortality through adaptive management and conservation measures triggered by actual eagle fatalities. Under Alternative 2, there is an increased likelihood of detecting eagle fatalities during post-construction monitoring and making eagles available for tribes to use for cultural and religious purposes when compared to Alternative 1.

5.5 Alternative 3: Issue Permit with Additional Mitigation

The environmental consequences under Alternative 3 are identical to those under Alternative 2, except for those catalyzed by the additional mitigations.

5.5.1 Bald and Golden Eagles

5.5.1.1 Carcass Removal

A carcass removal program would likely result in a long-term beneficial effect to the local and regional population of eagles. Under Alternative 3, eagles would likely be saved from some collisions with vehicles, and predicted take from the Project would be further offset when compared to Alternatives 1 and 2, if a carcass removal program was instituted by UAMPS. The level of effort (miles of roadway where carcasses are removed) required to offset take by one eagle per year would be estimated, and then measured through effectiveness monitoring. In Arizona, the estimate is that 350–500 miles of roadway need to be kept clear of carcasses to save an eagle per year from death by vehicle collision (Tetra Tech 2012).

Whereas the Service has a model that evaluates the benefit of power pole retrofits in terms of eagles saved (see the REA in Appendix D), we have no equivalent approved model that relates carcass removal from roadways to eagle conservation. UAMPS would need to develop the details of such a program collaboratively with the Service; the modeling efforts of BP Wind North America, Inc. and EDPR might be good starting points.

Any eagles saved under this alternative would be in addition to those saved under Alternative 2 and would further benefit both species of eagles.

5.5.1.2 Hunter Education

Nationally, approximately 32 percent of all anthropogenic sources of eagle mortality is due to both lead toxicosis and birds shot by poaching (USFWS 2016c). Assuming these west-wide estimates were true locally, efforts to reduce these threats locally could further offset eagle mortality from the Project.

Similar to carcass removal, the number of eagles that might be saved as a result of a hunter education program, perhaps including an ammunition replacement program, that UAMPS either creates or contributes to, should be estimated and then verified through monitoring. The model proposed by Cochran et al. (2015) is a first step, but local data would need to be collected to inform that model to make it relevant to the Project area. Success at reducing lead toxicosis of scavengers has been achieved in other regions using education and outreach techniques (see discussion in Section 3.3.3.1), and these examples could also be used to model the investment required to prevent lead toxicosis of a single eagle.

As with carcass removal, any eagles saved under this alternative would be in addition to those saved under Alternative 2 and would further benefit both species of eagles.

5.5.2 Migratory Birds and Bats

5.5.2.1 Carcass Removal

A carcass removal program might reduce the number of vehicle collisions with turkey vultures (*Cathartes aura*), black-billed magpies (*Pica hudsonia*), common ravens (*Corvus corax*), American crows (*Corvus brachyrhyncos*), and some other species of birds that commonly scavenge roadkill. Alternatively, roadkill might supply some of these species with sources of food they might not otherwise have, in which case a program that removes roadkill, depending on its method of disposal, might inadvertently reduce densities of some of the species locally if those species were not able to find adequate food sources outside of the road system.

Removing roadkill has been proposed as a method of reducing densities of common ravens where ravens are suspected to reduce nest success and productivity of greater sage-grouse (*Centrocercus urophasianus*). Depending on how far carcasses are moved and how they are disposed, there might be gains to sage-grouse productivity were such a program introduced in areas with both ravens and sage-grouse to the extent such areas exist near roadways.

5.5.2.2 Hunter Education

Because lead is not naturally present in or known to provide benefits to any living organism, other avian scavengers of hunter-killed or wounded animals would benefit from an education program that resulted in less lead-based ammunition in the environment, including the corvids mentioned above and some species of hawks that might ingest lead fragmentst found in hunter-killed ground squirrels.

5.5.3 Tribal Traditional Uses/Native American Religious Concerns

The Service anticipates that tribes would have no additional concerns under this alternative. Some tribes have been considering, and promoting, use of non-lead ammunition. The Yurok Tribe, hoping to reintroduce condors to tribal lands, is at the forefront (http://www.yuroktribe.org/documents/november_newsletter.pdf).

