Appendix G
Terrestrial Species and Habitats Resource Analysis Report

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Proposed Goldendale Energy Storage Project

Terrestrial Species and Habitats Resource Analysis Report

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

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Acronyms and Abbreviations

EIS	environmental impact statement
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
IBA	Important Bird Area
NHP	National Heritage Program
PHS	Priority Habitat and Species
RCW	Revised Code of Washington
RPH	rare plant habitat
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VMMP	Vegetation Management and Monitoring Plan
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WMP	Wildlife Management Plan
WSI	West Surface Impoundment

Summary

This report describes the existing conditions of terrestrial species and habitats in the study area. It also describes the potential impacts resulting from the proposed project and No Action Alternative.

The proposed project occurs in the semi-arid Columbia Plateau region of Washington, adjacent to the middle Columbia River. Terrestrial habitats within the project area include areas of vulnerable Columbia Plateau Western Juniper Woodland and Savanna and imperiled Inter-Mountain Basins Big Sagebrush Steppe and Columbia Plateau Steppe and Grassland habitat. Priority habitats include John Day Talus Slopes and Cliffs, which provide nesting habitat for golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*), and peregrine falcon (*Falco peregrinus*). Rocky talus slopes also provide roosting and hibernating habitat for bats and cover for small lizards and mammals. Migrating bald eagles (*Haliaeetus leucocephalus*) and state endangered ferruginous hawk (*Buteo regalis*) are present but not known to nest in the study area. Culturally important mule deer (*Odocoileus hemionus hemionus*) are commonly present year-round, while elk (*Cervus elaphus*) migrate through the study area in lower numbers. Patches of mixed-conifer forest in the study area provide habitat for the state threatened western gray squirrel (*Sciurus griseus*). Grassy and herbaceous areas support culturally important plants including smooth desert parsley (*Lomatium laevigatum*).

There would be temporary significant impacts on talus and cliff habitat during construction. Significant adverse impacts could also occur to terrestrial species during construction related to potential high levels of disturbance to breeding and nesting golden eagles. During operation of the proposed project, there is also a potential for significant adverse indirect impacts on talus and cliff raptor habitat if they can no longer support breeding raptors because of the proximity of human development and reduced prey availability. Such impacts could result in ongoing or repeated disturbance of habitat that is critical to species viability; the level of impacts would be dependent on the current presence of breeding raptors in this habitat, which will be determined during wildlife surveys. Operation of the project could permanently reduce the density of small prey species in the study area, thereby affecting raptor species such as prairie falcons and golden eagles, resulting in significant adverse indirect impacts to these species. Significant adverse indirect impacts could also occur to the western gray squirrel during operations if this species is found to be present in the areas of potentially suitable habitat mapped in the study area by Washington Department of Fish and Wildlife (WDFW). Refer to Table 1 for a summary of significant adverse impacts and mitigation.

Proposed mitigation measures, including land acquisition as compensatory mitigation, are suggested to reduce impacts below the level of significance. Free Flow Power Project 101, LLC (the Applicant) proposed several mitigation measures to reduce impacts to terrestrial habitat and species in their draft Wildlife Management Plan (WMP) and draft Vegetation Management and Monitoring Plan (VMMP) and has coordinated development of these draft plans with U.S. Fish and Wildlife Service (USFWS), WDFW, and Oregon Department of Fish and Wildlife. These plans will be included as articles of the Federal Energy Regulatory Commission (FERC) license and will be enforced with other license requirements. The Applicant will apply for an Eagle Incidental Take Permit from USFWS, if needed. Direct and indirect impacts on habitat and special status species would be addressed through permit requirements and mitigation measures to reduce impacts. If mitigation is implemented as described in Section 3.3.4, there would be no significant and unavoidable adverse impacts associated with the proposed project.

Table 1
Terrestrial Species and Habitat Impact Summary

TYPE OF IMPACT	SIGNIFICANT ADVERSE IMPACT FINDING	MITIGATION REQUIRED BY PERMIT	ADDITIONAL MITIGATION PROPOSED	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
Proposed Project: Construction				
Loss of terrestrial habitat or reduction in terrestrial habitat function	**Yes**	None	VMMP, which includes restoration, protection, weed management, revegetation, and monitoring measures WMP, which includes purchase of an off-site property for compensatory mitigation for habitat impacts	No
Disturbance, injury, or mortality of terrestrial species	**Yes**	Eagle incidental take permit	WMP, which includes purchase of an off-site property for compensatory mitigation for habitat impacts; surveys, monitoring, and reporting; scheduling and work area limits; noise, light, traffic, and dust control measures; best management practices; training; wildlife deterrents; and development of additional mitigation measures with agencies WDFW-proposed additions to the WMP for peregrine falcon and raptor monitoring, mitigation, and protection measures	No
Proposed Project: Operations				
Loss of terrestrial habitat or reduction in terrestrial habitat function	**Yes**	None	VMMP, which includes restoration, protection, weed management, revegetation, and monitoring measures WMP, which includes purchase of an off-site property for compensatory mitigation for habitat impacts	No
Disturbance, injury, or mortality of terrestrial species	**Yes**	Eagle incidental take permit	WMP, which includes purchase of an off-site property for compensatory mitigation for habitat impacts; surveys, monitoring, and reporting; scheduling and work area limits; noise, light, traffic, and dust control measures; best management practices; training; wildlife deterrents; and development of additional mitigation measures with agencies WDFW-proposed additions to the WMP for peregrine falcon and raptor monitoring, mitigation, and protection measures WDFW-proposed additions to the WMP for bat surveys and deterrent measures	No

TYPE OF IMPACT	SIGNIFICANT ADVERSE IMPACT FINDING	MITIGATION REQUIRED BY PERMIT	ADDITIONAL MITIGATION PROPOSED	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
No Action Alternative				
Loss of terrestrial habitat or reduction in terrestrial habitat function	No	None	N/A	No
Disturbance, injury, or mortality of terrestrial species	No	None	N/A	No

1 Introduction

Free Flow Power Project 101, LLC (the Applicant) proposes to build a pumped-water energy storage system that is capable of generating energy through release of water from an upper reservoir down to a lower reservoir. This will be referred to as the "proposed project." This report describes terrestrial species and habitats that occur or could occur within the study area and assesses probable impacts on those species and habitats from construction and operation of the proposed project and from a No Action Alternative. Chapter 2 of the State Environmental Policy Act Environmental Impact Statement (EIS) provides a more detailed description of the proposed project and No Action Alternative.

1.1 Resource Description

Terrestrial species are defined as plants or animals that live on land. Examples of terrestrial plants include trees, shrubs, and herbs that prefer upland or riparian habitats. Terrestrial wildlife includes mammals, birds, invertebrates, and reptiles. Amphibians are considered in the *Aquatic Species and Habitats Resource Analysis Report* (Appendix F of the EIS; Anchor QEA 2022a) and Section 4.6 of the Draft EIS. Terrestrial habitats are the places where plants and animals live that are found on land. Examples include forests, grasslands, deserts, shorelines, and underground habitats like caves and burrow systems.

The following key features of terrestrial species and habitats are analyzed in this report:

- Terrestrial species and habitats
- Species listed under the Endangered Species Act (ESA) and Washington State species of concern (listed and candidate species)
- Unique, priority, and culturally important species
- Wildlife migration routes

1.2 Regulatory Context

Table 2 provides the federal, state, and local regulations, statutes, and guidelines that potentially apply to the analysis for terrestrial species and habitats.

Table 2
Applicable Laws, Plans, and Policies

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
Federal	
Endangered Species Act (United States Code [USC] 16.1531 to 1544)	• Provides for the conservation of species listed as threatened or endangered and the habitats upon which they depend. Section 7 of the ESA requires federal agencies to consult with USFWS and/or National Marine Fisheries Service to ensure a federal action is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.
Bald and Golden Eagle Protection Act of 1940, as amended (USC 16.668 to 668c)	• Prohibits the taking of bald eagles, including their parts, nests, or eggs, without a permit issued by USFWS, and provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle… [or any golden eagle], alive or dead, or any part, nest, or egg thereof."

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
Migratory Bird Treaty Act of 1918, as amended (USC 16.703 to 713)	• Makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. Under the regulatory authority of USFWS.
State	
State Protected Species (Washington Administrative Code [WAC] 220.610)	• Provides lists of species classified as endangered and threatened in Washington State. Provides rules for the protection of bald eagles. Identifies and classifies native wildlife species. Defines the processes for listing, management, recovery, and delisting a species and the criteria for classifying wildlife as endangered, threatened, or sensitive.
Shoreline Management Act (Revised Code of Washington [RCW] 90.58)	• Regulates and manages the use, environmental protection, and public access of the state's shorelines. The Washington State Legislature passed the Shoreline Management Act in 1971 and adopted it in 1972. The Washington Department of Ecology and the local government have authority to enforce the Shoreline Management Act.
Washington State Growth Management Act (RCW 36.70A)	• Defines a variety of critical areas, which are designated and regulated at the local level under city and county critical areas ordinances. These critical areas may include shorelines or portions of fish habitat.
Washington State Wildlife Action Plan	• Provides a comprehensive plan for conserving the state's fish and wildlife and the natural habitats on which they depend. Defines species and habitats of greatest conservation need.
Fish and Wildlife (RCW Title 77)	• Provides the revised and reorganized game code of Washington State as of 1980; clarifies and improves the administration of the state's game laws.
Noxious Weed Law (WAC 16.750)	• Includes the state Noxious Weed List (Class A, B, and C), definitions and descriptions of region boundaries for Class B weeds, and the schedule of monetary penalties.
Washington Department of Natural Resources Natural Heritage Program (advisory)	• Assigns conservation status to species and habitats to support federal, state, and local land management policies and listing decisions; has no direct regulatory authority and is advisory only.
Local	
Klickitat County Critical Areas Ordinance (No. 0080613, Chapter IV)	• Defines critical areas and implements review and evaluation consistent with the Growth Management Act (RCW 36.70A). Critical areas can be related to public health and safety or public welfare (e.g., habitat protection).
Klickitat County Flood Damage Protection Ordinance (No. 0120120)	• Provides regulatory measures to promote the public health, safety, and general welfare; reduce the annual cost of flood insurance; and minimize public and private losses due to flood conditions in specific areas by provisions.

2 Methodology

2.1 Study Area

The study area for terrestrial species and habitats is defined as the terrestrial environments with the potential to be affected by construction and operation of the proposed project. This includes the project boundary plus a 0.6-mile offset, or "buffer zone," from the project areas boundary (see Figures 1a and 1b). This buffer zone is needed because even small wildlife species, such as ground squirrels, typically range this distance. The study area includes vertical air space up to 650 feet above ground that is typically used by birds, bats, and other flying species and vertical depth of up to 6.5 feet below ground that may be used by burrowing species. Nearby nesting areas of sensitive bird and bat species that frequently use air space and resources found in the proposed project footprint are also considered to be part of the study area.

2.2 Technical Approach

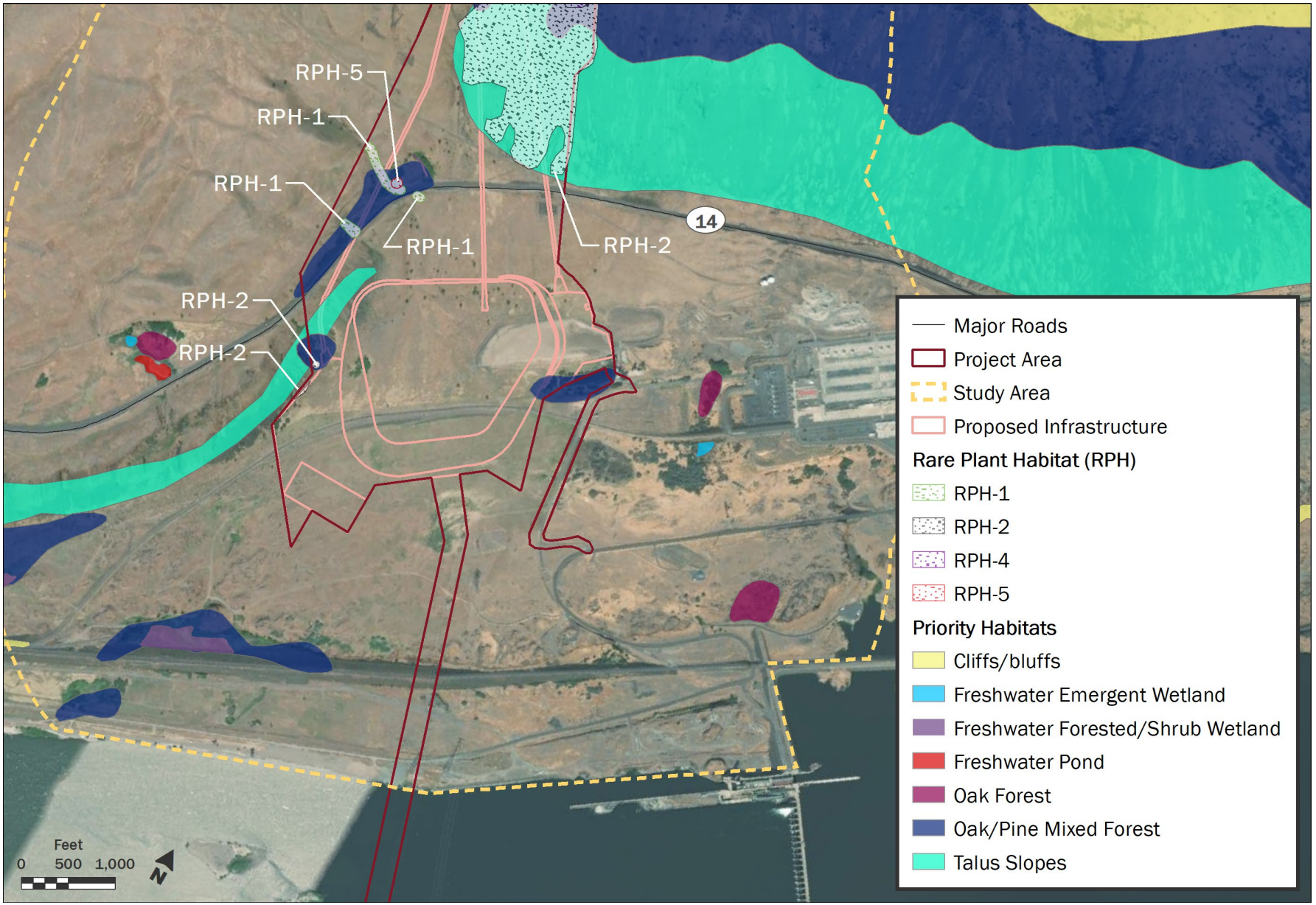
The analysis of potential impacts considered construction- and operation-related effects of the proposed project and No Action Alternative on terrestrial species and habitats in the study area. The analyses were primarily qualitative and based on review of available information including field surveys of the project area, information submitted by the Applicant, publicly available habitat mapping, species-specific studies and information, and lists of federal and state threatened and endangered species. Quantitative analysis was used to determine the amount and type of habitat that would be removed or converted because of the proposed project. Field survey delineations conducted by the Applicant were used to define the type and quantity of habitat that would be affected by the proposed project (FFP 2020a). Habitat types were defined based on the Washington Natural Heritage Program (NHP) Ecological Systems of Washington State guide (FFP 2020a; WDNR 2015). NHP habitat types are commonly used for biodiversity conservation and management planning purposes (WDNR 2015).

Project operations plans and construction drawings and publicly available habitat mapping were also used to determine impacts on terrestrial habitats within the study area. This was done by overlaying GIS data layers to estimate the area of each habitat type that would be affected, determine habitat types before and after proposed project activities, and estimate the area of total lost or converted habitat.

In addition to directly removed or converted habitat types, the analysis considered changes that could occur to adjoining habitats because of construction and operation activities, including habitat fragmentation of important wildlife migration routes. The analysis also considered changes due to operation that could indirectly alter terrestrial habitat in the three-dimensional study area (e.g., potential changes to air flow or belowground conditions).

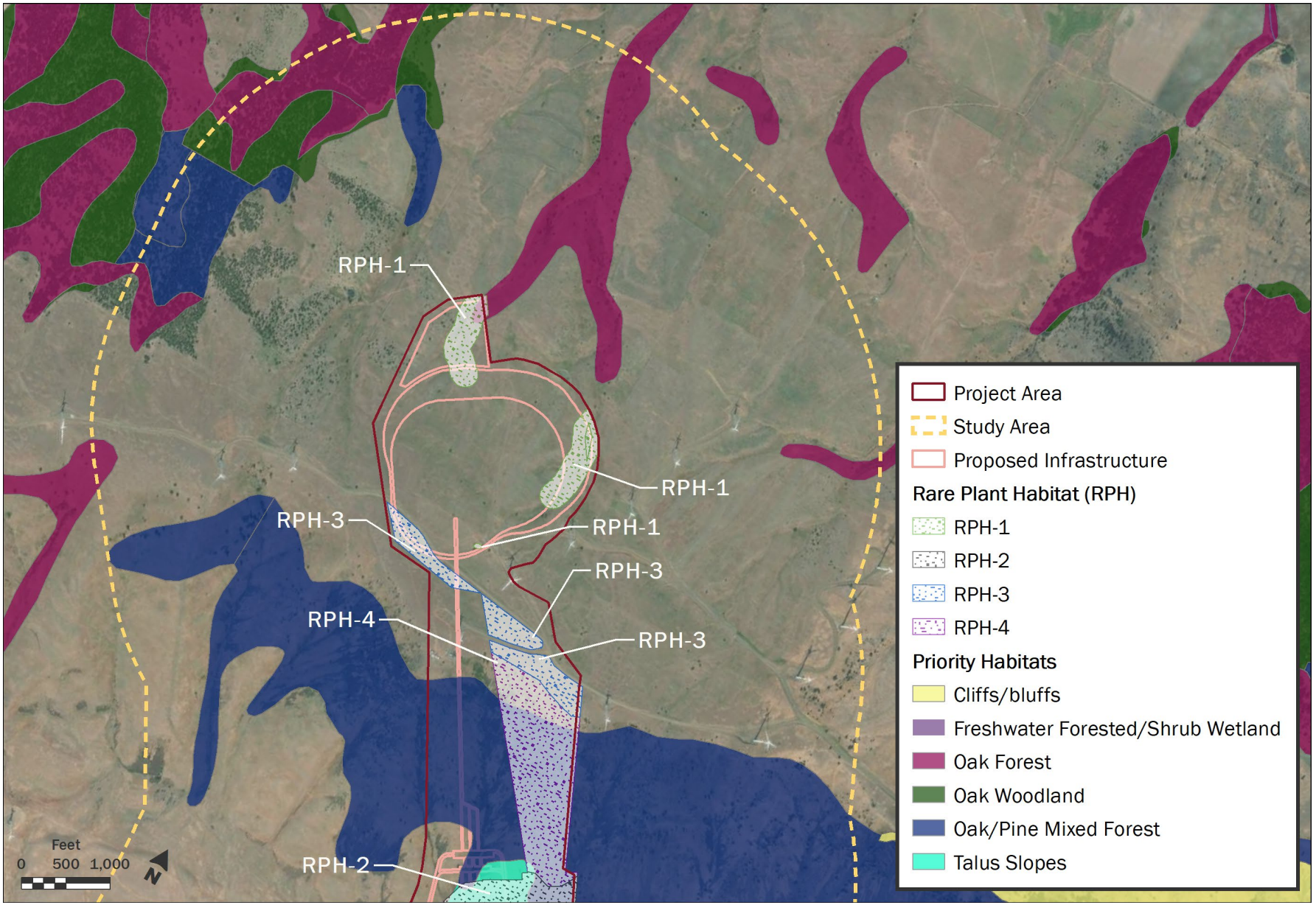
Special status species are defined as those listed as state or federally endangered, threatened, or candidate species; WDFW priority species; and Washington Department of Natural Resources (WDNR) Heritage species. Special status habitats are those identified as WDFW priority habitats (WDFW 2008) and USFWS critical habitats (USFWS 2017). Culturally important plant and wildlife species are defined as those considered important to Indian tribes or the general public.

Figure 1a
Terrestrial Species and Habitats Study Area and Priority and Rare Plant Habitats in the Southern Portion of the Study Area



Sources: FFP 2021; WDFW 2021a
Note: Unmapped habitat classification areas are shown in Attachment 1. The Pacific Flyway and Columbia Hills Important Bird Area overlap with the entire study area.

Figure 1b
Terrestrial Species and Habitats Study Area and Priority and Rare Plant Habitats in the Northern Portion of the Study Area



Sources: FFP 2021; WDFW 2021a
Note: Unmapped habitat classification areas are shown in Attachment 1. The Pacific Flyway and Columbia Hills Important Bird Area overlap with the entire study area.

Species impacts were evaluated based on potential resident, migratory, and seasonal presence in the study area. Publicly available state and federal species maps and lists were cross-checked with species field surveys for the proposed project area and adjacent areas, and agency supplied species-specific monitoring data (e.g., WDFW golden eagle nest monitoring data) to understand the likelihood and timing of presence, especially of special status and culturally important species.

The analysis of terrestrial wildlife species considered the effects of construction conditions, such as noise and vehicle traffic. The analysis of plant species considered construction effects such as removal and erosion. Analysis of project operations considered the removal, reduction, or alteration of resources (e.g., water, forage, and prey), as well as the effects of potential long-term habitat changes on terrestrial plants and wildlife species from operations.

Any potential changes to species presence and habitat quality that may result from climate change are addressed in Chapter 5, Climate Change, of the Draft EIS. Potential cumulative impacts on terrestrial species and habitats are addressed in Chapter 6, Cumulative Impacts, of the Draft EIS.

2.3 Impact Assessment

This report focuses on significant adverse impacts, with some information provided on less severe impacts. Impacts were evaluated relative to the direct and indirect effects of construction and operation of the proposed project and from the No Action Alternative, as outlined in Sections 2.3.1 and 2.3.2. For each of those sections, the evaluation separately identified direct and indirect impacts that may result from construction and operation of the proposed project or from the No Action Alternative. Direct impacts are those that would occur in the study area as the result of and at the same time as the construction and operation of the proposed project. Indirect impacts are those that would occur later in time or farther in distance but that are attributable to certain aspects or activities related to the proposed project.

2.3.1 Terrestrial Habitats

Terrestrial habitat impacts were evaluated to determine if there would be loss of habitat or reduction in habitat function. Direct impacts may be due to changes in habitat quantity and quality. Indirect impacts are those that alter habitat connectivity, prey abundance, interactions with non-native species, or other key functional elements.

Impacts on habitats from construction of the proposed project were based on the footprint of the proposed facilities and temporary construction sites and considered the area of each habitat type that would be affected. The impact assessment considered whether changes would cause degradation, loss, or conversion of habitat, including rare or special status habitat, and whether that habitat change could increase risks to species viability.

Impacts on habitats from operation of the proposed project were based on the final footprint of the proposed facilities and operation activities. The impact assessment considered whether changes would cause ongoing or repeated disturbance of habitat, including rare or special status habitat, and whether that habitat change could increase risks to species viability. In addition to the immediate area of operation, indirect impacts on surrounding habitat within the defined buffer zone for the terrestrial species and habitats study area were considered.

2.3.2 Terrestrial Wildlife and Plant Species

Terrestrial wildlife and plant species were evaluated to determine if there would be disturbance, injury, or mortality resulting from earthwork, stranding, noise and vibration, or other actions. In addition, this

assessment considered indirect impacts on terrestrial species that could be caused by impacts on terrestrial habitat including reduced quantity, quality, or loss of functional elements as described in Section 2.3.1.

The assessment of impacts on terrestrial wildlife and plant species from construction were determined based on potential presence of terrestrial species, including special status species, within the construction area. The assessment of impacts from project operations considered the potential presence of terrestrial wildlife and plant species within the study area, including seasonal presence. The impact assessments for both construction and operations considered whether changes would cause mortality or permanent injury to a species, events that increase the need for federal or state listing of a species or increase risk to species viability, and disruptions of normal species behavior.

3 Technical Analysis and Results

3.1 Overview

This section describes the affected environment, or the conditions before any construction begins, within the study area (Section 3.2). It discusses the probable impacts on wildlife species, plant species, and habitat from the proposed project (Section 3.3) and No Action Alternative (Section 3.4). Required permits for the proposed project are addressed in Section 3.3.3. When probable significant adverse environmental impacts remain after considering these conditions and permit requirements, Section 3.3.4 identifies mitigation measures that could further avoid, minimize, or reduce the identified impact. A determination of significant and unavoidable adverse impacts is made in Section 3.3.5.

3.2 Affected Environment

The following sections describe the types of birds, mammals, reptiles, plants, and terrestrial habitats in the study area, with a focus on state Priority Habitats and Species. The discussion is divided into two sections: Terrestrial Habitats and Terrestrial Species.

3.2.1 Terrestrial Habitats

The study area occurs at elevations from 440 to 2,800 feet above sea level, north of the Columbia River as it flows through the eastern foothills of the Cascade Mountains. The climate is semi-arid and temperate with moderately wet cool winters and hot dry summers. Average daily high temperatures of 86°F (June through September) and average daily low temperature of 31.6°F (December through March) have been recorded over the past 10 years. The region receives an average of 8.19 inches of precipitation from October through May, and 0.15 inch from June through September, primarily as rain (NWS 2021).

The study area occurs within Klickitat County and the Columbia Plateau Ecoregion (WDNR 2015). This broader ecoregion contains a number of upland terrestrial ecological systems, or habitat types, described in Table 3. Habitat types confirmed to be present in the study area are shown in Attachment 1. Plants species documented in each habitat type during surveys in the study area are described in Section 3.2.2.1.

Table 3
WDNR Natural Heritage Program Habitat Types within the Study Area

HABITAT TYPE	DESCRIPTION[1]	CONSERVATION STATUS[1,2]
Columbia Plateau Steppe and Grassland	Forbs typically average 25% cover, and shrubs average 10% cover. Soils vary from deep and well-drained to shallow with a microphytic crust. This habitat type supports a variety of grasses and forbs, while disturbed stands may contain rabbitbrush, sagebrush, and other disturbance-tolerant shrubs.	Imperiled (S2)
Columbia Plateau Scabland Shrubland	Consists of low, xeric shrubs and grasses on sites with little soil development and extensive exposed rock, gravel, or compacted soils. Annual species may be seasonally abundant, and cover of moss and lichen is often high (e.g., 1% to 60% cover). Biological soil crust cover is considered to be high.	Secure (S5)

HABITAT TYPE	DESCRIPTION[1]	CONSERVATION STATUS[1,2]
Inter-Mountain Basins Cliff and Canyon	Consists of steep cliff faces, narrow canyons, unstable scree and talus slopes, and rock outcroppings with very sparse vegetation. Some denser vegetation areas on unstable scree and talus slopes directly below cliff faces can occur. May support a variety of trees, shrubs, and forbs despite the steep, unstable environment.	Secure (S5)
Inter-Mountain Basins Big Sagebrush Steppe	Grassland with an open to moderately dense shrub cover, varying from 5% to 40%. Dominated by perennial bunchgrasses and forbs.	Imperiled (S2)
Columbia Plateau Western Juniper Woodland and Savanna	Woodlands and savannas dominated by western juniper (*Juniperus occidentalis*) ranging from eastern Klickitat, southern Benton, and Franklin counties. Restricted to areas with excessively drained soils, such as sand dunes, rock outcrops or escarpments.	Vulnerable (S3S4)
Introduced/Invasive Annual Grassland	May have formerly been Columbia Plateau Steppe and Grassland, but now dominated by invasive species such as cheatgrass (*Bromus tectorum*). Some native species may still be present. May occur in areas with and without rocky outcropping in the study area.	None
Introduced/Invasive Wooded	Patches of native and non-native tree species in previously developed areas that could be planted or volunteer.	None

Notes:
1. Habitat type descriptions and conservation status are from WDNR 2015.
2. Conservation status codes are as follows; two codes express a range rank indicating conservation status uncertainty:
   - S2 At high risk of extirpation in Washington due to restricted range, few occurrences, steep declines, severe threats, or other factors.
   - S3 At moderate risk of extirpation in Washington due to a fairly restricted range, relatively few occurrences, recent and widespread declines, threats, or other factors.
   - S4 At a fairly low risk of extirpation in Washington due to an extensive range and/or many occurrences but with possible cause for some concern as a result of local recent declines, threats, or other factors.
   - S5 At very low or no risk of extirpation in Washington due to a very extensive range, abundant occurrences, with little to no concern from declines or threats.

The northern portion of the study area where the upper reservoir would be constructed generally consists of rolling hills occupied by grasslands and shrub-steppe habitat types. Disturbance from development is limited in that location and primarily includes wind farm developments with multiple wind turbines, a network of connecting gravel access roads, and associated infrastructure. The southern portion of the study area where the lower reservoir and associated power transmission infrastructure would be constructed is composed of previously developed or disturbed land, including lands occupied by former smelter operations and lands crossed by major roads such as SR 14. Most of the habitat in that portion of the study area consists of introduced/invasive annual grasslands intermixed with rock outcroppings and developed areas (FFP 2020a). Other parts of the study area have higher quality habitat. Areas between the proposed upper and lower reservoirs and near the upper reservoir were found to contain five distinctive rare plant habitats (RPHs) capable of supporting listed endangered, threatened, and sensitive plant species (FFP 2020b; Figures 1a and 1b). An RPH for smooth desert parsley is located in the study area to the west of the lower reservoir project footprint and was documented during the Applicant's 2015 habitat survey (FFP 2020a; Attachment 1). The RPHs are described below:

- RPH-1 is characterized by seeps and ephemeral streams that occur in both the upper and lower reservoir portions of the study area. Closely surrounding habitat types include Columbia Plateau Scabland Shrubland and Western Juniper Woodland and Savanna, Inter-Mountain Basins Big

Sagebrush Steppe, and Introduced/Invasive Grassland. Some areas of RPH-1 are suitable for state endangered California broomrape (*Orobanche californica* ssp. *grayana*), state sensitive smooth goldfields (*Lasthenia glaberrima*), and state sensitive Nuttall's quillwort (*Isoetes nuttallii*), though these species were not observed during the Applicant's botanical survey (FFP 2020b). California broomrape may flower later in the year than the survey was conducted (FFP 2020b).

- RPH-2 occurs within the Inter-Mountain Basins Cliff and Canyon habitat type, along steep south-facing talus slopes that span the center of the study area. There is sparse vegetation in the higher elevations of this area with greater vegetation cover on the scree and talus slopes below the cliffs. Species of desert parsley (*Lomatium* spp.) were observed in this area, but none were identified as state threatened and Tribally important smooth desert parsley or state sensitive Suksdorf's desert parsley (*Lomatium suksdorfii*) (FFP 2020b).
- RPH-3 is a band of Columbia Plateau Scabland Shrubland located at the top of the escarpment along the southern edge of the upper reservoir area. This habitat is characterized by thin sandy to gravelly soil over basalt and exposed rock, with biological soil crust present in approximately 10% of this area. RPH-3 is suitable habitat for smooth desert parsley, Douglas' draba (*Cusickiella douglasii*), and hot-rock penstemon (*Penstemon deustus* var. *variabilis*), though they were not observed during the botanical survey (FFP 2020b). These species are expected to be flowering in May when the survey was conducted.
- RPH-4 occurs within Inter-Mountain Basins Big Sagebrush Steppe habitat and is found across the steep south-facing middle slope of the study area. It is characterized by an open shrub layer interspersed by herbaceous plants. Conditions are suitable for smooth desert parsley though none was observed during botanical surveys (FFP 2020b). There are also mixed pine stands of western juniper (*Juniperus occidentalis*) and ponderosa pine (*Pinus ponderosa*), which create seasonally moist microsites suitable for state sensitive few-flowered collinsia (*Collinsia sparsiflora* var. *bruceae*) and state sensitive common bluecup (*Githopsis specularioides*). Neither species was observed during botanical survey, though few-flowered collinsia may be done flowering by May (FFP 2020b).
- RPH-5 is a wetland area associated with a seep just above SR 14 and directly adjacent to an area of RPH-1. Surrounding habitat is Introduced/Invasive Grassland. RPH-5 contains suitable habitat for state sensitive western ladies' tresses (*Spiranthes porrifolia*), Nuttall's quillwort, and smooth goldfields, though these species were not observed during the botanical survey (FFP 2020b). Wetland habitats are discussed in more detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS; Anchor QEA 2022b).
- Smooth Desert Parsley Area: this area is located to west of the proposed lower reservoir footprint on rocky talus slopes spanning both sides of SR 14. Based on habitat mapping (shown in Attachment 1), habitat types that occur in this area are Inter-Mountain Basins Cliff and Canyon. Smooth desert parsley is a state threatened and Tribally important plant species. The presence of the species was documented in that location during the Applicant's 2015 habitat survey (FFP 2020a).

Air Habitat

The air habitat over the study area has specific characteristics of temperature, moisture, and wind regime, including wind speed and turbulence, that make it appropriate for certain wildlife species and for previous nearby wind energy development (Anchor Environmental 2004; Powell 2018; ERM 2021). This air space is used by bird and bat species for flying behaviors such as soaring, hunting, foraging, and migrating. Air habitat is also important for flying and wind-dispersing invertebrates and for wind seed dispersal. Soaring raptors, such as golden eagles, rely on wind for lift to reduce energetic costs during flight (Johnston et al. 2014). Additionally, existing topographic features of ridgelines create vertically

deflected air currents that provide lift for soaring birds. This type of vertical lift is usually strongest within the first thousand feet of the terrain surface (Johnston et al. 2014).

Bird Habitat

The study area is also located in the Pacific Flyway,[1] one of the main north-south migratory routes used by a variety of bird species. The Pacific Flyway extends from the arctic regions of Alaska and Canada to South America and is bounded on the west by the Pacific Ocean and on the east by the Rocky Mountains. Many migrant bird and raptor species use the Pacific Flyway to migrate between breeding habitat in North America and wintering habitat in the tropics (BirdLife International 2021).

The study area also overlaps with the National Audubon Society–defined Columbia Hills Important Bird Area[1] (IBA; Cullinan 2001). The IBA covers much of southern Klickitat County, ranging from the Klickitat River eastward to Rock Creek. The south slopes rise abruptly from the Columbia River, in places gaining over 1,600 feet of elevation over approximately 1 mile. The IBA excludes developed areas along SR 14. The Columbia Hills IBA is known to support several bird assemblages, including 13 or more species of raptor (Cullinan 2001). Bird species documented in the study area are described in more detail in Section 3.2.2.2.

Waterfowl Habitat

Waterfowl may use the ponds and portions of wetlands where water becomes ponded during wet seasons, though the pond habitat within the project area is small in scale (less than 0.5 acre) and low quality for waterfowl foraging or breeding. The two existing stock ponds (Pond/Wetlands P1 and P2) are the only still-water habitat located in the project area that are likely to be used as waterfowl habitat; surface waters are further detailed in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS) and Section 4.2 of the EIS.

Mule Deer Habitat

The study area falls within WDFW's East Columbia Gorge Mule Deer Management Zone. The goals for mule deer management are: 1) preserve, protect, perpetuate, and manage deer and their habitat to ensure healthy, productive populations; 2) manage deer for a variety of recreational, educational, and aesthetic purposes including hunting, scientific study, cultural, subsistence, and ceremonial uses by Native Americans, wildlife viewing, and photography; and 3) manage statewide deer populations for a sustainable annual harvest (WDFW 2016). An additional consideration for mule deer management is reducing deer-human conflict. The study area and the majority of Klickitat County is considered year-round mule deer habitat (WDFW 2016). A winter concentration habitat area is located in central Klickitat County.

3.2.1.1 Special Status Habitat

Critical Habitat

USFWS designated critical habitat for the northern spotted owl (*Strix occidentalis caurina*) exists along the western border of Klickitat County (USFWS 2021a). However, this area is more than 40 miles from the study area in old growth temperate rainforest habitat that is much different than the eastside shrub-steppe and mixed pine forest habitat of the study area. No designated critical habitat for terrestrial species occurs within the study area.

[1] The Pacific Flyway and Columbia Hills Important Bird Area overlap the entire study area and are therefore not depicted on Figures 1a and 1b.

Priority Habitat

WDFW's Priority Habitat and Species (PHS) Mapping identifies priority habitat types and features within the study area as John Day Talus Slopes, John Day Cliffs, Oak/Pine Mixed Forest, Freshwater Forested/Shrub Wetland, Emergent Wetland, Oak Forest/Oak Woodland, and Freshwater Pond (WDFW 2008). Though several of the mapped PHS habitat types are oak habitat, no oak has been documented in the portions of the study area that have been surveyed (Attachment 1). Oak may occur in the study area to the west of the upper reservoir. Wetland habitats are discussed in more detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS). The characteristics of the priority habitats and features, and their confirmed presence or absence in the study area, are summarized in Table 4. Priority habitats are shown in Figures 1a and 1b.

Table 4
WDFW Priority Habitat and Features and Rare Plant Habitat in the Study Area

PRIORITY HABITAT AND FEATURES	DESCRIPTION[1]	PRESENT IN STUDY AREA[2]
John Day Talus Slopes	Homogenous areas of rock rubble ranging in average size 0.5 to 6.5 feet (0.15 to 2.0 meters), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.	Yes
John Day Cliffs	Greater than 25 feet (7.6 meters) high and occurring below 5,000 feet (1,524 meters).	Yes
Oak/Pine Mixed Forest	Oak/Pine Mixed Forest with 0% to 25% canopy closure. Overlaps with John Day Talus Slope priority habitat feature in the study area.	Documented as mixed pine only. No oak were observed during Applicant's habitat and botanical surveys in the project area, but this habitat type may occur in the upper portion of the study area outside the areas surveyed by the Applicant.
Freshwater Forested/Shrub Wetland	Inland, scrub-shrub, temporarily flooded wetland (USFWS 2021b).	This priority habitat and feature type corresponds with some wetland features delineated during project area field surveys. Wetland areas described in more detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS).
Emergent Wetland	Wetland present for most of the growing season in most years and usually dominated by perennial plants (USFWS 2021b).	This PHF type corresponds with some wetland features delineated during project area field surveys. Wetland areas described in more detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS).
Oak Forest/Oak Woodland	Pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%; or where total canopy coverage of the stand is <25%, but oak accounts for at least 50% of the canopy coverage present. East of the Cascades, priority oak habitat is stands 2 hectares (5 acres) in size.	Potential Presence. No oak were observed during Applicant's habitat and botanical surveys in the project area, but this habitat type may occur in the northwest study area outside the areas surveyed.

PRIORITY HABITAT AND FEATURES	DESCRIPTION[1]	PRESENT IN STUDY AREA[2]
Freshwater Pond	Permanently flooded, man-made wetland area (USFWS 2021b).	Potentially present but not delineated in project area field surveys. Wetland areas described in more detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS).

Notes:
1. Priority habitat descriptions are from WDFW (2008) unless otherwise referenced.
2. Presence of priority habitat and features are documented in the Applicant's Environmental Report (FFP 2020a) and botanical survey in the project footprint (FFP 2020b).

3.2.2 Terrestrial Species

Sections 3.2.2.1 through 3.2.2.6 discuss the terrestrial plant and wildlife species that are found in and near the study area. Ground-dwelling wildlife species surveys were conducted in the vicinity of the upper reservoir in 1995, 2002, and 2005 (Ecology and Environment, Inc. 2006; FFP 2020a). Avian surveys were conducted in 1994, 1995, 1998, 1999, 2002, and 2003 for wind energy development in Klickitat County (WEST 2006). Bat survey data was collected in 2000 in Badgers Gulch Natural Area, approximately 5 miles north of the upper reservoir (WEST 2006). No wildlife surveys of the lower reservoir area have been completed. Plant and habitat surveys of the project footprint (Figures 1a and 1b) and most of the study area (Attachment 1) were completed by the Applicant in 2015 and 2019 (FFP 2020a). Special status and culturally important species are discussed in more detail in Section 3.2.3.

3.2.2.1 Plants

As described in Section 3.2.1, plant and habitat surveys were conducted in the vicinity of the proposed project in 2015 and 2019 (FFP 2020a). The 2015 survey was conducted to ground truth the ecological systems delineations used by WDNR NHP for biodiversity conservation at a medium-size scale (Attachment 1; Table 2-1 of Attachment 2; WDNR 2015). A medium-size scale is smaller than an ecoregion but larger than an individual plant community (WDNR 2015). The 2019 botanical survey was conducted to ground truth WDFW priority habitat mapping and document the presence of rare and special status plants species in the project area. The 2019 survey resulted in the designation of five RPHs. The RPHs and WDNR-defined ecological systems are shown in Figures 1a and 1b. A cultural resources survey was conducted in July 2019, during which the presence of culturally important plants was documented (Shellenberger et al. 2019). Culturally important plants are discussed in more detail in the *Tribal Resources Analysis Report* (Appendix H of the EIS; Ecology et al. 2022).

There are 68 special status plant species with documented occurrences in Klickitat County. Eight species are listed as state endangered, 30 are listed as state threatened, and 25 are listed as state sensitive (WDNR 2021). Five species are listed as locally extinct in Washington State. Special status and culturally important plant species are discussed in more detail in Section 3.2.3. A full list of rare plant species documented or with potential to occur in the study area is provided in Attachment 2, Table 2-1.

A number of introduced or invasive tree, shrub, grasses, and forb species, including Klickitat County Class B and C noxious weeds, are present in the study area and are described in more detail below. A visit to the proposed project footprint conducted on June 19 and 20, 2021, confirmed the presence

Noxious Weeds are state designated invasive, non-native plants that threaten agricultural crops, local ecosystems, or fish and wildlife habitats (WNWCB 2021).

of more invasive species and human-disturbed habitat near the proposed lower reservoir compared to habitat near the proposed upper reservoir (Anchor QEA 2022b).