Chapter 6.0 Cumulative Effects

Using the Service's Fatality Model (USFWS 2013a), we predict that 3.5 golden eagles and 1.2 bald eagles will be killed annually (prediction at the upper 80^{th} quantile) at the Project. We compared the predicted 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 (see Section 2.4).

In the Service's PEIS (USFWS 2016a), 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 2016a). 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 our Cumulative Effects Tool (CET) to complete the LAP analysis, which is described in detail below. This analysis incorporates both records of Federal Eagle Permits issued (i.e., authorized take) and unpermitted eagle mortality records that are available to us. Information on unpermitted take in our databases is generally sensitive information. In addition, we communicated with state wildlife agencies within the LAP to incorporate eagle mortality records they possess which may not be included in our database. The state agencies in Idaho, Montana, Wyoming, and Utah Department of Fish and Game did not have any data available that we did not already have.

6.1.1 Golden Eagles

For the Project, the LAP of golden eagles overlaps and is composed of eagles in the Great Basin, Northern Rockies, and Southern Rockies/Colorado Plateau BCRs (Table 6-1 and Figure 6-1). Using densities of each BCR and the proportion of each in the LAP, we estimated the Project LAP to be approximately 877 golden eagles (Table 6-1). The 1-, 5-, and 10-percent benchmarks for the Project golden eagle LAP are approximately 9, 44, and 88 golden eagles, respectively (Table 6-1).