Plant communities associated with specific WDNR NHP habitat types were documented during the 2015 survey (Attachment 1; FFP 2020b). Columbia Plateau Steppe and Grassland is found exclusively in the upper portion of the study area (Attachment 1). The herb layer consists of Hood River milk-vetch (*Astragalus hoodianus*), nine-leaf biscuitroot (*Lomatium triternatum*), spiny phlox (*Phlox hoodii*), curly blue grass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), bulbous blue grass (*Poa bulbosa*), spring draba (*Draba verna*), springbeauty (*Claytonia* sp.), and bluebunch wheatgrass (*Pseudoroegneria spicata*). The shrub layer consists of woody buckwheat species (*Eriogonum* spp.), rose (*Rosa* spp.), and rubber rabbitbrush (*Ericameria nauseosa*). Graminoids made up 60% to 80% of overall absolute cover, shrubs contributed to approximately 10% to 15%, and forbs contributed 25% to 30% cover (FFP 2020b). Small areas of Columbia Plateau Scabland Shrubland occur in mosaic with steppe and grassland. A contiguous band occurs near the southern edge of the upper reservoir. Plant genera observed included *Sedum*, *Phlox*, and *Eriogonum*, with a high percentage of rock and lichen.

Large portions of the middle and upper study area are defined as Inter-Mountain Basins Big Sagebrush Steppe. In the study area, the herb layer consists of arrow-leaf balsamroot (*Balsamorhiza sagittata*), bluebunch wheatgrass, lupine species (*Lupinus* spp.), fern-leaf biscuitroot (*Lomatium dissectum*), bulbous blue grass, and brome species (*Bromus* spp.). The shrub layer was made up of rubber rabbitbrush, buckwheat species, and stiff sagebrush (*Artemisia rigida*). Graminoids made up approximately 80% of absolute cover, shrubs consisted of approximately 20%, and forbs were 15% (FFP 2020b).

Columbia Plateau Western Juniper Woodland and Savanna occurs in the upper portion of the study area. Plant species that occur in this community include an herbaceous layer with nine-leaf biscuitroot, Hood River milk-vetch, brome species, bulbous blue grass, curly blue grass, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), yarrow (*Achillea* spp.), and sunflower (*Eriophyllum* spp.). The shrub layer consists of rubber rabbitbrush and woody buckwheat species, with ponderosa pine and western juniper trees. Graminoids contribute 50% to 80% cover, forbs about 10% to 15% cover, and shrubs approximately 35% to 60% cover. Trees comprise approximately 20% to 25% cover and become scarcer on the slopes and denser in the valleys and draws. Ponderosa pine comprises approximately 80% of total tree cover on the slopes, with western juniper making up the remaining 20% (FFP 2020b).

A large portion of the central-eastern study area is designated as Inter-Mountain Basins Cliff and Canyon. This area overlaps with the WDFW John Day Talus and Cliff Priority Habitat Features (Figures 1a and 1b). Trees, shrubs, and forbs include serviceberry (*Amelanchier alnifolia),* netleaf hackberry (*Celtis reticulata*), smooth sumac (*Rhus glabra*), western juniper, big sagebrush (*Artemisia tridentate*), antelope bitterbrush (*Purshia tridentata*), curl-leaf mountain-mahogany (Cercocarpus ledifolius), and ocean-spray (*Holodiscus discolor*) (FFP 2020b).

Most of the lower study area is classified as Annual Grassland or Annual Grassland with Rock Outcroppings with primarily introduced plant species (Attachment 1; FFP 2020b). This area may have been formerly Columbia Plateau Steppe and Grassland with some native species are still present. The herbaceous layer primarily consists of cheatgrass (*Bromus tectorum*), needle-and-thread grass (*Hesperostipa comata*), bulbous blue grass, buckwheat species, Menzies' fiddleneck (*Amsinckia menziesii*), fern-leaf biscuitroot, and groundsel (*Senecio* sp.). The shrub layer consists primarily of rubber rabbitbrush, with some woody buckwheat species, both in varying densities throughout the cover type. The grassland areas closer to the bluffs near the lower reservoir contained up to 20% talus rocks within the meadow. Graminoids are 70% to 90% absolute cover, forb species are approximately 5% to 10%, and

shrubs are approximately 5% to 30%. Annual grassland species on rock outcrop areas closer to the Columbia River were cheatgrass, yarrow, brome species, and quackgrass (*Elymus repens*). A woody buckwheat species was present in the shrub layer. Other species observed included fern-leaf biscuitroot, Menzies' fiddleneck, rubber rabbitbrush, and Canada thistle (*Cirsium arvense*). Graminoids were to approximately 75% of cover, forbs were 10%, and shrubs were 5%. About 25% of the area is rock or scree.

Small areas of Wetland, Inter-Mountain Basins Cliff and Canyon, and Introduced Woodland occur in the lower project areas (Figure 1, Attachment 1). Introduced tree species include Russian olive (*Elaeagnus angustifolia*), ornamental pea family trees, black cottonwood (*Populus trichocarpa*), smooth sumac, and scattered sweet almond (*Prunus dulcis*) and netleaf hackberry trees. Black cottonwood, netleaf hackberry, and smooth sumac are native, but are assumed to be planted given the development of the area. Inter-Mountain Basins Cliff and Canyon plant species are the same as described previously. Wetland plant species are described in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS).

Additionally, the 2015 plant survey found that the rare and imperiled plant species smooth desert parsley occurs directly west of the lower reservoir and laydown area. The desert parsley area is immediately outside the project boundary but inside the study area (Attachment 1). Desert parsley was confirmed to occur in the study area during the cultural resources survey (Shellenberger et al. 2019) and is discussed in more detail Section 3.2.3.

The botanical survey conducted in May 2019 only surveyed areas within the project boundary with the purpose of confirming the presence of WDNR special status plant species and confirming the presence of WDFW priority habitat types (Figures 1a and 1b; FFP 2020b). The botanical survey confirmed that vegetation in the study area is generally characteristic of shrub-steppe and disturbed shrub-steppe habitat with smaller areas of mixed pine forest (RPH-4) and scrub-shrub wetland (RPH-1 and RPH-5). The central part of the study area is characterized by sparsely vegetated rocky cliff and talus features (RPH-2 and RPH-4). Mixed pine forest in the study area includes primarily open to moderately dense stands of western juniper and ponderosa pine (RPH-4). These stands could provide the seasonally moist microsites required by special status plant species few-flowered collinsia, common bluecup, and smooth desert parsley, but these species were not documented during the botanical survey. Few-flowered collinsia flowers earlier (March to April) than when the botanical survey was conducted in May.

As described previously, vegetation in the lower central part of the study area (RPH-2 and lower) is dominated by introduced invasive plant species. Canada thistle is a Klickitat County Class C noxious weed. Klickitat County Class B noxious weeds dalmatian toadflax (*Linaria dalmatica*), rush skeletonweed (*Chondrilla juncea*), Russian olive, Himalayan blackberry (*Rubus armeniacus*), and quackgrass are also present.

Seep and ephemeral stream areas in the upper reservoir area and near SR 14 (RPH-1) contain an abundance of the sagebrush species *Artemisia* spp. Seasonal moisture, well-drained soil, and presence of a preferred sagebrush host plant make conditions appropriate for state endangered California (Gray's) broomrape (*Orobanche californica*). None was documented during surveys; however, California broomrape flowers after the survey was conducted (June to October). The presence of state sensitive Nuttall's quillwort was also not confirmed, though it may be present since it closely resembles non-flowering grass shoots.

Along the clifftop, near the southern boundary of the proposed upper reservoir (RPH-3), plant species are primarily big sagebrush (*Artemisia tridentata*) and buckwheat species, interspersed with forbs such as

arrow-leaf balsamroot, phlox (*Phlox* spp.) lupine, and desert parsley. Herb-Robert (*Geranium robertianum*), a Klickitat County Class B noxious weed, was noted. As described in Section 3.2.1, habitat in RPH-3 is suitable for special status plant species smooth desert parsley, Douglas' draba, and hot-rock penstemon (*Penstemon deustus* var. *variabilis*), but these species were not observed at the time the botanical survey was conducted (FFP 2020b).

3.2.2.2 Birds

As described in Section 3.2.1, the study area occurs within both the Pacific Flyway and the Columbia Hills IBA. There is also a PHS waterfowl congregation area just outside the southeast corner of the study area. The study area and surrounding areas provide a range of features that support breeding, foraging, resting, and overwintering habitat for a wide variety of resident and migratory bird and raptor species. Extensive baseline bird surveys were performed at the adjacent wind farm areas in 1994, 1995, 1998, 2002, and 2003 (WEST 2006). Together these studies cover most periods of the year including overwinter, early spring, late spring, summer breeding, and fall periods. Bird fatality data from Columbia Plateau wind energy developments were evaluated in 2010 and 2011 as part of a wind energy cumulative impacts assessment (WEST 2010, 2011).

During the surveys conducted in winter and spring (February to April) 2003, 39 species of birds comprising 1,232 individuals were observed. During surveys conducted in summer (June to August) 1998, 54 bird species were observed, while during the fall (September to October) 44 species were observed. A complete list of bird species observed near the study area is presented in Attachment 2, Table 2-2.

Bird groups observed during these surveys include passerines, corvids, raptors, and upland game birds. Observed bird species included, but were not limited to, American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), dark-eyed junco (*Junco hyemalis*), white-crowned sparrow (*Zonotrichia leucophrys*), and common raven (*Corvus corax*). Observed raptors included red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), state candidate golden eagle, prairie falcon, peregrine falcon, northern harrier (*Circus hudsonius*), and state endangered ferruginous hawk. Bald eagles, which are protected under special legislation, were also observed in the study area. Special status bird species are discussed in more detail in Section 3.2.3.

USFWS also identifies several migratory birds as Birds of Conservation Concern in Klickitat County. These are bird species that, without additional conservation actions, are likely to become candidates for federal listing (USFWS 2008). Birds of Conservation Concern observed near the study area during bird surveys include Cassin's finch (*Carpodacus cassinii*), Lewis's woodpecker (*Melanerpes lewis*), rufous hummingbird (*Selasphorus rufus*), long-eared owl (*Asio otus*), and sage thrasher (*Oreoscoptes montanus*).

Cliff and talus rocky and shrubland areas of the study area provide nesting habitat for raptor species such as golden eagles, ferruginous hawks, and prairie falcons. Cliff top shrub-steppe areas and previously developed areas with low-growing vegetation near the lower reservoir provide hunting habitat for predatory species. Raptors may forage as far as 15 miles away from nest sites throughout the reproductive cycle. Raptor use of an area may be substantial if the area contains high prey density, usually in the form of ground squirrels, pocket gophers, and rabbits (WEST 2006).

The nearby Columbia River is hunting habitat for study area raptors, such as bald eagles and osprey (*Pandion haliaetus*), that have a preference for hunting over water.

The study area is located in an area of the Middle Columbia region with abundant waterfowl. As previously discussed, the project area exists within the Pacific Flyway and overlaps with the National Audubon Society–defined Columbia Hills IBA (Cullinan 2001).

The Columbia River adjacent to the project area provides feeding and staging areas for waterfowl species. A PHS waterfowl concentration area exists in a side channel of the Columbia River just upstream of John Day Dam. The two existing stock ponds (Pond/Wetlands P1 and P2) are the only still-water habitat located in the project area, and may be used by waterfowl in fall through spring when ponded water is present. Other ephemeral or intermittent surface water and wetlands within the project area lack ponded water and are not likely to provide suitable habitat to waterfowl for extended periods of time.

Extensive baseline bird surveys, which include observations of waterfowl, were performed at the adjacent wind farm areas in 1994, 1995, 1998, 2002, and 2003 (WEST 2006). A complete list of waterfowl species that have been observed near the project area, or are likely to occur based on known distributions, is included in Attachment 2, Table 2-2.

3.2.2.3 Mammals

This section relies primarily on wildlife surveys conducted for the Conservation and Renewable Energy Systems and Kenetech EISs in 1995 and 2005 reported in the Windy Point Wind Farm Environmental Report (Ecology and Environment 2006) and in a Windy Farm wildlife impacts analysis (WEST 2006). Three mammal species were documented in the study area during habitat surveys in 2019 (FFP 2020a).

Many species of small, medium, and large-sized mammals frequently found in shrub-steppe and Columbia Plateau habitats in Washington are likely to occur in the study area. These include shrews (family Soricidae), deer mouse (*Peromyscus sonoriensis*), northern pocket gopher (*Thomomys talpoides*), Great Basin pocket mouse (*Perognathus parvus*), voles (subfamily Arvicolinae), raccoon (*Procyon lotor*), weasels (*Mustela* spp.*),* striped skunk (*Mephitis mephitis*), badger (*Taxidea taxus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and Columbian black-tailed mule deer (*Odocoileus hemionus columbianus*) (WEST 2006). Some species are associated with localized habitats near and within the study area, including: porcupine (family *Erethizontidae*) in mixed forest and shrub-steppe areas, yellow-bellied marmot (*Marmota flaviventris*) in areas of basalt outcrops and rocky ridges, and Nuttall's cottontail (*Sylvilagus nuttallii*) in shrubby thickets and rocky areas (WDFW 2021a; Ecology and Environment 2006). Many small mammal species groups including mouse, voles, gopher, skunk, badger, fox, and ground squirrel utilize underground dens or burrows during all or part of the year. Mammal species known to occur in and near the study area are provided in Attachment 2, Table 2-2.

Rocky Mountain mule deer, a species of management priority in Washington State, have been documented near the study area (WEST 2006). Mule deer are not a state or federally listed species or a species of concern but are discussed in Section 3.2.3 because of their cultural and economic importance. Elk are also known to pass through the study area and are considered part of the Mount St. Helen's Elk Herd. The study area is about 5 miles outside of the Mount St. Helen's Elk Herd Management Area (to the west) and about 50 miles outside the Yakima Elk Herd Management Area (to the north). Elk are expected to occur at low densities but may migrate through the study area.

Of the 15 bat species (order *Chiroptera*) that occur in Washington State, 14 are expected to occur in Klickitat County (WDFW 2021b) and 11 were documented in surveys within 11 miles of the proposed project (Fleckenstein 2001 *as cited in* WEST 2006).

Bat species documented near the study area include state candidate species Townsend's big-eared bat (*Corynorhinus townsendii*), though this species expected to occur at low densities throughout its range

(WDFW 2021b). Resident species with a high likelihood of occurring within the study area include big brown bat (*Eptesicus fuscus*), pallid bat (*Antrozous pallidus*), California myotis (*Myotis californicus*), and western small footed myotis (*Myotis ciliolabrum*) (WEST 2006). Migratory hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasionycteris noctivagans*) have been documented near the study area and are expected to be most common in summer and fall (WDFW 2021b; WEST 2006). Little brown bat (*Myotis lucifugus*), a state priority species, is documented in the study area (WDFW 2021a). The silver-haired bat makes up nearly half of bat turbine fatalities at Columbia Plateau wind energy developments (48%), with the hoary bat making up almost as many (46.4%), and the remaining fatalities from unidentified bat species (3.6%), little brown bat (1.3%), and big brown bat (0.7%) (WEST 2010, 2011). Bat species observed near the study area are listed in Attachment 2, Table 2-2.

The potential for bats to occur in the study area is based on the availability of foraging areas with prey insects, roost trees, and water sources (WDFW 2013). Nearly all bat species found in Washington occasionally roost and hibernate in crevices found in rock fractures or talus slopes, which are prevalent in the study area. Mixed forested areas may provide roost trees for some bat species. Small bodies of water such as ponds, streams, and wetland areas in and near the study area may provide water sources and attract foraging bats. The Columbia River and its tributaries are a potential water source for bats, as well as a landscape feature that may serve as a flyway. Although bats tend to follow linear landscape features (such as riparian areas) when commuting between roosting and foraging areas, little is known about their actual flyways, particularly during migration.

3.2.2.4 Reptiles

This section relies on the same wildlife surveys described in previous sections. Additionally, two reptile species were observed during a visit to the proposed project footprint conducted on June 19 and 20, 2021 (Anchor QEA 2022b).

Several species of common reptiles are present in the area, including Pygmy short-horned lizard (*Phrynosoma douglasii*), western fence lizard (*Sceloporus occidentalis*), racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis elegans*), and western rattlesnake (*Crotalus viridis*) (Ecology and Environment 2006). Pygmy short-horned lizards occur primarily in shrub-steppe habitats and have a preference for rocky soils in which they can burrow. Western fence lizards are usually found in association with rock outcroppings, talus slopes, and cliff faces; however, they can also be found in open forested areas on rocks, logs, and trees (Washington Herp Atlas 2009). Garter snakes, western rattlesnakes, racers, and gopher snakes are commonly found throughout Washington State (WDFW 2021c). Reptile winter hibernation and sheltering areas include rodent burrows, spaces under logs and tree stumps, rock crevices, and lumber and rock piles. A list of reptile species known to occur and with the potential to occur in the study area is provided in Attachment 2, Table 2-2.

3.2.2.5 Invertebrates

No studies of invertebrates have been conducted in the study area. This section describes the general soil-dwelling and above surface invertebrate communities that occur in grassland, shrubland, and wooded habitats of the Columbia River basin (Niwa et al. 2001), such as those in the study area. Above ground invertebrates can be associated with the ground surface or various layers of vegetation from ground cover to tree canopy. Invertebrate groups include insects, mites, spiders, collembola (phylum *Arthropoda*), land snails and slugs (class *Gastropoda*), and worm (phylum *Annelid*) species. Invertebrates provide a food source for other wildlife and perform a variety of functional roles that are important for habitat health including carbon and nutrient cycling, pollination, microclimate control, decomposition, and plant biomass control (Niwa et al. 2001). Both generalist species, those that eat a variety of foods and survive in a variety of habitats, and specialist species, those that require a specific food or habitat, are

expected to be present in the study area (Niwa et al. 2001). However, no invertebrate surveys have been performed in the study area. Special status invertebrate species with the potential to occur in the study area are provided in Attachment 2, Table 2-3.

3.2.3 Special Status and Culturally Important Species

This section addresses rare, threatened, and endangered plant and animal species that have been observed or that have higher potential to occur in the study area. This includes species that are federally listed as threatened or endangered, proposed for federal listing, or federal candidate species (USFWS 2021c); state species of concern (defined as state-listed as threatened, endangered, sensitive, or candidate; WDFW 2021d); or species that receive specific protection defined in federal or state legislation. The section also includes culturally important species. A list of special status species is provided in Attachment 2, Table 2-3.

The federally listed gray wolf (90-day relisting; USFWS 2021d) has the potential to occur throughout Washington State but is unlikely to be present in the study area because no known wolf packs occur within Klickitat County (WDFW 2021e).

Golden and Bald Eagles

Bald and golden eagles range over large geographic areas across North America and use a variety of habitats. Bald eagles are typically found near waterbodies including lake shorelines, rivers, and coastal areas (USFWS 2016), while golden eagles typically occupy more mountainous terrain and open, arid environments consistent with that found in the study area. Both eagle species may use different habitats based on breeding, migration, and wintering; availability of prey; and level of disturbance (Buehler 2020).

Though bald eagles were once threatened or endangered everywhere in the United States except Alaska, populations have rebounded, and the species was removed from the ESA list of federal threatened and endangered species in 2007 and removed from Washington State special status in 2017. However, the bald eagle is still protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Golden eagle populations, conversely, appear to be experiencing reduced reproductive success in Washington State and are now a candidate for state listing (Watson et al. 2020).

Bald eagles generally nest in mature trees or snags in forested areas near waterbodies that offer foraging opportunities (Buehler 2000). Though rarer, they will nest on cliffs, in shrubs, and on the ground where trees are not available. With increasing frequency, they will also nest on human-made structures, such as power poles and communications towers. Key factors influencing nest site selection include forest size and structure, quality of foraging areas, and low human disturbance (Buehler 2000). Migrating and wintering eagles can be highly social, gathering in large numbers near open water or other areas rich in food resources. Bald eagles were observed near and within the study area during studies conducted for nearby wind farms from 1994 to 2003 but were only present during winter and spring (December to May) and are therefore thought to be migrants (WEST 2006). During subsequent surveys, no nesting bald eagles were observed though appropriate bald eagle nesting habitat was documented (WEST 2006). Therefore, nesting bald eagles have the potential to be present in the study area.

Golden eagles generally breed in open or semi-open areas in tundra, shrubland, grassland, and desert rimrock, but generally avoid urban and heavily forested areas (Kochert et al. 2002). Golden eagles usually nest on rock ledges and cliffs, but they also nest in large trees, steep hillsides, and—rarely—on the ground (Kochert et al. 2002). When migrating, golden eagles are associated with features such as cliff lines, ridges, and escarpments, where they take advantage of uplift from deflected winds. They often forage over open landscapes, using thermals to move efficiently. Washington breeding birds are non-migratory

and nest sites are typically used year after year, with the breeding pair maintaining an average of 2.7 nests in the territory (Watson et al. 2014a, 2014b).

Golden eagle flushing distances—the distance at which a disturbance can cause birds to take flight to avoid the disturbance—range from 344 to 1,280 feet for a walking person and 46 to 623 feet for a vehicle (Richardson and Miller 1997). Bald eagle flushing distances can be up to 0.6 mile (Richardson and Miller 1997). Types of human activity that may disturb eagles include visual disturbance (i.e., the ability of the raptor to see humans), audible disturbance such as shouting, and direct physical disturbance such as during some types of outdoor recreation (Richardson and Miller 1997). The degree of sensitivity to disturbance may depend on habitat characteristics, stage of breeding cycle, the type of disturbance, and the individual bird (Richardson and Miller 1997; Pagel et al. 2010). Signs of disturbance include agitation and vigilant behavior, changes to foraging and feeding, and nest abandonment (Pagel et al. 2010). Spatial buffers of 650 feet to 1 mile from activity are suggested to prevent disturbance (Richardson and Miller 1997). USFWS (Pagel et al. 2010) suggests that extended construction activities occurring within 1 to 3 miles may disturb golden eagles.

During bird surveys conducted from 1994 to 2003, golden eagles were observed in the study area during all seasons (WEST 2006) and golden eagle nests are documented within a 36-square-mile area overlapping the proposed project (FFP 2020a).

Ferruginous Hawk

Ferruginous hawk, a state endangered species, are migratory and occur in arid grasslands and shrub-steppe habitats (WDFW 2021f; Watson et al. 2018). Preferred prey species are burrowing mammals including ground squirrels and pocket gophers, smaller birds, reptiles, and insects, all of which are common in study area. Ferruginous hawks arrive on breeding areas from late April through July. Preferred nesting sites are available in the study area and include small rock outcrops on the slope of steep hillsides or canyons or in isolated trees, such as junipers. This species was observed in and near the study area in low numbers during baseline bird surveys that occurred from 1995 to 2002. WDFW has not documented nesting sites within the study area (WDFW 2021a). However, recent studies note that conservation of non-breeding habitats is important for maintaining the health of breeding populations (Watson et al. 2018).

Prairie Falcon

Prairie falcons prefer the arid environments of eastern Washington, such as shrub-steppe habitat that occurs near and within the study area. Preferred prey includes a variety of species that are common in the study area such as ground squirrels and ground nesting birds and passerines. Prairie falcons require cliffs for nesting but will make use of a wide variety of features from 400-foot basalt cliffs to smaller escarpments raised 20 feet above sloping canyon walls. Prairie falcon have been identified as a state priority species because Washington has a limited number of suitable cliffs for nesting (Larsen et al. 2004). A study in Oregon found that most suitable scrapes, or nest sites, are located more than 0.5 mile from human habitation and within 0.25 mile of water (Larsen et al. 2004). Additionally, prairie falcon scrapes and foraging areas are located within home ranges as large as 150 square miles. Suggested spatial buffer zones for prairie falcons range from 164 feet to prevent post-fledging visual disturbance to 0.5 mile for noise disturbance (Richardson and Miller 1997).

WDFW has identified prairie falcons and nest scrapes both within and in the vicinity of the study area (WDFW 2021g). In addition, at least two historic prairie falcon scrapes have been documented to the southeast and northeast of the proposed project. In 2019, WDFW surveys documented two adult prairie falcons displaying courtship behavior and confirmed a used scrape (territory; Nest No. 288; WDFW 2021g). Prairie falcons are also migratory birds and subject to the Migratory Bird Treaty Act.

Peregrine Falcon

Peregrine falcons occur in nearly all parts of the state including along the northern outer coast and San Juan Islands, in the Cascade Range foothills, along the Columbia River, adjacent to other waterbodies within the Columbia Basin, and across many parts of eastern Washington (Vekasy and Hayes 2016; WDFW 2021h). Following significant population declines related to the widespread use of DDT in the 1940s and 1950s, peregrine falcons were listed as a federally endangered species by USFW in 1970 and as a state endangered species by the Washington Fish and Wildlife Commission in 1980 (Vekasy and Hayes 2016, WDFW 2021h). Following national restrictions on the use of DDT and species population recovery efforts, peregrine falcon was removed from the federal endangered species in 1999 (Vekasy and Hayes 2016). In 2002, the peregrine falcon was reclassified as a state sensitive species and by 2016, the species' state sensitive status was determined to be no longer applicable under Washington State law (WDFW 2021h). They continue to be classified as “protected wildlife” under Washington Administrative Code (WAC) 232.12.011 and are protected under the Migratory Bird Treaty Act (Vekasy and Hayes 2016).

Peregrine falcons typically nest in cliffs near large bodies of water but will also use other relatively high places, including human-built structures (e.g., tall buildings, bridges), that offer protection from potential predators and a vantage point over the surrounding terrain (WDFW 2021h). Peregrines prey on other birds ranging in size from small songbirds to medium-sized shorebirds, gulls, pigeons, and waterfowl. They typically hunt in areas of open cover types including estuaries, agricultural fields, coastal beaches, large bodies of water, and open areas in urban settings. Nesting is largely dependent on the presence and availability of abundant prey in the vicinity of nesting sites and occurs at elevations up to about 3,000 feet or higher in nearly all parts of the state (Vekasy and Hayes 2016, WDFW 2021h). Habitats used by peregrines during the non-breeding season typically support high densities of shorebirds, waterfowl, and other small- to medium-sized birds (Vekasy and Hayes 2016).

Previous avian surveys in the vicinity of the project area have identified peregrine falcon nests along the Columbia River but note that peregrine falcon breeding occurrence in Klickitat County was rare at the time of the surveys (WEST 2003, 2006). The Oregon Department of Fish and Wildlife has also reported a peregrine nesting site in the vicinity (FFP 2020a).

Western Gray Squirrel

The western gray squirrel is state threatened (WDFW 2021d). WDFW priority species mapping (WDFW 2021a) indicates the potential presence of this species in the study area. However, western gray squirrel presence is unknown because of the lack of recent wildlife surveys in the study area.

There are only three remaining populations of the western gray squirrel in Washington, one of which occupies oak woodlands and conifer forests in Klickitat and Yakima counties, including similar habitat types within the study area (WDFW 2021f). The populations are isolated and face a number of threats, including habitat loss and degradation, wildfires, highway mortality, and disease. Western gray squirrels are most frequently associated with pine trees, which provide nesting cover and seeds for food, and oak trees, which provide natal den sites and acorns for food. In Washington, they also use stands of Douglas fir trees when a component of oak or pine is present. The squirrels require mature stands of trees with sufficient canopy cover to provide secure nest sites and allow for traveling in trees. They also need a diverse selection of vegetation to provide a multitude of food resources. Hollow trees, stumps, and abandoned animal burrows are used as storage sites. Human-derived debris such as piping and other abandoned material are also used.

Western gray squirrels mate from early winter to late spring, with one litter of two to four young appearing from March to June (WDFW 2021f). After about 30 days of age, the young are fully furred and make short trips out of the nest. At about 60 days of age, they eat solid foods and venture to the ground. At about

3 months of age, juvenile squirrels are on their own, sometimes remaining close to the nest until their parents' next breeding period. Most squirrels die in their first year but can live up to 3 to 5 years. Squirrels experience predation from raptors, coyotes, and bobcats. Vehicles, disease, and starvation also kill squirrels.

Little Brown Bat

The little brown bat is a WDFW priority species and is considered one of the most common in Washington State (WDFW 2021b, 2021a). This species makes up approximately 1.3% of bat fatalities at wind farms in the Columbia Plateau Ecoregion (WEST 2010, 2011). Individuals have been captured during bat surveys approximately 11 miles northeast of the study area (Fleckenstein 2001 *as cited in* WEST 2006), indicating that presence in the study area is likely, but unconfirmed because of the lack of recent wildlife surveys.

This species is a habitat generalist that uses a broad range of ecosystems throughout Washington. In Washington, it occurs most commonly in both conifer and hardwood forests, but also occupies open forests, forest margins, shrub-steppe, clumps of trees in open habitats, sites with cliffs, and urban areas. Within these habitats, riparian areas and sites with open water are usually preferred (WDFW 2021f).

Major food sources are emerging aquatic insects (especially midges), but moths, beetles, non-aquatic flies, a variety of other insects, and spiders are also eaten. Foraging is often concentrated over or near water, but also occurs in other cover types. Feeding is most active during the 2 to 3 hours after dusk when insect activity often peaks.

Mating mostly occurs in late summer and early autumn during swarming before hibernation and may continue into winter, with females giving birth 50 to 60 days later. Day roosting occurs in a variety of sites, including buildings and other structures, tree cavities and beneath bark, rock crevices, caves, and mines. Hibernation generally occurs from September or October until March or April, with hibernation sites including caves, abandoned mines, and lava tubes.

Mule Deer

Mule deer are not a state or federally listed species or a species of concern. However, mule deer are considered to be of cultural and economic importance as this species provides hunting and viewing opportunities for many, economic support to the state and to local communities, and has long provided food and clothing for native peoples (WDFW 2016).

Mule deer are common throughout much of eastern Washington State and occur at varying densities along the state's entire north-south extent, from the crest of the Cascade Mountains east to the Idaho border. Mule deer make season migrations of up to 50 miles and, though adaptable, are negatively impacted by landscape habitat loss, conversion, and fragmentation.

The study area is within WDFW's East Columbia Gorge Mule Deer Management Zone. The study area is considered year-round mule deer habitat (WDFW 2016) with a winter concentration habitat area located northeast of the study area in central Klickitat County (Attachment 3). Mule deer are expected to occur commonly in the study area.

Smooth Desert Parsley

Smooth desert parsley is a perennial herb of the carrot family (*Apiaceae*). The preferred habitat for this species is found in the study area and includes ledges and crevices of basalt cliffs along the Columbia River and nearby rocky slopes of sagebrush steppe. Smooth desert parsley is adapted to dry, rocky conditions where competition is minimal (WNHP 2021). Associated plants include many species found in

the study area including buckwheat, grasses (e.g., *fescue* spp.*),* and other species of desert parsley (*Lomatium* spp.). In disturbed areas, it is associated with invasive cheatgrass.

Smooth desert parsley is a state threatened species (WDNR 2021) and is an important Tribal cultural resource (Shellenberger et al. 2019). It was not documented inside the project boundary during botanical surveys conducted for the Applicant in 2019 (FFP 2020b) but was documented during cultural resources surveys led by Yakama Nation Cultural Resource Program that same year (Shellenberger et al. 2019). Therefore, this plant is considered to be present in the study area. Smooth desert parsley and other culturally important plants are further discussed in the *Tribal Resources Analysis Report* (Appendix H of the EIS).

3.3 Proposed Project

This section describes the probable terrestrial species and habitat impacts from the proposed project.

3.3.1 Impacts from Construction

Construction for the proposed project is estimated to last 5 years, from mid-2025 to early 2030. Direct impacts on terrestrial habitat and species could occur from land clearing, excavation, grading, and fill placement activities that permanently remove, fill, or otherwise change existing habitats or habitat connectivity. Construction could result in direct mortality of plant or wildlife species in the footprint of the upper or lower reservoirs when land clearing, excavation, or berm construction occur.

Noise and disturbance associated with construction activities and vehicles would temporarily affect wildlife. Construction noise likely to be generated by the proposed project would result from activities such as clearing and grading, excavation, tunneling, and blasting. These activities would temporarily create noise above current background noise conditions. Construction equipment likely to be used for the proposed project would generate noise ranging from 80 decibels at 50 feet from a backhoe, up to 94 decibels at 50 feet from blasting activities (FHWA 2006). Some construction activities would create continuous noise, such as tunneling, whereas noise associated other construction activities, such as blasting, would be intermittent. Locations within about 0.5 mile of blasting would experience occasional instances of noise exceeding ambient levels. Continuous construction noise would exceed ambient levels closer to the noise source. Canyon-shaped areas where noise is reflected would likely further shorten the distance at which noise-related disturbance of terrestrial species could occur. More information on noise and vibration levels and the potential to disturb or harm people or wildlife is in the *Environmental Health Resource Analysis Report* (Appendix I of the Draft EIS; Aspect and Anchor QEA 2022).

Terrestrial habitat related functions (e.g., biotic and abiotic functions) would also be adversely affected by construction of the proposed project. Biotic functions that would be affected include reduced plant growth and reproduction and reduced opportunities for wildlife species to use the habitat for shelter, foraging, and breeding. Abiotic functions that would be affected include moisture and temperature regulation, soil formation, and slope stability as a result of vegetation loss.

3.3.1.1 Direct Impacts

Terrestrial Habitat

Terrestrial habitats within the footprint of the upper and lower reservoirs would be permanently lost by construction of the project. Activities that would affect these areas include excavation, fill placement, grading, and structure installation for construction of the reservoirs, reservoir berm areas, berm access road at the upper reservoir, and the substation area near the lower reservoir. Direct temporary and

permanent impacts on terrestrial habitats from construction of the proposed project are summarized in Table 5 and discussed further after the table.

Table 5
Permanent and Temporary Direct Impacts on WDNR Natural Heritage Program Habitat Types from Construction of the Proposed Project

HABITAT TYPES	TEMPORARY IMPACT[1] (ACRES)	PERMANENT IMPACT[1] (ACRES)
Columbia Plateau Steppe and Grassland	7.5	49.6
Columbia Plateau Scabland Shrubland	0	1.8
Inter-Mountain Basins Cliff and Canyon	0	0.6
Inter-Mountain Basins Big Sagebrush Steppe	8.1	40.8
Columbia Plateau Western Juniper Woodland and Savanna	0.8	0.2
Introduced/Invasive Annual Grassland[2]	37.1	90.4
Introduced/Invasive Wooded	0	0.9
Developed/Disturbed	0.8	9.3
Total	**54.3**	**193.6**

Notes:
1. Temporary impact areas are from Table 3.3-7 of Exhibit E in FFP 2020a. Permanent impact areas (except Developed/Disturbed) are from Section 4.2 of the Applicant's response to FERC's request for additional information (Rye 2021).
2. With and without rocky outcroppings.

Terrestrial habitat within the study area includes upland grassland, shrub-steppe, cliff, and wooded habitat types, as described in Section 3.2.1. Impacts on these habitats from proposed project construction are summarized in Table 5. Terrestrial habitats within the construction footprint of the upper and lower reservoirs would be permanently lost. The footprint includes the reservoirs, reservoir berm areas, the berm access road at the upper reservoir, and the substation area near the lower reservoir.

Terrestrial habitats within the project boundary and identified as construction laydown areas are considered to be temporarily lost during construction but are expected to be revegetated after construction consistent with the Applicant's draft VMMP (FFP 2020c; Attachment 4). Terrestrial habitats in the cliff areas between the upper and lower reservoirs are considered to be temporarily degraded during construction because of increased noise and vibration from heavy equipment and blasting from surface and underground components of the project (e.g., access tunnels, underground powerhouse, and headrace tunnels).

Approximately 49.6 acres of WDNR imperiled Columbia Plateau Steppe and Grassland and 40.8 acres of imperiled Inter-Mountain Basins Big Sagebrush Steppe habitats would be permanently lost by construction of the upper reservoir. A small area of Columbia Plateau Scabland Shrubland (1.8 acre) would also be permanently lost. This area encompasses the entirety of Applicant-defined RPH-1 (7.8 acres) and 1.1 acres of RPH-3 (Figure 1b). This would be a permanent loss of imperiled and rare plant habitat but would not increase risk to species viability and therefore would not result in a significant adverse impact.

An additional 91.3 acres of introduced/invasive-species-dominated annual grassland and woodland in the lower reservoir area is also expected to be permanently lost. Because of the lower quality of this habitat, this would not result in a significant adverse impact.

The temporary loss of habitat in construction laydown areas would include Columbia Plateau Steppe and Grassland (7.5 acres), Inter-Mountain Basins Big Sagebrush Steppe (8.1 acres), Columbia Plateau

Western Juniper Woodland and Savanna (0.8 acre), and introduced/invasive annual grassland (37.1 acres) habitat types. Columbia Plateau Western Juniper Woodland and Savanna is considered a vulnerable habitat type and could be important for state threatened western gray squirrels in the study area, but the amount temporarily lost would be small and no oaks were identified in the habitat. Therefore, this would not result in a significant adverse impact. All temporarily disturbed habitat types are expected to be revegetated after construction consistent with the Applicant's draft VMMP (FFP 2020c; Attachment 4).

Terrestrial habitats in the cliff areas between the upper and lower reservoirs would be temporarily degraded during construction because of increased noise and vibration from heavy equipment and blasting for surface and underground components of the project (e.g., access tunnels, underground powerhouse, and headrace tunnels). Canyon-shaped areas where noise is reflected would likely shorten the distance at which noise-related disturbance could occur. This disturbance would make the habitat unsuitable for hibernating, nesting, or burrowing species. Because the increased noise and vibration would be temporary, this would not result in a significant adverse impact to habitat.

Special Status Habitats

There would be a permanent loss of 0.4 acre and temporary loss of 1.1 acres of PHS mapped Oak/Pine Mixed Forest near the lower reservoir. However, habitat surveys in the study area have determined that this habitat is characterized by non-native trees and native trees planted for landscaping purposes (FFP 2020d; shown in Attachment 1). There would be a temporary loss of 0.6 acre of PHS mapped Oak Forest near the upper reservoir. Habitat surveys in the study area found this area to be characterized by mixed pine with no oaks present (FFP 2020a, 2020b). Losses to these habitat types would not result in a significant adverse impact because the areas are small, no oak is present, and mixed pine forested areas are abundantly available in the study area and surrounding areas.

There would be temporary degradation of 65.1 acres of John Day Talus and cliff/slope mixed pine forest (PHS mapped as Oak/Pine Mixed Forest) between the lower and upper reservoirs during construction. The degradation of talus and forested cliff and slope is related to noise, vibration, traffic, and dust that could reduce the ability of this habitat to support raptor breeding and nesting for multiple years. Although these impacts would be temporary, they would be considered significant impacts. However, with implementation of the Applicant's proposed mitigation measures (see Section 3.3.4) , these would not be considered significant and unavoidable adverse impacts.

Terrestrial Species

Plants

Construction of the proposed project would result in the direct mortality of plant species in the upper and lower reservoir footprints and construction areas, potentially including rare plants California broomrape, smooth desert parsley, Douglas' draba, and hot-rock penstemon that could occur in RPH-1 and RPH-3. About 81.5 acres of trees, shrubs, and herbaceous plant species would be permanently lost because of construction (Table 5). About 9.6 acres of lost plant species are in RPH, which includes potential habitat for multiple rare plants including California broomrape, smooth desert parsley, Douglas' draba, and hot-rock penstemon.

About 53.5 acres of plant species would be temporarily lost. About 5.2 acres of temporarily lost plant species are in RPH. Plant species would also be directly affected by compaction of topsoil and permanent disturbance of seed banks during the construction of laydown areas. After construction, temporarily disturbed areas and directly adjacent areas would be more prone to establishment by invasive plant species.

Temporary, minor impacts on plant species may include non-lethal injury to trees, shrubs, and herbaceous plant species in areas adjacent to construction and laydown areas, and injury to plant species along access roads that may experience a higher frequency of use during construction.

Overall, the direct mortality of plant species and disturbance of habitat would not increase risk to species viability and therefore would not result in a significant adverse impact on plants. However, the loss of plant species and the disturbance of habitat could affect Tribal resources important to traditional cultural practices and the natural and cultural resources associated with those practices. Such impacts are discussed in Section 4.9, Cultural and Tribal Resources, of the Draft EIS and in the *Tribal Resources Analysis Report* (Appendix H of the EIS).

Birds

Any breeding and pre-fledged birds that are present in the project area are likely to be directly affected by vegetation clearing and other construction activities, which could result in elimination of nesting and perching sites and could result in nest failure. Cliff nesting raptors, especially those with hatchlings or fledglings, within or near the study area could experience impacts from repeated disturbance from construction activities or reduced prey availability during construction. Disturbance can cause eagles to exhibit agitation and vigilant behavior, change their foraging and feeding, and abandon nests (Pagel et al. 2010). The degree of sensitivity to disturbance may depend on habitat characteristics, stage of breeding cycle, the type of disturbance, and the individual bird (Richardson and Miller 1997; Pagel et al. 2010). This would not result in a significant adverse impact because it would not increase the risk to species viability for non-special status species. Special status bird species are discussed below.

Waterfowl are not likely to be directly affected by construction activities due to their ability to fly away from the disturbance areas. Impacts on waterfowl would include disturbance and relocation to different habitats. No breeding areas or areas of high concentration of waterfowl are expected to occur within the area of construction. Because the impact would be a short-duration disruption of normal behavior and would not affect sensitive life stages such as breeding or overwintering, construction of the proposed project is not expected to result in a significant adverse impact on waterfowl.

Non-nesting, post-fledged, and adult birds are the least likely to be directly affected by construction activities due to their ability to fly away from the disturbance areas. Impacts on these birds would include disturbance and relocation to different habitats. These impacts would occur throughout the 5-year construction period but would cease once construction is completed. Because the impact would be a temporary disruption of normal behavior, this would not result in a significant adverse impact.

Mammals

Larger mammals (e.g., deer, bobcat, coyote, and fox) are the least likely to be directly affected by construction activities due their ability to move quickly and travel sufficient distances from the disturbance. Mammals such as bats, squirrels, gophers, rabbits, raccoons, and weasels may experience effects from construction activities because they are more dependent on ground burrowing, rock crevices, shrubs, and trees for cover. However, some may be able to leave the disturbed area and find nearby habitat.