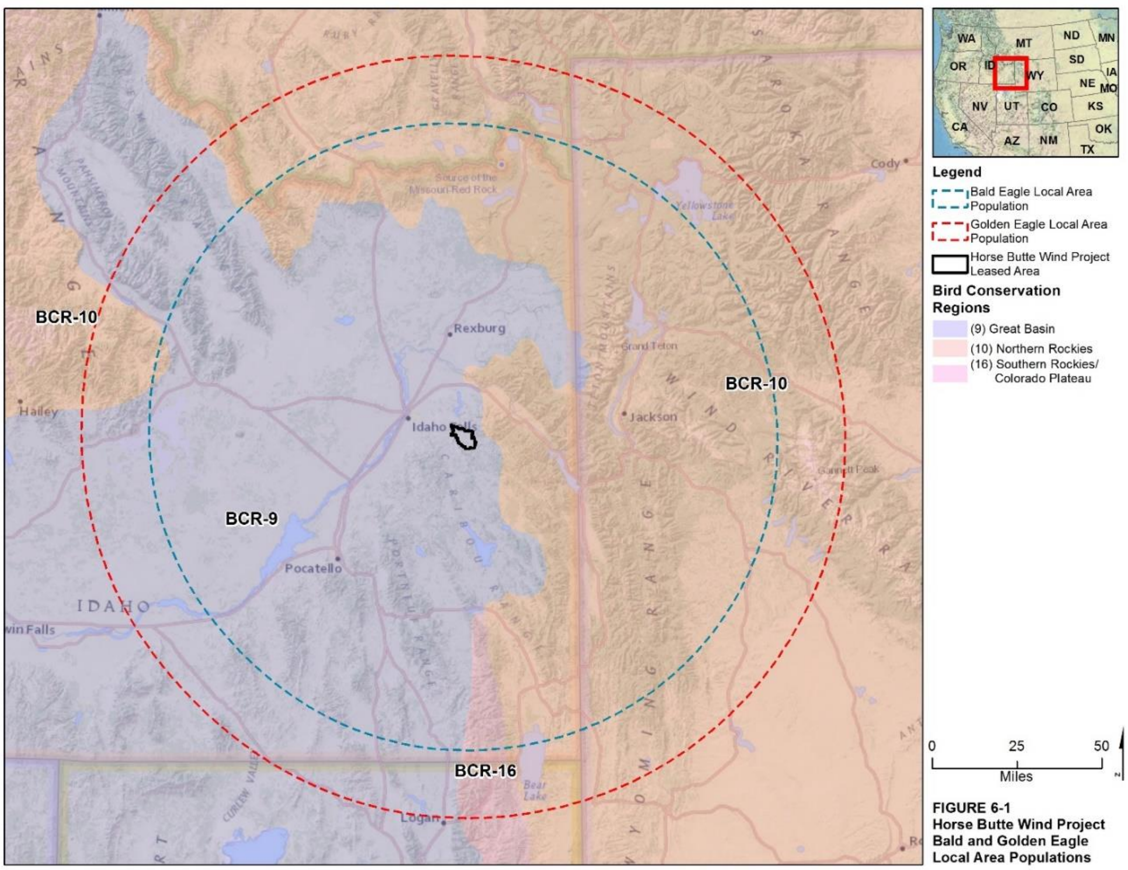
6.1.2 Bald Eagles

The LAP of bald eagles is composed of eagles in Northern Rockies EMU (Table 6-1). Using densities of bald eagles in the LAP portion of the EMU, we estimated the Project LAP to be 54 bald eagles (Table 6-1). The 1-, 5-, and 10-percent benchmarks for the Project bald eagle LAP are approximately 1, 3, and 6 bald eagles, respectively (Table 6-1).

Table 6-1: Estimated Golden and Bald Eagle Local Area Population (LAP) for the Horse Butte Wind Project in Bonneville County, Idaho.

Bird Conservation Region	Estimated Number of Golden Eagles	Estimated Number of Bald Eagles
Great Basin (portion of LAP)	383.39	N/A
Northern Rockies (portion of LAP)	484.79	53.39
Southern Rockies/Colorado Plateau (portion of the LAP)	8.2	N/A
Total Local Area Population	876.39	53.39
1% LAP Benchmark	8.76	0.54
5% LAP Benchmark	43.82	2.67
10% LAP Benchmark	87.64	5.34

Figure 6-1. Horse Butte Wind Project Bald and Golden Eagle Local Area Populations



6.2 Authorized Take

6.2.1 GOLDEN EAGLES

Based on our analysis using the CET there is no currently authorized take for golden eagles within the LAP for the Project. However, we have issued two Eagle Permits for the removal of inactive golden eagle nests; there was no take of birds in these cases. These authorizations are included in the LAP analysis. The projected annual total of golden eagle fatalities within the LAP is 3.5, including the Project. Authorized take would be approximately 0.40 percent of the LAP, which is currently below the 5-percent trigger.

6.2.2 BALD EAGLES

There are two permitted (non-wind) projects within the bald eagle LAP for the Project. One of these projects is expected to cause an annual take of 1.33 bald eagles as a result of nest disturbance; the other project is not expected to result in take of bald eagles. Based on the projected total of 2.1 annual bald eagle fatalities within the LAP, including the Project, authorized take would be approximately 3.92 percent of the LAP, which is currently below the 5-percent trigger.

6.3 Unauthorized Take

An important caveat that comes with our unauthorized take analysis is that it only 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) can lend themselves better to incidental discovery and reporting while mortalities that are likely occur in remote locations example, may be under-represented in our database; however, this was the best information available to us regarding eagle mortalities in the vicinity of the LAP.

When conducting the unauthorized take analysis in the Project LAP, we used eagle mortality records from our database (Table 6-2) for the most recent 10-full-year period (2008–2017). This period was used 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 avian electrocutions and how to reduce its risk may have altered the rate at which electrocutions have occurred over the last half-century, and the rate of reporting of those electrocutions.