Construction activities such as tree and other vegetation clearing, ground compaction, and drilling or blasting may result in harassment or mortality. Mammals such as gophers, moles, voles, shrews, and mice may experience a higher degree of effects from construction activities because they have a smaller range and depend more on ground burrowing. These animals may experience direct harassment, injury, or mortality resulting from construction equipment use, ground compacting activities, and blasting. If they are forced to leave established burrows and dens in winter, small mammal species would be exposed to

harsher conditions and may not be able access cached food resources. Disruption and/or direct mortality of hibernating small mammals could also occur. Overall, short-term to persistent disruptions in behavior and injury or mortality to non-special status species would not result in significant adverse impacts to non-special status mammals during construction. Special status mammal species are discussed below.

Reptiles

Reptiles such as snakes and lizards may be killed or injured during construction activities. In summer reptiles use exposed rocky areas, which are present throughout the study area, to warm their bodies. Other exposed areas include existing access roads, laydown yards, and other rock outcroppings in the temporary reservoir area. In winter reptiles use abandoned small mammal burrows, rock piles and crevices, or spaces under logs as hibernation sites. Construction activities that could disrupt or destroy reptile habitats include excavation, berm building, vegetation clearing, vehicle operation, and blasting. This would not result in a significant adverse impact on non-special status reptiles because of the abundance of suitable reptile habitat in the surrounding areas. No special status reptile species are known to occur in the study area.

Invertebrates

Invertebrates may be injured or killed during construction activities. Non-winged invertebrates are more susceptible to direct impacts due to their limited mobility and relatively small home ranges. Winged invertebrates are likely to relocate to adjacent unaffected habitats. Invertebrates are expected to experience negligible impacts because they are common in habitats similar to the study area.

Special Status Species

A number of WDNR Heritage Plant species, including culturally important smooth desert parsley, could be adversely affected by construction activities from loss of RPH-1 and RPH-3 habitat. Because the area lost is relatively small and other documented areas of smooth desert parsley are located nearby, this would not result in a significant adverse impact to the species. However, the loss of desert parsley and other culturally important plants could be a significant impact to Tribal resources as described in the *Tribal Resources Analysis Report* (Appendix H of the EIS).

If present, actively breeding and nesting golden eagles at previously documented cliff sites directly adjacent to the lower reservoir area would be disturbed by heavy equipment operation and drilling and blasting noise and vibration, which could affect species viability. Any nests within a 0.5 m distance from blasting noise would likely be impacted (USFWS 2007). Additionally, extended construction activities occurring within 1 to 3 miles from nest sites may cause golden eagle disturbance, including nest abandonment, which would constitute “take” under the Bald and Golden Eagle Act. Although this could be a significant adverse impact, implementation of proposed mitigation measures (see Section 3.3.4) would reduce or eliminate impacts on breeding and nesting golden eagles.

Although construction impacts on state priority species would be considered significant, disruptions to normal behavior would be temporary and the Applicant has proposed mitigation measures (see Section 3.3.4). Considering the temporary impact and implementation of mitigation, there would be no significant and unavoidable adverse impacts to state priority prairie falcons, state threatened western gray squirrel, bald eagles, and state endangered ferruginous hawk.

3.3.1.2 Indirect Impacts

Terrestrial Habitat

Construction would result in permanent reduction in habitat connectivity between aquatic and riparian habitat of the Columbia River and upland plateau and cliff habitats in the study area. Lateral connectivity along plateau and cliff habitat would also be decreased. Reduction in habitat connectivity would affect all habitat types, including special status habitats. The presence of new physical obstructions and increased human activity from construction and traffic would reduce habitat connectivity by making it more difficult for some wildlife species to make daily and seasonal movements, but the changes would not increase risk to species viability. Therefore, impacts would not be significant.

Habitat Connectivity

Habitat connectivity is the degree to which the landscape enables or impedes animal movement and other natural processes, such as seed dispersal (NWF 2021). Wildlife move daily and seasonally to survive. The habitats wildlife rely on can be fragmented by housing, roads, fences, facilities, and other man-made barriers. Man-made barriers force wildlife species to use more energy to reach food, water, shelter, and breeding sites (NWF 2021).

Terrestrial Species

No indirect impacts to terrestrial species are expected to result from construction.

3.3.1.3 Conclusion

There would be temporary significant impacts on talus and cliff habitat during construction. A significant adverse impact could also occur to breeding and nesting state candidate golden eagles. This would occur if the level of disturbance from construction activities reduces species viability from nest abandonment. However, if mitigation proposed by the Applicant and WDFW is implemented as described in Section 3.3.4, the impacts to talus and cliff habitat, golden eagles, and other raptors would likely not be significant.

3.3.2 Impacts from Operation

Operations for the project are assumed to occur during a 45-year period beginning after construction ends. Operations would include increased human activity, such as vehicle traffic, equipment operation, and facility maintenance, in the study area. Species that are tolerant of human activity would likely continue to occupy available habitat within the project boundary and study area; species that are less tolerant of human activity would be more likely to avoid study area habitats. Operation of the upper and lower reservoir would create two open water areas—the upper reservoir would create about 61 acres of open water and the lower reservoir would create about 63 acres of open water. It is assumed that either reservoir could be completely full or both reservoirs could be partially full at a given time during operation (FFP 2020a). No additional direct changes to terrestrial habitats are expected after completion of construction, but indirect changes will continue to occur from reduced biotic and abiotic functions and reduced habitat connectivity.

Operation of the proposed project is expected to permanently increase noise, light, dust, and vehicle traffic, due to human presence in the study area. Based on mapping of visual infrared satellite data, lighting needed for operations of the proposed project would convert currently dark nighttime habitat between John Day Dam and the city of Rufus, Oregon, to non-dark habitat (Stare 2021). For safety reasons, the project would likely be lit 24-hours per day. Artificial light can change species interactions in a particular habitat (Davies et al. 2013) and can reduce nighttime habitat connectivity.

Operation and maintenance of the proposed facility would produce periodic noise and vibration, primarily from the turbine-generator system and maintenance activities. Noise would be generated from periodic

truck movements and the temporary use of heavy tools and equipment. Impacts from noise and vibration during operation would be substantially lower than construction noise and vibration impacts because there would be much less activity. The Applicant expects that background noise levels will not be elevated beyond 500 feet from project infrastructure (FFP 2020a). The Applicant indicates they will minimize noise impacts to protect the rural setting that currently exists in the Columbia Gorge. Operational noise from the proposed project is expected to be negligible. It is likely that an alarm system will also be used to alert bystanders to the start of pumping from one reservoir to the other. This will create a short-term local noise but will be an important safety feature and should not be mitigated (FFP 2020a).

Permanent increases in noise, light, dust, vehicle traffic, and human presence would also degrade habitats in the study area that are presently used by resident and transient terrestrial wildlife species. This degradation could result in indirect impacts by increasing competition for resources and reducing the ability of wildlife to disperse or migrate in the study area and in adjacent areas. Wildlife may continue to avoid areas that were previously used for resources (e.g., food, water, and shelter) during project operations.

3.3.2.1 Direct Impacts

Terrestrial Habitats

No additional direct impacts on terrestrial habitats are expected during operation of the proposed project.

Terrestrial Species

Periodic vegetation management could result in direct impacts from injury or killing of individual invertebrates. Similar to construction, non-winged invertebrates are more susceptible to direct impacts due to their limited mobility and relatively small home ranges. Winged invertebrates are likely to relocate to adjacent unaffected habitats. Invertebrates are expected to experience negligible impacts because they are common in habitats similar to the study area. No additional direct impacts on terrestrial species are expected during operation of the proposed project.

3.3.2.2 Indirect Impacts

Terrestrial Habitat

Within the study area outside the proposed project boundary, there would be indirect impacts from reduced habitat function including a long-term reduction in the ability of the study area to support the same abundance and community of species that it previously supported. Biotic and abiotic functions described for construction in Section 3.3.1 would continue to be reduced during operation compared to current conditions. However, some level of habitat would eventually return that would be used by terrestrial species including those that are tolerant of human disturbance. These indirect impacts on terrestrial habitat would not result in a significant adverse impact because ongoing or repeated disturbance of habitat that is critical to species viability would not occur.

The reservoir open water areas are not intended to provide habitat, but would likely attract birds, bats, and flying insects, potentially resulting in injury or mortality from wind turbines near the upper reservoir. In addition to flying insects, wind-dispersing invertebrates could get caught on fencing and lighting infrastructure. Insects and spiders would provide a food source to birds and bats, potentially attracting them to the area.

The open water areas created by the reservoirs could also attract ground-dwelling species, including small prey species and elk and deer to a potential water source. The Applicant's draft WMP includes wildlife deterrents for the reservoirs such as fences around the edges of the reservoirs that would likely deter larger mammals. Floating shade balls in the reservoir open water areas are also proposed as a mitigation measure by the Applicant to help deter birds, but no information is given in the Applicant's WMP on how

bats would be deterred (FFP 2020d). Because the unintentional creation of habitat by the proposed project would not result in ongoing or repeated disturbance of habitat that is critical to species viability, these types of indirect impacts would not be considered significant adverse impacts.

Although potential habitat would be unintentionally created by the proposed project, it would be less than ideal for use by terrestrial species, especially with implementation of the Applicant's draft WMP (Attachment 5). Surrounding undisturbed habitats, which are much more abundant, would likely be more attractive to wildlife in the project vicinity. Because the unintentional creation of habitat by the proposed project would not result in ongoing or repeated disturbance of habitat that is critical to species viability, these types of indirect impacts would not be considered significant adverse impacts.

Changes to air habitat in the study area could happen because of changes in topography, moisture, and temperature caused by the proposed project, including construction of the reservoirs. These changes to air habitat have the potential to cause indirect adverse effects on flying species, especially soaring raptors, that rely on consistent air habitat characteristics and function. A wind resource effects analysis conducted by the Applicant found that turbulence directly over the upper reservoir increased to 21.5 to 32.3 feet squared per seconds squared (ft^2/s^2 [2 to 3 m^2/s^2]; a measure of total kinetic energy based on changes in velocity) at 262 feet (80 meters) above the reservoir (ERM 2021). Based on this amount of change in turbulence, the analysis found there would be negligible changes to air habitat (ERM 2021). This level of turbulence is greater than current conditions at the location of the proposed reservoir, but consistent with turbulence over other nearby habitat features. Based on that determination, raptors that currently occupy the study area are not expected to have difficulty navigating in the changed air habitat conditions above the upper reservoir. Therefore, there would be no significant adverse impacts on air habitat.

The increased human activity in the study area with proposed project operations would decrease habitat quality for some species**.** Operation and maintenance of the proposed facility would produce periodic noise and vibration, primarily from the turbine-generator system and maintenance activities. Impacts from noise and vibration during operation would be substantially lower than construction noise and vibration impacts because there would be much less activity. The Applicant expects that background noise levels will not be elevated beyond 500 feet from project infrastructure (FFP 2020a).

The Applicant indicates they will minimize noise impacts to protect the rural setting that currently exists in the Columbia Gorge. Operational noise from the proposed project is expected to be negligible. It is likely that an alarm system will be used to alert bystanders to the start of pumping from one reservoir to the other. This will create a short-term local noise but will be an important safety feature and should not be mitigated (FFP 2020a). There is a potential for significant adverse indirect impacts on talus and cliff habitat if they can no longer support breeding raptors because of the proximity of human development and reduced prey availability. Such impacts could result in ongoing or repeated disturbance of habitat that is critical to species viability. The impact level would be dependent on the current presence of breeding raptors in this habitat determined during wildlife surveys.

Artificial lighting installed for proposed project operations may further reduce habitat connectivity by creating light barriers for some nocturnal species (Lacoeuilhe et al. 2014). In their 2020 FLA, the Applicant states that the lighting design for the proposed project would incorporate directional lighting, light hoods, and the use of low-pressure sodium bulbs or light emitting diode (LED) lighting to reduce casting light into adjacent undisturbed habitats (FFP 2020a). Operational devices to allow surface lighting in the central portion of the project area to be turned off at night are also being considered. If such designs are implemented, indirect impacts from reduced habitat connectivity between surrounding habitat types would occur due to the presence of the proposed project and the potential for edge effects. Because the steep bluff between the two reservoirs would have little to no surface disturbance and the

relative abundance of undisturbed habitat in the vicinity of the proposed project, these types of indirect impacts would not result in ongoing or repeated disturbance of habitat that is critical to species viability. As a result, they would not be considered significant adverse impacts.

Special Status Habitats

As previously discussed, John Day Talus and Cliffs habitats in the study area may no longer support nesting raptors because of the permanent proximity of human development and reduced prey availability, which could be a significant adverse impact. Wildlife studies (proposed by the Applicant as part of the mitigation measures) would identify areas that are currently used for roosting, nesting, or foraging by culturally important or special status raptor species such as golden eagles, ferruginous hawks, and prairie falcons. To further address this impact, the Applicant has coordinated with WDFW and USFWS and proposes to acquire raptor foraging habitat in Klickitat County at a ratio of 1:1 for habitat area lost near the lower reservoir and at a ratio of 2:1 for habitat area lost near the upper reservoir (Rye 2021). With mitigation, the impact to prey raptor habitat is not expected to be a significant adverse impact.

Terrestrial Species

Plants

Under current conditions, invasive and noxious weed plant species are common in the lower reservoir area but less common in the upper reservoir area. Increased disturbance associated with operation of the proposed project (e.g., dust and vehicle traffic) could increase the opportunity for invasive plant species to become established and spread in the study area. An increased abundance of invasive species would also increase seed dispersal to surrounding habitats where invasive species could out-compete native plant species. The Applicant plans to implement a Noxious Weed Management Plan, as described in their draft VMMP (FFP 2020c), to reduce the potential for these indirect impacts. Therefore, this would not result in a significant adverse impact.

Mammals and Birds

Mammals and birds may be affected by loss, conversion, degradation, and fragmentation of habitats throughout the study area. Following construction, mammals and birds may continue to adapt to the changing habitat conditions or move into adjacent habitats in the project operational time frame.

Small mammals may be more greatly affected by the scale of habitat fragmentation, loss of travel corridors, or conversion, removal, or disturbance of particular habitat types in the study area. Over time, small populations that become isolated will die off. This could result in a minimal indirect impact on regionally common species of small mammals such as shrews, deer mouse, northern pocket gopher, Great Basin pocket mouse, and various species of voles.

Operation of the project could permanently reduce the density of small prey species in the study area, thereby affecting raptor species such as prairie falcons and golden eagles. Over time, the combined effect of increased ongoing disturbance and reduced prey resources could cause indirect permanent disruptions of normal behavior for golden eagles. Such disruptions could cause increased risk to overall species viability. Therefore, these types of indirect effects could result in a significant adverse impact. However, the Applicant has agreed to purchase and protect raptor foraging habitat to compensate for these indirect impacts, as described in Section 3.3.4. With mitigation, the impact to prey resources and foraging habitat is not expected to result in a significant adverse impact to golden eagles and other raptors.

Birds and bats that congregate around the open water areas of the reservoirs because of increased insect prey resources are more likely to experience a collision with existing project power lines or nearby wind turbines. Floating shade balls in the reservoir open water areas are proposed as a mitigation measure by the Applicant to help further deter birds. No state or federally endangered or threatened

species are expected to be among those that would congregate near the reservoirs. Therefore, this would not result in a significant adverse impact.

As described in Section 3.3.2, lighting infrastructure would be installed for project operations and the project would likely be lit 24-hours per day. Light pollution can have negative effects on migration, nighttime navigation, breeding behavior, and reproduction of songbirds (Kempenaers et al. 2010). Artificial light can reduce foraging ability for some bat species, especially those that tend to be more sensitive to habitat disturbance (Lacoeuilhe et al. 2014). Because most flying species would be able to avoid the study area, there would be no significant adverse impacts. Such indirect impacts may also be further reduced by implementation of the Applicant's proposed lighting design.

While many mammal species may become challenged by proposed project operations, less sensitive and more opportunistic species may come to thrive in the changing environment.

Reptiles

Similar to mammals and birds, snakes, lizards, and other reptiles potentially in the study area may continue to adapt to the changed habitat conditions of the proposed project operations or move into adjacent unimpacted habitats. Therefore, there would be no significant adverse impacts from operation of the proposed project on reptiles. No special status reptile species are documented to be present.

Invertebrates

Invertebrates would be subject to the same operational effects as other animal groups, including loss, conversion, degradation, and fragmentation of habitats throughout the study area. In addition to direct impacts from injury or killing of individual invertebrates during periodic vegetation management and removal, such actions could also indirectly affect invertebrates by reducing potential habitat. Over time, invertebrate communities in the study area may experience a shift towards generalist species or species affiliated with invasive plant species. Overall, there would be no significant adverse impacts on invertebrates from operation of the proposed project.

Special Status Species

Disturbance from project operations could increase establishment and seed dispersal of invasive plants, which could then out-compete native and rare plant species. This indirect impact could affect culturally important smooth desert parsley and other WDNR Heritage rare plant species with the potential to be present in the study area. State candidate golden eagles could experience indirect impacts ranging from permanent disruptions to normal behavior. Other special status raptors such as state sensitive bald eagle and state threatened endangered ferruginous hawk are no longer monitored, so it is unknown if they breed in the study area. State priority species little brown bat could experience increased mortality at nearby wind turbines if it is attracted to increased prey resources at the reservoir open water areas. If present, state threatened western gray squirrel could experience significant adverse impacts. However, with the implementation of the Applicant's proposed mitigation measures (see Section 3.3.4), there would be no significant adverse impacts on special status species from operation of the proposed project.

3.3.2.3 Conclusion

There is a potential significant adverse impact on John Day Talus and Cliff PHS habitat from operation of the proposed project if that habitat becomes unable to continue to support golden eagles, prairie falcons, and other raptors because of reduced prey availability or proximity to human activity. Such impacts could result in the ongoing or repeated disturbance of habitat that is critical to species viability. With mitigation, such as the Applicant's proposal to purchase of compensation raptor habitat, the impact would not be significant.

Impacts on other wildlife species from operations could include long-term and permanent disruptions of normal behavior. However, for non-special status species impacts would not be significant because they would not increase risk to species viability. There is potential for significant adverse indirect impacts on the western gray squirrel, if it is present, because of their state threatened status and isolated populations. However, with mitigation, there would be no significant adverse impacts on special status species from operation of the proposed project.

3.3.3 Required Permits

The following permits related to terrestrial species and habitats would be required for construction and operation of the proposed project:

- **Scientific Collection Permit (WDFW):** A scientific collection permit is required to salvage, move, or remove fish and wildlife species (including avian nests and eggs) for research, construction, and other purposes (Revised Code of Washington 77.32.240, WAC 220.200.150, and WAC 220.450.030).
- **Eagle Incidental Take Permit (USFWS):** This permit is needed if take of golden eagles cannot practicably be avoided in the course of an otherwise lawful activity. Most take authorized under this permit is in the form of disturbance (Code of Federal Regulations 50.22.26, USFWS Form 3-200-71). Disturbance would be most likely to occur during heavy equipment operation or drilling and blasting related to construction, as described in the Applicant's draft WMP.

3.3.4 Proposed Mitigation Measures

This section proposes mitigation actions based on the significant adverse impacts from the proposed project described in Sections 3.3.1 and 3.3.2. Proposed mitigation is intended to be specific to the impact addressed and includes measures to avoid, minimize, rectify, reduce, or compensate for lost resources and functions. Mitigation measures to address impacts may require coordination and consultation with the Washington Department of Ecology (Ecology), Tribes, and other state and federal agencies (e.g., WDFW, USFWS). Specific mitigation actions would be confirmed during project permitting.

Permit-Required Mitigation Measures

An Eagle Incidental Take Permit may be required if disturbance to golden eagles cannot be avoided and if impacts are determined to constitute "take" under the Bald and Golden Eagle Act. Mitigation measures may be recommended by USFWS during review of an Incidental Take Permit, and compensatory mitigation may be required to ensure the preservation of the affected species. Required mitigation may include measures that lead to an equal or greater increase in the species population.

Applicant-Proposed Mitigation Measures

The Applicant proposed several mitigation measures to reduce impacts on terrestrial species and habitats in their draft VMMP (FFP 2020c; Attachment 4) and draft WMP (FFP 2020d; Attachment 5). Drafts of the VMMP and WMP were developed in coordination with USFWS, WDFW, and Oregon Department of Fish and Wildlife and are being revised in coordination with those agencies. Once finalized, those plans will be included as articles of the FERC license and will be enforced with other license requirements. The mitigation measures proposed in the draft VMMP and WMP and the intent of those measures are summarized in Tables 6 and 7. Applicant-proposed mitigation is generally intended to be specific to the impact addressed and includes measures to avoid, minimize, rectify, reduce, or compensate for lost resources and functions.

Proposed revisions to the measures in the draft VMMP and WMP for terrestrial species and habitats are also provided in a section after Tables 6 and 7, and Section 4.6.2.3 of the Draft EIS provides expected revisions to the WMP for aquatic species and habitats.

Table 6
Summary of Proposed Mitigation Measures in the Applicant's Draft Vegetation Management and Monitoring Plan

PROJECT PHASE	PROPOSED MITIGATION MEASURE	BRIEF DESCRIPTION	MITIGATION INTENT
Pre-construction	Noxious Weed Survey and Invasive Plant Control Plan	• Conduct a pre-construction invasive plant survey to establish baseline conditions for noxious weed and invasive plants in the project area • Develop a list of target species to be surveyed and mapped in the project area • Develop a comprehensive noxious weed/invasive plant control plan that includes the identification of control methods and revegetation practices	• Reduce the spread of noxious weeds and invasive species both within and adjacent to the project area
Construction	Noxious Weed Management	• Provide training to increase worker awareness and identification of noxious weed/invasive plants, procedures for reporting and confirming infestations, and prevention/control measures • Treat existing noxious weed/invasive plant infestations prior to performing construction and maintenance activities • Clean machinery and equipment to remove potential noxious weed/invasive plant seeds, especially when transferring equipment between the upper and lower portions of the study area • Minimize disturbance of existing native vegetation and avoid disturbance of vegetation in sensitive areas • Reseed disturbed areas with native plant seed mix developed in coordination with WDFW • Use certified weed-free hay, straw, and topsoil for construction activities where possible	• Reduce the spread of noxious weeds and invasive species both within and adjacent to the project area
	Protection of Native Vegetation	• Control noxious weeds and invasive plants using the best management practices identified in the Noxious Weed/Invasive Plant Control Plan • Flag or fence areas containing sensitive plants • Designate specific areas for work activities, access, and equipment movement	• Avoid and minimize disturbance to native and sensitive plant communities
	Revegetation of Temporary Disturbance Areas	• Reseed any vegetated area that is temporarily disturbed by construction activities • Prepare native seed mix appropriate for project area in coordination with WDFW and additional guidance from other agencies (e.g., U.S. Bureau of Land Management)	• Restore areas of soil disturbance with native vegetation to prevent/reduce erosion and to reduce/prevent recolonization by noxious weeds or invasive species

PROJECT PHASE	PROPOSED MITIGATION MEASURE	BRIEF DESCRIPTION	MITIGATION INTENT
Operation	Noxious Weed Management	• Manage noxious weeds per the Noxious Weed/Invasive Plant Control Plan • Monitor revegetated areas for compliance with performance standards • Replant and/or amend areas where vegetation is not meeting performance standards • Avoid new areas of vegetation disturbance	• Reduce the spread of noxious weeds and invasive species both within and adjacent to the project area
	Grazing Control for New Plantings	• Install protective enclosures (e.g., wire cages, rigid protection tubes) on planted trees and shrubs to prevent/reduce grazing damage from wildlife such as deer, antelope, and elk	• Ensure viability of native woody plantings to support the reestablishment of wildlife habitat
	Restored Area Monitoring	• Perform a minimum of 5 years of annual monitoring of restoration plantings for compliance with performance standards • Maintain planted areas to control noxious weeds/invasive species and grazing control measures • Consult with agency stakeholders and landowners on revegetation program • Establish reference plots in adjacent native habitats that will not be disturbed by the project to provide a reference for comparing revegetation success • Monitor any areas where reseeding occurs for germination and establishment success • Document area of erosion • Monitoring noxious weed/invasive species and identify appropriate treatment methods	• Restore disturbed areas to provide native vegetation that supports terrestrial habitat and species including special status species

Source: FFP 2020c

Table 7
Summary of Proposed Mitigation Measures in the Applicant's Draft Wildlife Management Plan

PROJECT PHASE	PROPOSED MITIGATION MEASURE	DESCRIPTION	MITIGATION INTENT
Pre-construction	Raptor Nest Surveys and Monitoring	• Conduct pre-construction surveys to identify and locate raptor (bald eagle, golden eagle, and prairie falcon) nests based on historically documented nest locations and all areas of suitable nesting habitat within 1-mile of the project area • Focus golden eagle and prairie falcon surveys on historically documented nest locations near the project area • Perform occupancy surveys for identified nests for two consecutive breeding seasons prior to initiating construction with a third survey performed during the summer to evaluate nest productivity • Develop mitigation measures and nest protection measures in coordination with USFWS, WDFW, and Oregon Department of Fish and Wildlife	• Provide essential information for avoiding and reducing disturbance and other forms of take of raptors including golden eagle, prairie falcon, and bald eagle • Inform mitigation decisions
	Bald Eagle Winter Roost Surveys	• Conduct pre-construction winter roost surveys in all suitable roosting habitat in the study area between December and February to identify and document bald eagle communal winter roost sites	• Inform the development of measures to avoid or minimize construction and operations impacts on bald eagle winter roost sites
	Literature Review	• Conduct a literature review to collect information on migratory bird and bat impacts from the operation of pumped storage projects adjacent to wind turbines	• Inform the development of measures to reduce the attractiveness of the future reservoirs to migratory birds and bats
Construction	Flagging/Fencing Construction Zone Limits	• Placement of flagging and/or fencing around the limits of the construction zone and boundaries of adjacent sensitive areas	• Alert workers to the presence of potential sensitive areas in the vicinity of the project area • Reduce the potential for construction disturbance of sensitive areas (e.g., high quality native plant communities, priority habitats) designated for preservation
	Construction Activity Work Window	• Limit construction activities to the hours between 8:00 a.m. and 6:00 p.m.	• Avoid disrupting crepuscular foraging activity by species such as ungulates and raptors (e.g., owls) and minimize disturbance of nocturnal wildlife activity

PROJECT PHASE	PROPOSED MITIGATION MEASURE	DESCRIPTION	MITIGATION INTENT
Construction	Noise Control	• Limit construction during nesting and breeding periods, and concentrate construction activities with the loudest noise potential to occur outside of critical nesting periods • Prohibit on- and near-surface blasting and helicopter use within 0.25 to 1 mile of active nest sites (when feasible) • Avoid blasting within 0.5 mile of active golden eagle nests • Refine spatial noise control buffer using site-specific studies and consultation with a knowledgeable area biologist • Conduct high noise activities simultaneously when feasible • Equip noise-producing equipment with mufflers or other types of noise control features when possible	• Reduce disturbance on nesting raptors and other wildlife in the vicinity of the project area
	Raptor-Safe Transmission Line Construction Methods	• Implement standards and guidelines from Avian Power Line Interaction Committee and the Electrocution Mitigation Basics protection, mitigation, and enhancement measures during construction of power transmission lines • Install visibility enhancement devices (e.g., marker balls, bird diverters) on transmission line wires • Ensure transmission lines are sited on existing poles to maintain appropriate clearance between energized conductors and grounded hardware	• Minimize risk of electrocution and collision mortality to raptors that contact the project's power transmission lines
	Biological Monitor	• Employ a biological monitor to check construction sites to ensure protected areas are not disturbed and protective measures (e.g., flagging fencing) are intact, inspect open construction pits daily to ensure animal safety, and verify that open pits are closed, temporarily fenced, or covered each evening	• Ensure that construction mitigation measures are being properly implemented and maintained • Identify potential problems with construction mitigation measures so that they can be rectified before impacts on wildlife or sensitive areas occur
	Biological Training Program	• Provide environmental training on sensitive biological resources associated with the project to construction workers, contractors, and future project operations employees	• Develop awareness of the sensitive biological resources in the project area and vicinity so that workers can identify potential impacts on those resources and the means to avoid and/or minimize such impacts

Construction	Habitat Loss Management	• Use existing roads and previously developed lands for majority of project features and construction activities • Purchase an off-site property for compensatory mitigation for wildlife habitat impacts (i.e., golden eagle) at a 2:1 mitigation ratio for habitat impacts in the upper reservoir area and a 1:1 ratio for habitat impacts the lower reservoir area	• Avoid/minimize impacts on on-site habitats • Provide compensatory mitigation for wildlife habitat loss
	Traffic Management Plan	• Set appropriate speed limits for the project area to minimize collisions with wildlife • Control dust and erosion to limit changes in air quality and visibility • Establish controlled/limited construction access routes to reduce potential for collisions • Install appropriate signage and other features (e.g., speed bumps, flaggers) to notify recreation users of construction work and to direct traffic as needed	• Avoid minimize wildlife and individual injuries/fatalities from vehicle activity
Operation	Carcass Removal Program	• Monitor and remove carcasses of livestock, big game, and other animals from the project area	• Reduce presence of scavenging wildlife, foraging eagles, and other raptors in the project site by removing potential attractants
	Wildlife Deterrents for Reservoirs	• Install floating plastic shade balls and wildlife exclusion fencing in and around the reservoirs • Monitor bird usage of the reservoirs • Manage vegetation adjacent to reservoirs • Install fences, riprap, or cement around edges of reservoirs • Implement bird hazing techniques (if necessary) • Install physical barriers (e.g., low-current shocking wires/strips, modified reservoir edge habitat) • Reduce potential forage around reservoirs • Mark fences associated with the project with vinyl strips and/or reflective tape	• Discourage migratory birds and other wildlife from using the reservoirs • Reduce potential attractants to mammals that are potential raptor prey species • Continue to evaluate the effectiveness of bird and wildlife deterrents; implement adaptive management if unsuccessful • Reduce risks of avian collision with project structures
	Wildlife Incident Reporting System	• Develop wildlife incident reporting system that accompanies the USFWS Injury and Mortality Reporting System • Report incidents of wildlife mortality, injuries, nuisance activity, and other interactions • Report eagle injuries or mortalities immediate to USFWS and WDFW	• Identify ongoing project impacts on wildlife • Identify modified or additional project conservation measures to protect wildlife from harm

PROJECT PHASE	PROPOSED MITIGATION MEASURE	DESCRIPTION	MITIGATION INTENT
Operation	Dust Palliatives	• Apply dust palliatives or suppressants to all unpaved roads	• Reduce dust clouds from vehicle use that could disturb wildlife or reduce forage quality in the project vicinity
	Light Pollution Management	• Implement artificial light pollution control measures (e.g., use warm-colored LED lights; install shield to limit glare and illumination area; turn off unnecessary lights at night)	• Reduce attraction of insects to reservoir areas, which may draw bats and nocturnal birds seeking prey • Reduce potential disorienting effects of light on migrating and or nocturnal birds • Reduce potential disturbances to songbird breeding and reproductive behavior
	WMP Reporting	• Submission of annual reports throughout the construction period and during the first 3 years of property operation to document monitor results, implementation and success of mitigation measures, and any proposed changes to the WMP (e.g., additional mitigation measures)	• Reduce impact to avian and other wildlife species by continuing to evaluation wildlife usage of the project area and the effectiveness of the mitigation measures

Source: FFP 2020d

WDFW-Proposed Mitigation Measures

WDFW proposes the following additional mitigation measures to help identify and mitigate for impacts to terrestrial species and habitats. Ecology supports these additional measures, which are expected to be included in revisions to the WMP through ongoing agency coordination:

- **Peregrine Falcon Measures.** WDFW proposes adding peregrine falcons to the list of raptors (which currently includes bald eagle, golden eagle, and prairie falcon) covered by surveys, monitoring, and conservation and mitigation measures in the WMP.
- **Raptor Monitoring During Proposed Project Operations.** Raptor monitoring is not currently included in the WMP for operations (i.e., past the construction period) but is expected to be included in revisions to the WMP through agency coordination. Monitoring during proposed project operations would be used to evaluate the effectiveness of ongoing mitigation measures for the protection of raptors, nests, and foraging habitat. Ongoing monitoring results would continue to inform the development of specific mitigation and protection measures.
- **Focused Raptor Mitigation and Protection.** Raptor monitoring during pre-construction, construction, and operation of the proposed project would be used to inform the development of specific raptor mitigation measures (e.g., spatial and temporal work restrictions based on documented nest locations and sensitive species timing needs) and general nest protection measures in consultation with USFWS, WDFW, and Oregon Department of Fish and Wildlife.
- **Pre-Construction Bat Surveys.** To address the lack of survey information on bats in the project area, pre-construction bat surveys are recommended to identify those bat species present in the study area and how bats are using the study area (e.g., foraging, roosting, hibernacula).
- **Post-Construction Bat Surveys.** Use of year-round acoustic monitoring is recommended to determine if bats are attracted to the reservoirs by nighttime insect activity, water, or other factors, and whether the proposed use of floating shade balls is effective in deterring bat foraging above the reservoirs. Surveys will also help to determine if bats are colliding with aboveground structures or if there are incidents of bats drowning in the reservoirs.
- **Implementation of Bat Deterrent Measures.** If monitoring shows that bats are attracted to the reservoirs, then implementation of bat deterrent measures (e.g., acoustic deterrents such as those used at wind projects) is recommended.

In addition to the WDFW-proposed changes to the WMP noted above to help identify and mitigate for impacts to terrestrial species and habitats, additions to the WMP are also identified in the *Aquatic Species and Habitats Resource Analysis Report* (Appendix F of the EIS) and Section 4.6.2.3 of the Draft EIS for aquatic species and habitats.

3.3.5 Significant and Unavoidable Adverse Impacts

Construction was determined to include temporary significant adverse impacts from degradation of John Day Talus and cliff/slope mixed pine forest (Priority Habitat and Species mapped as Oak/Pine Mixed Forest) between the lower and upper reservoirs. It was also determined that construction could result in significant adverse impacts through temporary disturbance of golden eagles, which would constitute "take" under the Bald and Golden Eagle Act, or temporary disturbance of other state priority species.

Proposed project operations were determined to include potential significant adverse impacts to John Day Talus and Cliffs habitats that may no longer support nesting raptors. Operations could also have indirect significant adverse impacts to raptor species, such as prairie falcons and golden eagles, and indirect significant impacts to state threatened western gray squirrel.

However, mitigation specific to these impacts is proposed and includes measures to avoid, minimize, rectify, reduce, or compensate for lost resources and functions. Through compliance with laws and with implementation of the mitigation measures described in Section 3.3.4, there would be no significant and unavoidable adverse impacts related to terrestrial species and habitats from construction or operation of the proposed project.

3.4 No Action Alternative

The No Action Alternative represents the future habitat conditions within the study area in the absence of implementing the proposed project. Public Utility District No. 1 of Klickitat County would continue to hold the existing water right, which may be held in trust or sold to other purchasers of water. The wind energy project and other existing energy infrastructure in the study area would continue to be operated. Investigation of contamination and development of cleanup actions on the Columbia Gorge Aluminum cleanup site would continue through a separate Model Toxics Control Act cleanup process.

In the absence of the proposed project fully removing the West Surface Impoundment (WSI), it is unknown what cleanup action would be required for the WSI through the full site cleanup process, which is underway. For purposes of evaluating the No Action Alternative, it is assumed that the WSI would remain intact and continue to be monitored and maintained under the existing closure plan. However, the WSI would remain within the ongoing Model Toxics Control Act cleanup process for the smelter site and could be subject to additional remedial actions potentially requiring long-term stewardship measures, monitoring, and land-use restrictions that would be expected to be part of the cleanup plan.

3.4.1 Terrestrial Habitat

Under the No Action Alternative, the study area would be expected to continue to support the current terrestrial habitats. A cleanup action could improve overall conditions for upland habitat, removal of invasive species, and creating, restoring, and enhancing wetlands and sensitive habitats, but could involve impacts to existing vegetation and increased noise and vibration that could lead to additional direct and indirect impacts. Overall, the No Action Alternative would not be expected to result in a significant adverse impact on terrestrial habitats and would be mitigated by the requirements of existing state regulatory programs and policies.

3.4.2 Terrestrial Species

Under the No Action Alternative, the study area would be expected to continue to support the current terrestrial species. A cleanup action could improve overall conditions for wildlife and their habitats, but could involve impacts to existing vegetation and increased noise and vibration that could lead to additional direct and indirect impacts on plants, mammals, reptiles, invertebrates, and special status species. Wildlife species that are less tolerant of human activity, that require larger areas of continuous habitat, or that require darkness for nighttime navigation could experience impacts during construction of a cleanup action. No impacts are expected to occur that would cause increased risks to overall species viability or increase the need for federal or state listing of a species. Through compliance with laws and with implementation of appropriately determined mitigation measures, there would be no significant adverse impacts related to terrestrial species from the No Action Alternative.

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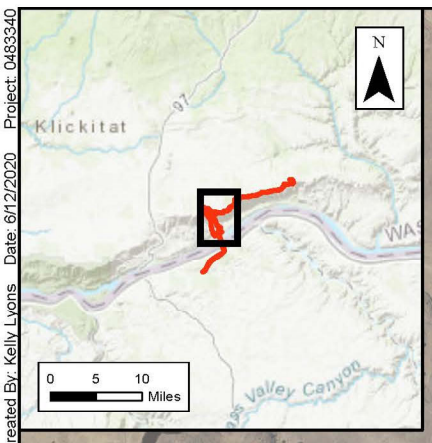
Attachment 1
Washington NHP Habitat Types

Source: FFP 2020b

Project: 0483340 Date: 6/12/2020 Created By: Kelly Lyons



Willis Rd

Columbia Plateau Scabland Shrubland
Columbia Plateau Steppe and Grassland
Columbia Plateau Western Juniper Woodland and Savanna
Inter-Mountain Basins Big-Sagebrush Steppe
Inter-Mountain Basins Cliff and Canyon
Introduced Upland Vegetation – Annual Grassland
Introduced Upland Vegetation – Annual Grassland with Rock Outcroppings
Introduced/Invasive Wooded
Wetland
Developed/Disturbed

VEG-1
VEG-2
VEG-3
VEG-4
VEG-5
VEG-6
VEG-7
VEG-8
VEG-9

Upper Reservoir Outer Berm
Upper Reservoir
Headrace Tunnel
Powerhouse
Access Tunnel
Multi-Use Tunnel
Tailrace Tunnel
Water Supply Valve House
Lower Reservoir
Lomatium laevigatum
Substation
John Day Dam Rd
John Day Reservoir
WASHINGTON
OREGON
14

0 1,500 3,000
Feet

Legend

- 2015 Observation Point
- Rare & Imperiled Species and Plant Communities (WNHP)
- Project Boundary

Proposed Infrastructure

- Access Road
- High Voltage Cable
- Transmission Line
- Transmission Co-Located with Existing BPA ROW
- Existing Access Road
- Proposed Reservoir
- Proposed Reservoir Berm Outer Slope
- Laydown Area
- Powerhouse
- Substation
- Water Supply Valve House
- Access Tunnel
- Access Tunnel Portal
- Headrace/Tailrace Tunnel

Figure 3.3-1
Vegetation Cover Types
Final License Application
Goldendale Energy Storage Project
Goldendale, WA

Environmental Resources Management
www.erm.com
ERM

FILE: M:\Projects\Goldendale Energy Storage Project\maps\FLA 2020\Figure 3.3-1 Vegetation Cover.mxd | REVISED: 06/12/2020 | SCALE: 1:18,000 when printed at 11x17

Source: National Agricultural Imagery Program, July 2017, flown 1m per pixel; NAD 1983 StatePlane Washington South FIPS 4602 Feet