6.3.1 GOLDEN EAGLES

Based on the records in our eagle mortality database there were 318 unauthorized golden eagle mortalities within two times the Project LAP (218 miles) from 2008 to 2017 (Table 6-2). This distance was used to conservatively account for unpermitted anthropogenic take beyond that Project LAP that might be influencing the Project LAP. Of the most frequent anthropogenic causes of mortality, 43 (14 percent) were due to electrocution, 16 (5 percent) were due to collision with wind turbines, and 10 (3 percent) were collisions with other structures, including vehicles (Table 6-2). Conversely, facility maintenance practices for wind energy and larger electric utility companies might increase the chances of an eagle carcass (should one exist) being detected and reported. This highlights a few of the potential biases inherent in using a data set that is composed largely of incidentally collected mortality data. Although many of the available golden eagle mortality records from our database are related to electrocutions, strikes by wind turbines, or collisions with structures/vehicles, we cannot say that these sources of eagle mortality are more prevalent on the landscape and more important drivers of eagle populations in the vicinity of the LAP than shooting, poisoning, or any other anthropogenic sources of eagle 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. We (USFWS 2016a) reported the known cause of mortality for 97 of 139 recovered radio-telemetered eagles. In the study, approximately 11 percent of the mortalities were attributed to electrocution, 11 percent were shot, and approximately 7 percent 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. Feb 2, 2018). It is likely that anthropogenic-caused eagle mortalities due to collisions, shooting, or poisoning were underreported in the LAP primarily from differences in recovery probability. This further illustrates a bias with these mortality records because there is not a systematic mortality survey effort.

With these potential biases in mind, we used our CET to calculate the annual documented eagle take from mortality factors within the LAP. From this analysis, the Service estimates there are 9.8 (1.12 percent) golden eagle mortalities annually from anthropogenic causes, which is below the 10-percent benchmark.

6.3.2 BALD EAGLES

Based on the records in our eagle mortality database there were 15 unauthorized bald eagle mortalities within two times the Project LAP (172 miles) from 2008 to 2017 (Table 6-2). As with golden eagles, this distance was used to conservatively account for unpermitted anthropogenic take beyond that Project LAP that might be influencing the Project LAP. Of the most frequent anthropogenic causes of mortality, 4 (27 percent) were due to electrocution and 4 (27 percent) were caused by collisions, in general (Table 6-2).

With these potential biases in mind, we used our CET to calculate the annual documented bald eagle take from mortality factors within the LAP. From this analysis, we are aware of approximately 1.5 (2.81 percent) bald eagle mortalities annually from anthropogenic causes, which is below the 10-percent benchmark.

Table 6-2. Known Unauthorized Golden Eagle Mortalities within 109 Miles and Bald Eagle Mortalities within 86 Miles of the Horse Butte Project from 2008 through 2017.

	Golden Eagles		Bald Eagles	
Source	**Number of Fatalities [1, 2]**	**Number of Fatalities (Annual)**	**Number of Fatalities [1, 2]**	**Number of Fatalities (Annual)**
Electrocution	43	4.3	4	0.4
Trauma	3	0.3	0	0
Poisoning[3]	2	0.2	1	0.1
Shooting	8	0.8	0	0
Collision with Wind Turbines	16	1.6	0	0
Collision with Vehicle	3	0.3	0	0
Trapped	1	0.1	0	0
Collision (Other)	7	0.7	4	0.4
All other anthropogenic sources[4]	76	7.6	6	0.6
Total	**318**	**31.8**	**15**	**1.5**
% of LAP	**1.12**		**2.81**	

[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 2008-2017.
[3] Sources of poisoning include lead and other sources.
[4] All other sources include Other, Unknown, and Trauma.

6.4 Conclusions

In this EA we considered three alternative actions

- Alternative 1: Deny the Permit Application (No Action)
- Alternative 2: Issue a 5-Year Permit Based on the Applicant's Eagle Conservation Plan
- Alternative 3: Issue a Permit with Additional Mitigations

The alternatives provide a reasonable range to assess differing potential environmental effects associated with issuance of an Eagle Permit. Alternative 1 does not achieve a net conservation benefit to eagles and would not meet the underlying purpose or need we have identified in this EA. Alternatives 2 and 3 have similar but slightly differing environmental effects—namely the additional mitigation benefits in Alternative 3. Alternative 2 is our Preferred Alternative because it provides mitigation consistent with our fatality prediction, which meets our population management objective, and ensures that eagle fatalities are adaptively managed and detected. Alternative 3 would provide for additional mitigations that might compensate for take at the facility beyond what is required under current authorities.

Authorizing the take of golden eagles at the Project will result in a cumulative permitted take less than the 1- and 5-percent thresholds of the LAP. Further, we estimate that authorized and unauthorized take combined will be less than 10 percent of the LAP. For bald eagles, authorized take at the Project and others is estimated to be greater than 1, but less than 5 percent of the LAP for this species, and the combined estimate of authorized and unauthorized take will be less than 10 percent of the LAP.