Attachment 2
Terrestrial Species Lists

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Tall agoseris	*Agoseris elata or Aoseris x elata*	G4, S3?	S	-	Regional Endemic; Meadows, prairies, open woods, and exposed rocky ridges with various aspects, from low elevation to timberline	No
Grand redstem	*Ammannia robusta or Ammannia coccinea*	G5, S1	S	-	Sparse; Shoreline and islands along the Columbia River, in riparian mudflats dominated by annual species	No
Gray's broomrape	*Aphyllon californicum var. grayanum or Orobanche grayana or Orobanche californica ssp. grayana*	G4T3T4, S1	E	-	Peripheral; Vernally moist meadows and lower montane meadows, parasitic on sagebrush	Potentially present but not observed during botanical or cultural survey
Wormskiold's northern wormwood	*Artemisia campestris var. wormskioldii or Artemisia campestris ssp. borealis var. wormskioldii*	G5T1, S1	E	-	Regional Endemic; Arid shrub steppe on basalt, usually flat terrain, floodplain of Columbia River	Potentially present but not observed during botanical or cultural survey
Palouse milkvetch	*Astragalus arrectus or Astragalus palousensis*	G2G4, S2	T	-	Regional Endemic; Grassy hillsides, sagebrush flats, river bluffs, and grassy or shrub-dominated openings of ponderosa pine and Douglas-fir forests	No
Transparent milkvetch	*Astragalus diaphanus*	G4, SX	Extirp	-	Regional Endemic; Sandy or gravelly soils on gravel bars, alluvial slopes, and overlying basaltic rocks	No
Pauper milkvetch	*Astragalus misellus var. pauper or Astragalus howellii var. pauper*	G3T3, S2	T	-	Regional Endemic; On open ridgetops and gentle upper slopes, rarely middle and lower slopes, mostly along the western margin of the Columbia Basin province	No
Ames' milkvetch	*Astragalus pulsiferae var. suksdorfii*	G4T2, S1	E	-	Disjunct; Open ponderosa pine forests with antelope bitterbrush, on generally flat or very gentle terrain in coarse-textured substrates	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Texas bergia	*Bergia texana*	G5, SX	Extirp	-	Peripheral; Muddy or sandy shores and flats along rivers, lakes, reservoirs, and ponds	No
Prostrate povertyweed	*Blitum spathulatum or Monolepis spathulata*	G5, S1	S	-	Peripheral; Moist streambanks and meadows, often associated with alkaline soils	No
Redblack rockcress	*Boechera atrorubens or Arabis sparsiflora var. atrorubens*	G5T3, S1	E	-	Regional Endemic; Rocky sagebrush slopes and rimrock and vernally moist swales with camas.	No
Oregon bolandra	*Bolandra oregana*	G3, S2	T	-	Regional Endemic; Low-elevation sites along the Columbia River drainage; usually near streams or on cliffs near waterfalls in moist, wooded, rocky places in deep shade	No
Long-bearded mariposa lily	*Calochortus longebarbatus var. longebarbatus*	G4T3, S3	S	-	Regional Endemic; Open areas in vernally moist meadows, forest-meadow edges, and semiopen areas within coniferous woods	No
Cusick's camas	*Camassia cusickii*	G4, S1	S	-	Regional Endemic; Basalt cliffs associated with seeps at an elevation of ca. 150 meters (500 feet)	No
Northern beaked sedge	*Carex rostrata (sensu stricto)*	G5, S2	S	-	Sparse; Fens, quaking or floating peat, lake and stream shores, wet meadows; often in shallow water or on floating mats	No
Slender broom sedge	*Carex tenera var. tenera or Carex tenera var. tenera*	G5T5, S2	S	-	Sparse; Dry to moist meadows, open forests, shrub wetlands, and lake shores.	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Weak thistle	*Cirsium remotifolium var. remotifolium*	G5TNR [T3], S1	E	-	Peripheral; Moist meadows, streamsides, rock outcrops, prairies, and transition zone between forests and meadows or balds	No
Few-flowered collinsia	*Collinsia sparsiflora var. sparsiflora or Collinsia sparsiflora var. bruceae*	G4T4, S1	S	-	Peripheral; Thin soils over basalt on almost flat to steep, generally south-facing slopes; moist in spring, but becoming dry by summer	Potentially present but not observed during botanical or cultural survey
Hairy bugseed	*Corispermum villosum*	G4?, S2	S	-	Sparse; Shifting sand dunes with sand derived from coarse basalt, with scattered shrubs or bunchgrasses and vegetative cover of less than 10%	No
Idaho hawksbeard	*Crepis bakeri (var. idahoens is no longer recognized)*	G4, S1	S	-	Regional Endemic; Bluebunch wheatgrass grasslands on rocky slopes with basalt outcrops (may also be on calcareous soils), roadside ditches and shoulders	No
Gray cryptantha	*Cryptantha leucophaea or Oreocarya leucophaea*	G2G3, S2	T	-	Regional Endemic; Sandy substrates, especially sand dunes that have not been completely stabilized	No
Beaked cryptantha	*Cryptantha rostellata (some authors include C. flaccida)*	G4, S2	S	-	Regional Endemic; Usually in scattered patches of a few individuals along dry, open drainages	No
Snake River cryptantha	*Cryptantha spiculifera or Oreocarya spiculifera*	G4?, S2S3	S	-	Sparse; Dry, open, flat, or sloping areas in stable or stony soils, with low vegetative cover	No
Douglas' draba	*Cusickiella douglasii or Draba douglasii*	G4G5, S1	S	-	Peripheral; Windswept rocky ridges, granitic rock screes, loose volcanic hillsides, red barren hills, rocky flats, and serpentine ridges	Potentially present but not observed during botanical or cultural survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Fringed water-plantain	*Damasonium californicum or Machaerocarpus californicus*	G4, S1	S	-	Peripheral; Damp ground, in and near water of shallow ponds, vernal pools, intermittent streams, sloughs, and mud flats at low elevations	No
Nesom's monkeyflower	*Diplacus cusickioides or Diplacus cusickii (misapplied) or Mimulus cusickii (misapplied)*	G4G5, S1	S	-	Peripheral; Arid regions, including bottomlands, basalt-derived scree in hot canyon bottoms, volcanic pumice, and sand dunes	No
Smallflower mooncup	*Eremothera minor or Camissonia minor*	G4, S2	S	-	Sparse; Gravelly basalt slopes, sandy and alkaline soils, and dry rocky hillsides; often with considerable cover of bare soil	No
Oregon coyote-thistle	*Eryngium petiolatum*	G4, S2	S	-	Regional Endemic; An obligate wetland species of wet prairies, swales, shallow ditches, and low ground	No
Liverwort monkeyflower	*Erythranthe jungermannioides or Mimulus jungermannioides*	G3, SH	Extirp	-	Regional Endemic; Moist basalt crevices and seeps in vertical cliff faces and canyon walls	No
Candelabrum monkeyflower	*Erythranthe pulsiferae or Mimulus pulsiferae*	G4?, S2	S	-	Sparse; Seasonally wet or moist open areas; often in exposed mineral soil or in grass/forb openings in ponderosa pine, Douglas-fir, and Oregon white oak forests	No
Suksdorf's monkeyflower	*Erythranthe suksdorfii or Mimulus suksdorfii*	G4, S2S3	S	-	Sparse; Open, moist or dry places, from valleys and foothills to moderate or occasionally high elevations in the mountains	No
Washington monkeyflower	*Erythranthe washingtonensis or Mimulus washingtonensis*	G4, S1	S	-	Regional Endemic; In Oregon known from wet basaltic cobbles; historical Washington collections are from low-elevation, wet, open places	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Common bluecup	*Githopsis specularioides*	G5, S2S3	S	-	Sparse; Dry, open places at lower elevations, such as thin soils over bedrock outcrops, grassy balds, talus slopes, and gravelly prairies	Potentially present but not observed during botanical or cultural survey
Diffuse stickseed	*Hackelia diffusa var. diffusa*	G4T3, S2	T	-	Regional Endemic; Bottoms of mossy talus and scree slopes, shaded areas, cliffs, roadsides, and other disturbed sites	
Nuttall's quillwort	*Isoetes nuttallii*	G4?, S2	S	-	Sparse; Terrestrial in seasonally wet ground, seepages, temporary streams, and mud near vernal pools	Potentially present but not observed during botanical or cultural survey
Dwarf rush	*Juncus hemiendytus var. hemiendytus*	G5T5, S1	S	-	Peripheral; Mud flats, edges of vernal pools, and moist to wet meadows	No
Kellogg's rush	*Juncus kelloggii*	G3?, S1	E	-	Peripheral; Sandy to clayey damp soils in a variety of habitats, such as vernal pools, seepage areas, and low spots in fields and meadows	No
Inch-high rush	*Juncus uncialis*	G3G4, S2	T	-	Sparse; Vernal pools and pond edges, often in channeled scablands, or biscuit-swale topography	Potentially present but not observed during botanical or cultural survey
Smooth goldfields	*Lasthenia glaberrima*	G5, S1	S	-	Peripheral; Margins of vernal pools, wet or muddy stream banks, wetlands, and winter-flooded meadows	Potentially present but not observed during botanical or cultural survey
Bolander's linanthus	*Leptosiphon bolanderi or Linanthus bakeri*	G4G5, S2	S	-	Peripheral; Dry, rocky places and open or partially vegetated slopes with scattered basalt rocks	Potentially present but not observed during botanical or cultural survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Yellow wildrye	*Leymus flavescens or Elymus flavescens*	G4[G3], S1	E	-	Regional Endemic; Shifting sand dunes and disturbed sandy areas along ditches or road banks; some populations are found along riverbanks	No
Loesel's twayblade	*Liparis loeselii*	G5, S1	S		Disjunct; Springs, bogs, wetlands, and wet sunny places in Douglas-fir forests	No
Awned halfchaff sedge	*Lipocarpha aristulata or Hemicarpha aristulata or Hemicarpha intermedia*	G5?, S1S2	S	-	Disjunct; Wet soil and mud, often comprised of fine sand and silt, in bottomlands, sandbars, beaches, shorelines, stream banks, ponds, and ditches	No
Klickitat biscuitroot	*Lomatium klickitatense (previously included in Lomatium grayi)*	G2G3, S2	T	-	Local Endemic; Found on roadcuts and cliffs of reddish brown volcanic bedrock and adjacent west or south-facing weathered basalt clay or silty loam slopes and meadows	No
Basalt biscuitroot (Smooth Desert Parsley)	*Lomatium laevigatum*	G3, S2S3	T	-	Local Endemic; Ledges and crevices of basalt cliffs along the Columbia River and adjacent rocky slopes of sagebrush steppe	Potentially present and observed during cultural survey but not overserved during botanical survey
Suksdorf's biscuitroot	*Lomatium suksdorfii*	G3, S3	S	-	Local Endemic; Semiopen to open, dry, rocky hillsides on moderate to steep slopes at elevation of 90 to 1100 meters (300-3,600 feet)	Potentially present but not observed during botanical or cultural survey
Ribseed biscuitroot	*Lomatium tamanitchii or Lomatium packardiae var. tamanitchii*	G2, S2	T	-	Local Endemic; Occurs on hardened, silica-rich volcanic ash layers within water-reworked deposits of volcanic basalt on plateau tops and gentle, often southerly slopes	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
White meconella	*Meconella oregana*	G2, S1	E	-	Regional Endemic; Primarily in open grassland; sometimes within a mosaic of forest and grassland on gradual to almost 100% slopes	No
Downy false-monkeyflower	*Mimetanthe pilosa or Mimulus pilosus*	G5, S1	S	-	Sparse; Gravelly or sandy, seasonally moist openings, creek beds, or riverbanks, often on fine gravel or sand	No
Branched montia	*Montia diffusa*	G4, S1S2	S	-	Regional Endemic; Moist forests and open fir woodlands in the lowland and lower montane zones; occasionally in xeric soil or disturbed sites	No
Foxtail mousetail	*Myosurus alopecuroides or Myosurus clavicaulis or Myosurus minimus var. clavicaulis*	G3?, S2	T	-	Sparse; An obligate vernal pool species; found on hard, bare, desiccated clay, in sparsely vegetated areas of shallow pools	No
Vernal pool mousetail	*Myosurus sessilis*	GNR [G2], S1	E	-	Peripheral; Rangewide, found in vernal pools and alkali flats. In Washington, found along the edge of seasonally wet cattle ponds	No
Marigold pincushion-plant	*Navarretia tagetina*	G5, S1	S	-	Peripheral; Open, rocky places, scablands, vernal pools, grasslands and stony washes; with standing water or saturated soil in early spring, becoming completely dry in summer	No
Coyote tobacco	*Nicotiana attenuata*	G4, S2	S	-	Sparse; Dry sandy bottomlands, rocky washes, and other dry, open places	No
Tufted evening-primrose	*Oenothera cespitosa ssp. Cespitosa*	G5T5, S2	S	-	Peripheral; Open sagebrush desert; on loose talus, steep sandy or gravelly slopes, the flat terrace of the Columbia River, roadcuts, and other exposed sites	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Tufted evening-primrose	*Oenothera cespitosa ssp. Marginata*	G5T3T5, S1	S	-	Peripheral; Dry hills, rocky slopes, and exposed dry washes in open grasslands	No
Adder's-tongue	*Ophioglossum pusillum*	G5, S2	S	-	Sparse; Seasonally wet areas in pastures, old fields, roadside ditches, bogs, fens, wet meadows, flood plains, moist woods, grassy swales, dry or damp sand, dry hillsides, and in seasonally wet, acidic soil	No
Rosy owl's-clover	*Orthocarpus bracteosus*	G3?, S2	T	-	Regional Endemic; Moist meadows in the transition zone between wetland and upland; they are dominated by grasses and forbs and in full sunlight with little to no shrub or tree cover	No
Western yellow wood-sorrel	*Oxalis suksdorfii*	G4, SH	Extirp	-	Regional Endemic; Usually in meadows and moist forests; sometimes on dry open slopes or shrubby areas	No
Barrett's penstemon	*Penstemon barrettiae*	G2, S2	T	-	Local Endemic; Rocky substrates of basaltic origin, with little soil development, including crevices in basalt cliffs, ledges of rock outcrops, open talus, and occasionally well-drained roadsides	No
Hot-rock penstemon	*Penstemon deustus var. variabilis*	G5T2, S1	E	-	Regional Endemic; Dry foothills and lowlands, on open, dry, thin soils over basalt	Potentially present but not observed during botanical or cultural survey
Whited's fuzzy-tongue beardtongue	*Penstemon eriantherus var. whitedi*	G4G5T2, S2	T	-	Regional Endemic; West-facing slopes of small canyons, ridgetops, and dry rocky places in the foothills of the Cascades and in the Columbia Basin	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Whitebark pine	*Pinus albicaulis*	G3G4, S3	S	Prop T	Widespread; Found primarily at upper tree line in subalpine areas of higher mountains	No
Short-spurred plectritis	*Plectritis brachystemon or Plectritis congesta ssp. brachystemon*	G5?, S1	S	-	Sparse; Coastal bluffs, lowland prairies, and rocky balds surrounded by Douglas-fir and big-leaf maple forests	No
Parry's knotweed	*Polygonum parryi*	G4, S1	S	-	Peripheral; Vernally moist areas in otherwise dry habitats; open places with sandy, gravelly, or rocky soil	No
Newberry's cinquefoil	*Potentilla newberryi*	G3G4, SX	Extirp	-	Peripheral; Wetlands where there is some seasonal drying, such as dry lakeshores, vernal pools, water holes, and river shorelines	No
Downy buttercup	*Ranunculus hebecarpus*	G5, S1	S	-	Peripheral; Seasonally moist gravelly sites, vernal wetlands, shaded streamsides, and steep slopes with rocky outcrops and swales bordering Oregon white oak forests	No
Obscure buttercup	*Ranunculus triternatus or Ranunculus glaberrimus var. reconditus or Ranunculus reconditus*	G5T2, S1S2	E	-	Local Endemic; Meadow steppe habitat dominated by bunchgrasses and forbs.	Potentially present but not observed during botanical or cultural survey
Columbia yellowcress	*Rorippa columbiae*	G3, S1S2	T	-	Regional Endemic; Riverbanks, internally drained lakes with extended periods of dryness, wet meadows, and ditches	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Dwarf sandwort	*Sabulina pusilla or Arenaria pusilla or Minuartia pusilla or Alsine pusilla*	G5, S1	S	-	Sparse; Dry, sparsely vegetated, compacted orange basalt gravel within sagebrush communities and vernally wet areas	No
Soft-leaved willow	*Salix sessilifolia or Salix exigua var. sessilifolia*	G4?, S2	S	-	Regional Endemic; Wet lowland habitats, including silty or sandy riverbanks, riparian forests, dredge spoils, sandy beaches, and at the upper edge of an intertidal zone	No
Scribner's grass	*Scribneria bolanderi*	G4, S1	S	-	Peripheral; Dry, sandy to rocky soils, seepages, vernal pools, and sometimes along roadsides, from 500-2,990 meters (1,640-9,800 feet) rangewide	No
Pale blue-eyed grass	*Sisyrinchium sarmentosum or Sisyrinchium angustifolium*	G2, S2	T	-	Local Endemic; Seasonally moist grass/sedge meadows and small openings from 110-1,735 meters (365-5,700 feet)	No
Western ladies-tresses	*Spiranthes porrifolia or Spiranthes romanzoffiana var. porrifolia*	G4, S2	S	-	Sparse; Wet meadows, bogs, streams, and seepage slopes. Elevation in Washington: 3-2,075 meters (10-6,800 feet)	Potentially present but not observed during botanical or cultural survey
Flat-leaved bladderwort	*Utricularia intermedia*	G5, S2S3	S	-	Sparse; Shallow ponds, slow-moving streams, and wet sedge or rush meadows	No
Siskiyou false hellebore	*Veratrum insolitum*	G3, S1	E	-	Regional Endemic; Openings in thickets, moist meadows, stream banks, and mixed evergreen forest edges, at 0-1,500 meters (0-4,920 feet)	No

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Narrow-leaf mule's-ears	*Wyethia angustifolia*	G4, S1	S	-	Peripheral; Dry or seasonally wet open ground, grassy slopes, meadows, prairies, and openings in oak and pine-oak forests	No
Monterey centaury	*Zeltnera muehlenbergii or Centaurium muehlenbergii*	G5?, S1	S	-	Sparse; Seasonally moist areas, including the margins of reservoirs and receding shorelines, often on mossy soil	No
Yarrow	*Achillea millefolium*	-	-	-	Grows in wet to dry soil in meadows, open places, in all elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Tapertip onion	*Allium acuminatum*	-	-	-	Grows in open, usually rocky places below 6,000 feet	Potentially present and observed during cultural survey but not observed during botanical survey
Barestem biscuitroot	*Lomatium nudicaule*	-	-	-	Grows in open areas with dry rocky clay or sandy soils from near coastline to mid elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Nine-leaf biscuitroot	*Lomatium triturnatum*	-	-	-	Grows on open or sagebrush slopes, ridges, pine woodlands in vernal-wet spots, often in serpentine areas	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Pungent desert parsley	*Lomatium papilioniferum (L. grayi)*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Biscuit root	*Lomatium macrocarpum*	-	-	-	Grows in rocky slopes, woodlands, at low elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Fernleaf biscuitroot	*Lomatium dissectum*	-	-	-	Grows in wooded or brushy slopes, talus and steep rocky slopes, at low to high elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Arrowleaf balsamroot	*Balsamorhiza sagittata*	-	-	-	Grows in deep rich soils in ponderosa pine and sagebrush habitats, often in huge patches, at mid elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Black Hawthorne	*Crataegus spp. (C. suksdorfii or C. douglasii)*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Smooth sumac	*Rhus glabra*	-	-	-	Grows in disturbed soils and grasslands near water in dry areas	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Western juniper	*Juniperus occidentalis*	-	-	-	In Oregon and Washington found in elevations between 500 to 5,000 feet (150-1,500 meters) (OSU 2021)	Potentially present and observed during cultural survey but not observed during botanical survey
Ponderosa pine	*Pinus ponderosa*	-	-	-	In the Pacific Northwest it is most commonly found east of the Cascades, however in Oregon it is common in the western valleys of the Willamette, Umpqua, and Rogue Rivers (OSU 2021)	Potentially present and observed during cultural survey but not observed during botanical survey
Strict buckwheat	*Eriogonum strictum var. proliferun*	-	-	-	Grows in rocky places in shrublands, mountains, at low to high elevations (OSU 2021)	Potentially present and observed during cultural survey but not observed during botanical survey
Thyme-leaved buckwheat	*Eriogonum thymoides*	-	-	-	Grows in dry or rocky soils in sagebrush, on rocky ridges	Potentially present and observed during cultural survey but not observed during botanical survey
Arrowleaf buckwheat	*Erogonum compositum*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Columbia Gorge broad-leaf lupine	*Lupinus latifolius*	-	-	-	Grows in moist, open to shady woods and meadows	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Rubber rabbitbrush	*Ericameria nauseosa*	-	-	-	Grows in dry soils in many habitats below 10,500 feet	Potentially present and observed during cultural survey but not observed during botanical survey
Chocolate lily	*Fritillaria camschatcensis*	-	-	-	Grows in wet soils that never dry in coastal areas and rain forest	Potentially present and observed during cultural survey but not observed during botanical survey
Nootka rose	*Rosa nutkana*	-	-	-	Grows in moist flats at low to mid elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Brodiaea	*Triteleia hyacinthina*	-	-	-	Grows in spring-wet grasslands from coast to mid-elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Wavyleaf thistle	*Cirsium undulatum*	-	-	-	East-Side Forest, Shrub-Steppe, Meadow, grows in open dry areas at low to mid elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Slender hawksbeard	*Crepis atribarba*	-	-	-	Grows in dry, grassy, open areas, pine forests in steppe	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Northern mule-ears	*Wyethia amplexicailis*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Bitterroot	*Lewisia rediviva*	-	-	-	Grows in rocky soils in open places from just above sea level to alpine	Potentially present and observed during cultural survey but not observed during botanical survey
Common stork's-bill	*Erodium cicutarium*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Miner's lettuce	*Claytonia perfoliata*	-	-	-	Grows in spring-damp, often shady places in the south, open to shady places in the north, often on disturbed soils, from sea level to mid-elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Spreading dogbane	*Apocynum androsaemifolium*	-	-	-	Grows in rocky places, dry open areas in conifer forests and adjacent shrub-steppe and prairies, at low to subalpine elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Silver puffs	*Uropappus lindleyi*	-	-	-	Grows in loose soils in meadows, woods, steppe or deserts, at low and mid elevations	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

COMMON NAME	SPECIES NAME	HERITAGE RANK	STATE STATUS	FEDERAL STATUS	DISTRIBUTION PATTERN/HABITAT[1]	STUDY AREA[2]
Menzies' fiddleneck	*Amsinckia menziesii*	-	-	-	Abundant over a wide range in open ground from coastline to mid elevations, Meadow, West-Side Forest, Shrub-Steppe	Potentially present and observed during cultural survey but not observed during botanical survey
Netleaf hackberry	*Celtis laevigata*	-	-	-		Potentially present and observed during cultural survey but not observed during botanical survey
Nuttal's larkspur	*Delphinium nuttallianum*	-	-	-	Grows in open meadows, near streams, ponderosa pine woodlands, sagebrush, at low to high elevations	Potentially present and observed during cultural survey but not observed during botanical survey
Western serviceberry	*Amelanchier alnifolia*	-	-	-	Grows in open meadows, fencerows, woodlands, streambanks, conifer forests, at low to high elevations	Potentially present and observed during cultural survey but not observed during botanical survey

Table 2-1
Plant Species

Notes:
1. Unless otherwise noted, plant habitat and distribution information is from WNHP 2021.