We have considered impacts to eagles from the Project at the eagle management unit and local area scales in this EA, incorporating the PEIS by reference, and conclude that any direct, indirect, and cumulative effects of the action under Alternative 2 are not likely to be significant. This is because our conservative prediction of eagle take would be within calculated take thresholds, and eagle take we propose authorizing would be compensated by power pole retrofits. Additionally, under this Alternative, UAMPS would be required to perform sufficient fatality monitoring, to implement adaptive management that requires measures to reduce eagle mortalities if take rates appear to be higher than predicted,and to continue operational measures that avoid and minimize eagle mortality,.

Chapter 7.0 References

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Chapter 8.0 Consultation and Coordination

The following agencies/Tribes were consulted on this project:

- Idaho Department of Fish and Game (Jim Strickland, Nikki Wade, Steve Schmidt, Paul Atwood, Rob Cavallero)
- Idaho National Laboratories (Jericho Whiting)
- Mike Whitfield, independent biologist
- Shoshone-Bannock Tribes
  - Government-to-government consultation March 17, 2014
- Eastern Shoshone Tribe
- Nez Perce Tribe
- Northern Arapaho Tribe

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Chapter 10.0 Glossary

Breeding Territory
Equivalent to eagle territory (USFWS 2013a).

Buteo
Any of several hawks of the genus *Buteo*.

Clutch
The total number of eggs laid in one nesting attempt.

Diurnal Birds
Birds whose primary activity periods are during the day. Day flying birds.

Eagle Management Unit
The geographic scale over which permitted take is regulated to meet the management objective. The eagle management units (EMU) for both species is four administrative flyways (Altantic, Mississippi, Central, and Pacific). 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 would be combined as one EMU.

Eagle Territory
An area that contains, or historically contained, one or more nests within the home range of a mated pair of eagles (from the regulatory definition of “territory” at 50 CFR 22.3). “Historical” is defined here as at least the previous 5 years (USFWS 2013a).

Echolocation
The use of sound waves and echoes to determine where objects are in space.

Site Fidelity
Loyalty to a particular area even when the area is no longer of value.

Hibernacula
A cave or a mine that provides a constant temperature and protection for winter hibernation.

Local Area Population
Defined by the dispersal distance of young bald and golden eagles. This area is 135 km (86 miles) for bald eagles and 175 km (109 miles) for golden eagles (USFWS 2016a).

Local Project Level
The Project footprint of the UAMPS Project and a 16-km (10-mile) radius around that footprint.

Mean Species Specific Inter-Nest Distance
The mean nearest-neighbor distance between simultaneously occupied eagle nests (USFWS 2013a). The mean inter-nest distance is the outer boundary of the Project area.

Occupied Nest
“A nest used for breeding in the current year by a pair of eagles. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current year’s mutes (whitewash) suggest site occupancy. In years when food resources are scarce, it is not

	uncommon for a pair of eagles to occupy a nest yet never lay eggs; such nests are considered occupied.” (USFWS 2013a)
Project Area	The area that includes the Project footprint as well as contiguous land that shares relevant characteristics (USFWS 2013a). For eagle-take considerations at this Project, we have defined this area as the Project footprint and a 10-mile surrounding perimeter.
Project Footprint	The minimum-convex polygon that encompasses the wind-project area inclusive of the hazardous area around all turbines and any associated utility infrastructure, roads, etc. (USFWS 2013a).
Project Leased Area	The area of private land leased by Horse Butte Wind for O&M of the Project.

Appendices

The following appendices are available online, at:
https://www.fws.gov/pacific/migratorybirds/library/wpanalyses.html

Appendix A	Eagle Conservation Plan
Appendix B	Post-Construction Avian and Bat Fatality Report
Appendix C	Bayesian Eagle Risk Analysis and Fatality Prediction
Appendix D	Resource Equivalency Analysis Summary
Appendix E	Pole Selection Criteria
Appendix F	Bird and Bat Conservation Strategy