2. Presence in the study is based off the Applicants 2015 and 2019 habitat and botanical surveys (FFP 2020d, g) and on a study area cultural survey (Shellenberger et al. 2019).
"Heritage Rank: WNHP uses the ranking system developed by NatureServe to assess global and state conservation status of each plant species, subspecies, and variety. Taxa are ranked on a scale of 1 to 5 (from highest to lowest conservation concern).
G = Global Rank: rangewide status of a full species
T = Trinomial Rank: rangewide status of a subspecies or variety
S = State Rank: status of a species, subspecies, or variety within the state of Washington

1 = Critically Imperiled – at very high risk of extirpation due to very restricted range, very few occurrences, very steep declines, very severe threats, or other factors
2 = Imperiled – at high risk of extirpation due to restricted range, few occurrences, steep declines, severe threats, or other factors
3 = Vulnerable – at moderate risk of extirpation due to a fairly restricted range, relatively few occurrences, recent and widespread declines, threats, or other factors
4 = Apparently secure – at fairly low risk of extirpation due to an extensive range or many occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors
5 = Secure – at very low risk of extirpation due to a very extensive range, abundant occurrences, and little to no concern from decline or threats

H = Historical– known from only historical occurrences (prior to 1978) but still with some hope of rediscovery
"State Status: Washington state status is assigned by WNHP based on the matrix in Table 1. Categories include:
E = Endangered, in danger of becoming extinct or extirpated from Washington
T = Threatened, likely to become Endangered in Washington
S = Sensitive, vulnerable or declining and could become Threatened or Endangered in Washington
Extirp = possibly extinct or extirpated in Washington (includes state historical species)"

"Federal Status: Under the US Endangered Species Act (ESA), the US Fish and Wildlife Service recognizes four categories:
E = Endangered. A species, subspecies, or variety in danger of extinction throughout all or a significant portion of its range.
T = Threatened. A species, subspecies, or variety likely to become Endangered in the foreseeable future
Prop = Proposed. A species, subspecies, or variety formally proposed for listing as Endangered or Threatened (a proposal has been published in the Federal Register, but not a final rule)
Cand = Candidate. A species, subspecies, or variety being evaluated by USFWS for potential listing as Threatened or Endangered under the ESA, but no formal proposal has been published yet.

Table 2-1
Plant Species

The Interagency Special Status and Sensitive Species Program (ISSSSP) of the US Forest Service (USFS) and Bureau of Land Management (BLM) in Washington and Oregon updated its list of Sensitive species in 2021 (ISSSSP 2021).

BS = BLM Sensitive; all USFWS candidate and delisted species and WNHP species of concern ranked S1, S1S2, S1S3, S2, or S2S3 found on at least one BLM managed area in Washington.

FS = Forest Service Sensitive: all USFWS candidate and delisted species and WNHP species of concern ranked S1, S1S2, S1S3, S2, or S2S3 found on at least one USFS managed area in Washington."

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Mammals					
Badger	*Taxidea taxus*	-	-	Documented near the study area.	Ecology and Environment 2006
Big brown bat	*Eptesicus fuscus*	-	-	Documented near the study area and fatalities at nearby wind farms are recorded.	WEST 2010, 2011
Black-tailed Jackrabbit	*Lepus californicus*	SC	-	Not documented in the study area.	
Bobcat	*Lynx rufus*	-	-	Documented near the study area.	Ecology and Environment 2006
California myotis	*Myotis californicus*	-	-	Documented near the study area.	WEST 2006
Cascade red fox	*Vulpes vulpes cascadensis*	SC	-	Not likely to occur in study area.	
Columbian black-tailed deer	*Odocoileus hemionus columbianus*	-	-	Documented near the study area.	Ecology and Environment 2006
Coyote	*Canis latrans*	-	-	Documented near the study area.	Ecology and Environment 2006
Deer mouse	*Peromyscus maniculatus*	-	-	Documented near the study area.	Ecology and Environment 2006
Elk	*Cervus canadensis*	-	-	Likely to occur in the study area.	
Fisher	*Pekania pennanti*	SE	-	Not likely to occur in study area.	
Fringed myotis	*Myotis thysanodes*	-	-	Appropriate habitat exists but not documented in study area.	WEST 2006
Gray wolf	*Canis Lupus*	SE	PE[3]	Extremely unlikely to be present. There are currently no known wolf packs in Klickitat County.	WDFW 2021
Great Basin pocket mouse	*Perognathus parvus*	-	-	Documented near the study area.	Ecology and Environment 2006
Hoary bat	*Lasiurus cinereus*	-	-	Documented in study area. This species represents the second largest percent of fatalities at nearby wind farms.	WEST 2006, 2010, 2011
Little brown bat	*Myotis lucifugus*	-	-	Documented near the study area and fatalities at nearby wind farms are recorded.	WEST 2006, 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Long-eared myotis	*Myotis evotis*	-	-	Documented near the study area.	WEST 2006
Long-legged myotis	*Myotis volans*	-	-	Documented near the study area.	WEST 2006
Mule deer	*Odocoileus hemionus hemionus*	-	-	Documented near the study area.	WEST 2006
Northern pocket gopher	*Thomomys talpoides*	-	-	Documented near the study area.	Ecology and Environment 2012
Nuttall's cottontail	*Sylvilagus nuttallii*	-	-	Documented near the study area.	Ecology and Environment 2013
Pacific marten	*Martes caurina*	-	-	Not documented in the study area.	
Pallid bat	*Antrozous pallidis*	-	-	Documented near the study area.	WEST 2006
Porcupine	*Erethizon dorsatum*	-	-	Documented near the study area.	Ecology and Environment 2006
Raccoon	*Procyon lotor*	-	-	Documented near the study area.	Ecology and Environment 2006
Red fox	*Vulpes vulpes*	-	-	Documented near the study area.	Ecology and Environment 2006
Shrew	*Sorex spp.*	-	-	Documented near the study area.	Ecology and Environment 2016
Silver-haired bat	*Lasionycteris noctivagans*	-	-	Documented in study area. This species represents the largest percent of fatalities at nearby wind farms.	WEST 2006, 2010, 2011
Spotted bat	*Euderma maculatum*	-	-	Occurs in eastern Washington, but not documented near the study area.	
Townsend's big-eared bat	*Corynorhinus townsendii*	SC	-	Documented near the study area.	WEST 2006
Townsend's ground squirrel	*Urocitellus townsendii townsendii*	SC	-	Not documented in the study area.	
Washington ground squirrel	*Urocitellus washingtoni*	SC	-	Priority species mapped in study area.	

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Western gray squirrel	*Sciurus griseus*	ST	-	Priority species mapped in study area.	
Western pipistrelle	*Pipistrellus hesperus*	-	-	Appropriate habitat exists but not documented in study area.	WEST 2006
Western small-footed myotis	*Myotis ciliolabrum*	-	-	Documented near the study area.	WEST 2006
White-tailed jackrabbit	*Lepus townsendii*	SC	-	Not documented in the study area.	
Wolverine	*Gulo gulo luscus*	SC	-	Not likely to occur in study area.	
Yuma myotis	*Myotis yumanensis*	-	-	Documented near the study area.	WEST 2006
Birds					
American coot	*Fulica americana*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
American crow	*Corvus brachyrhynchos*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
American goldfinch	*Carduelis tristis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
American kestrel	*Falco sparverius*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
American robin	*Turdus migratorius*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
American wigeon	*Anas americana*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Ash-throated flycatcher	*Myiarchus cinerascens*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Bald eagle	*Haliaeetus leucocephalus*	-	-	Commonly documented in the study area during the winter.	WEST 2006, 2010, 2011
Band-tailed pigeon	*Patagioenas fasciata*	PS	-	Not documented in study area.	
Barn owl	*Tyto alba*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Barn swallow	*Hirundo rustica*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Barred owl	*Strix varia*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Barrow's Goldeneye	*Bucephala islandica*	PS	-	Not documented in study area.	
Bewick's wren	*Thryomanes bewickii*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Black swift	*Cypseloides niger*	-	BCC	Not documented in study area.	
Black-backed Woodpecker	*Picoides arcticus*	SC	-	Not documented in study area.	
Black-billed magpie	*Pica pica*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Black-crowned night-heron	*Nycticorax nycticorax*	PS	-	Not documented in study area.	
Black-throated gray warbler	*Setophaga nigrescens*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Black-throated sparrow	*Amphispiza bilineata*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Brewer's blackbird	*Euphagus cyanocephalus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Brewer's sparrow	*Spizella breweri*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Brown-headed cowbird	*Molothrus ater*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Bufflehead	*Bucephala albeola*	PS	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Bullock's oriole	*Icterus bullockii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Burrowing owl	*Athene cunicularia*	SC	-	Not documented near the study area, but appropriate habitat exists.	
California gull	*Larus californicus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
California quail	*Callipepla californica*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Canada goose	*Branta canadensis*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Canyon wren	*Catherpes mexicanus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Cassin's Finch	*Carpodacus cassinii*	-	BCC	Documented in study area.	WEST 2006
Cassin's vireo	*Vireo cassinii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Chipping sparrow	*Spizella passerina*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Chukar	*Alectoris chukar*	PS	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Clark's grebe	*Aechmophorus clarkii*	SC	BCC	Not documented in study area. Priority species if breeding.	
Cliff swallow	*Petrochelidon pyrrhonota*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Common Goldeney	*Bucephala clangula*	PS	-		
Common nighthawk	*Chordeiles minor*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Common poorwill	*Phalaenoptilus nuttallii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Common raven	*Corvus corax*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Common yellowthroat	*Geothlypis trichas*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Cooper's hawk	*Accipiter cooperii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Dark-eyed junco	*Junco hyemalis*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Downy woodpecker	*Picoides pubescens*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
European starling	*Sturnus vulgaris*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Evening grosbeak	*Coccothraustes vespertinus*	-	BCC	Not documented in study area.	
Ferruginous hawk	*Falco peregrinus*	SE	-	Uncommon, but documented near the study area in at least one bird survey. Migrants may pass through the study area.	WEST 2006
Flammulated owl	*Psiloscops flammeolus*	SC	-	Not documented near the study area.	
Forster's tern	*Sterna forsteri*		-	Documented near study area. Priority species if breeding.	WEST 2006, 2010, 2011
Franklin's gull	*Leucophaeus pipixcan*	-	BCC	Not documented in study area.	
Golden eagle	*Aquila chrysaetos*	SC	-	Commonly documented in the study area.	WDFW 2021e, WEST 2006, 2010, 2011
Golden-crowned kinglet	*Regulus satrapa*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Golden-crowned sparrow	*Zonotrichia atricapilla*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Grasshopper sparrow	*Ammodramus savannarum*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Gray catbird	*Dumetella carolinensis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Gray flycatcher	*Empidonax wrightii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Gray partridge	*Perdix perdix*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Great blue heron	*Ardea herodias*	PS	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Great horned owl	*Bubo virginianus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Greater sage-grouse	*Centrocercus urophasianus*	SE	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Hairy woodpecker	*Picoides villosus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Harlequin duck	*Histrionicus histrionicus*	PS	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Hermit thrush	*Catharus guttatus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Hooded merganser	*Lophodytes cucullatus*	PS	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Horned grebe	*Podiceps auritus*	-	-	Priority species if breeding.	WEST 2010, 2011
Horned lark	*Eremophila alpestris*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
House finch	*Carpodacus mexicanus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
House sparrow	*Passer domesticus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
House wren	*Troglodytes aedon*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Killdeer	*Charadrius vociferus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Lark sparrow	*Chondestes grammacus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Lazuli bunting	*Passerina amoena*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Lesser goldfinch	*Carduelis psaltria*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Lesser yellowlegs	*Tringa flavipes*	-	BCC	Not documented in study area.	

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Lewis's woodpecker	*Melanerpes lewis*	-	BCC	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Lincoln's sparrow	*Melospiza lincolnii*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Loggerhead shrike	*Lanius ludovicianus*	SC	-	Documented near the study area.	WEST 2006
Long-billed curlew	*Numenius americanus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Long-eared owl	*Asio otus*	-	BCC	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
MacGillivray's warbler	*Geothlypis tolmiei*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Mallard	*Anas platyrhynchos*	PS	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Marbled godwit	*Limosa fedoa*	-	BCC	Not documented in study area.	
Merlin	*Falco columbarius*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Mountain bluebird	*Sialia currucoides*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Mountain quail	*Oreortyx pictus*	PS	-	Not documented in study area.	
Mourning dove	*Zenaida macroura*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Northern flicker	*Colaptes auratus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Northern goshawk	*Accipiter gentilis*	SC	-	Documented near the study area in at least one bird survey.	WEST 2006
Northern harrier	*Circus cyaneus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Northern pintail	*Anas acuta*	PS	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Northern rough-winged swallow	*Stelgidopteryx serripennis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Northern shrike	*Lanius excubitor*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Northern spotted owl	*Strix occidentalis caurina*	SE	FT	Extremely unlikely to be present because there is not appropriate habitat in the study area. Critical habitat is present at eastern edge of Klickitat County approximately 40 miles away.	
Olive-sided flycatcher	*Contopus cooperi*	-	BCC	Not documented in study area.	
Orange-crowned warbler	*Leiothlypis celata*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Osprey	*Pandion haliaetus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Peregrine falcon	*Falco peregrinus*	PW	-	Documented nesting near study area.	FFP 2020
Pileated woodpecker	*Dryocopus pileatus*	SC	-	Not observed at nearby wind farm. No recorded mortality in Klickitat County windfarms.	WEST 2006, 2010, 2011
Pine siskin	*Spinus pinus*		-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Praire falcon	*Falco mexicanus*	PS	-	Nests documented in the study area.	WDFW 2021f
Purple finch	*Haemorhous purpureus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Red-breasted nuthatch	*Sitta canadensis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Red-tailed hawk	*Buteo jamaicensis*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Red-winged blackbird	*Agelaius phoeniceus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Ring-billed gull	*Larus delawarensis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Ring-necked pheasant	*Phasianus colchicus*	PS	-	Windy point.	WEST 2006, 2010, 2011
Rock pigeon	*Columba livia*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Rock wren	*Salpinctes obsoletus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Rough-legged hawk	*Buteo lagopus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Ruby-crowned kinglet	*Corthylio calendula*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Rufous hummingbird	*Selasphorus rufus*	-	BCC	Documented near study area. Priority species if breeding.	WEST 2006
Sage thrasher	*Oreoscoptes montanus*	SC	BCC	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Sagebrush sparrow	*Artemisiospiza nevadensis*	SC	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Sandhill crane	*Antigone canadensis*	SE	-	Not documented in study area.	
Savannah sparrow	*Passerculus sandwichensis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Say's phoebe	*Sayornis saya*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Sharp-shinned hawk	*Accipiter striatus*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Short-eared owl	*Asio flammeus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Song sparrow	*Melospiza melodia*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Sooty grouse	*Dendragapus fuliginosus*	PS	-	Not documented in study area.	
Spotted sandpiper	*Actitis macularia*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Spotted towhee	*Pipilo maculatus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Swainson's hawk	*Buteo swainsoni*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Swainson's thrush	*Catharus ustulatus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Townsend's solitaire	*Myadestes townsendi*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Townsend's warbler	*Setophaga townsendi*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Tree swallow	*Tachycineta bicolor*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Turkey vulture	*Cathartes aura*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Varied thrush	*Ixoreus naevius*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Vaux's swift	*Chaetura vauxi*	SC	-	Uncommon, but documented near the study area in at least one bird survey. Migrants may pass through the study area.	WEST 2006
Vesper sparrow	*Pooecetes gramineus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Violet-green swallow	*Tachycineta thalassina*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2012
Virginia rail	*Rallus limicola*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Warbling vireo	*Vireo gilvus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Western grebe	*Aechmophorus occidentalis*	SC	-	Documented near the study area.	WEST 2006
Western kingbird	*Tyrannus verticalis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Western meadowlark	*Sturnella neglecta*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2012
Western tanager	*Piranga ludoviciana*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Western wood-pewee	*Contopus virens*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
White-breasted nuthatch	*Sitta carolinensis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
White-crowned sparrow	*Zonotrichia leucophrys*	-	-	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2012
White-headed woodpecker	*Leuconotopicus albolarvatus*	SC	-	Unlikely to be present. One individual was observed in a Christmas Bird Count circle that included the study area.	WEST 2006
White-throated swift	*Aeronautes saxatalis*	-	-	Documented mortality at Columbia Plateau windfarms	WEST 2010, 2011
Wild turkey	*Meleagris gallopavo*	PS			
Williamson's sapsucker	*Sphyrapicus thyroideus*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Wilson's warbler	*Wilsonia pusilla*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Winter wren	*Troglodytes hiemalis*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Wood duck	*Aix sponsa*	PS	-		
Yellow warbler	*Setophaga petechia*	-	-	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Yellow-rumped warbler	*Dendroica coronata*			Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Reptiles					
California mountain kingsnake	*Lampropeltis zonata*	SC	-	Not documented in the study area.	
Gopher snake	*Pituophis melanoleucus*	-	-	Documented at nearby windfarm.	Ecology and Environment 2006
Racer snake	*Coluber constrictor*	-	-	Documented at nearby windfarm.	Ecology and Environment 2006
Rubber boa	*Charina bottae*	-	-	Documented in study area.	Anchor QEA 2021
Sagebrush lizard	*Sceloporus graciosus*	SC	-	Not documented, but the study area is in a watershed of known occurrence.	
Sharp-tailed snake	*Contia tenuis*	SC	-	Not documented in the study area.	
Short-horned lizard	*Phrynosoma douglassi*	-	-	Documented at nearby windfarm.	Ecology and Environment 2006
Striped whipsnake	*Masticophis taeniatus*	SC	-	Not documented in the study area.	
Western fence lizard	*Sceloporus occidentalis*	-	-	Documented in study area.	Anchor QEA 2021
Western garter snake	*Thamnophis elegans*	-	-	Documented at nearby windfarm.	Ecology and Environment 2006
Western pond turtle	*Actinemys marmorata*	SE	-	Not documented in the study area.	
Western rattlesnake	*Crotalus viridis*	-	-	Documented at nearby windfarm.	Ecology and Environment 2006
Invertebrates					
Columbia Oregonian (Snail)	*Cryptomastix hendersoni*	SC	-	Not documented in the study area. Four sites in Klickitat County with most eastern known population in Rufus, Oregon.	

Table 2-2
Wildlife Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	PRESENCE IN STUDY AREA[2]	SOURCE
Dalles sideband (Snail)	*Monadenia fidelis minor*	SC	-	Not documented in the study area but appropriate habitat exists.	
Juniper hairstreak (Butterfly)	*Callophrys gryneus*	SC	-	Not documented in the study area but appropriate habitat exists.	
Mardon skipper (Butterfly)	*Polites mardon*	SE	-	Not likely to occur in study because of lack of appropriate habitat.	

Notes:

1. All habitat information was retrieved from WDFW 2021d unless otherwise noted.

2. No wildlife studies have been conducted in the lower reservoir area of the study area. No wildlife studies have been conducted specifically for the proposed project. Where presence is documented near the study area it is based on wildlife surveys conducted for the nearby wind farm or from available WDFW data.

3. The final rule delisting the gray wolf went into effect on January 4, 2021 (USFWS 2020). On September 15, 2021, USFWS completed intial review of two petitions to relist western population of gray wolf and present substantial, credible information indicating that a listing action may be warranted (USFWS 2021d).

Ecology: Washington Department of Ecology

Priority species: Priority Habitats and Species
WDFW: Washington Department of Fish and Wildlife
State Designations (WDFW 2021g)
SE: State Endangered
ST: State Threatened
SC: State Candidate
SS: State Sensitive
PS: State Priority Species
Federal Designations (USFWS 2021c)
FT: Federal Threatened
PE: Proposed for re-listing as Federal Endangered
BCC: Bird of Conservation Concern
PW: protected wildlife under WAC 220-200-100

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Band-tailed pigeon	*Patagioenas fasciata*	PS	-	Upland forests and limited mineral sources in western Washington. habitats have been influenced by timber harvest and management of clearcuts that reduce food resources.	Not documented in study area.	
Barrow's Goldeneye	*Bucephala islandica*	PS	-	Cavity-nesting duck	Not documented in study area.	
Black swift	*Cypseloides niger*	-	BCC	Nest on cliff ledges behind or near waterfalls and sea caves and forage over forests and open areas (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Black-backed Woodpecker	*Picoides arcticus*	SC	-	Boreal forests of North America. Burned Pacific Northwest coniferous forests with standing dead lodgepole pine, ponderosa pine, and western larch.	Not documented in study area.	
Black-crowned night-heron	*Nycticorax nycticorax*	PS	-	Wetlands across North America, including saltmarshes, freshwater marshes, swamps, streams, rivers, lakes, ponds, lagoons, tidal mudflats, canals, reservoirs, and wet agricultural fields (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Black-tailed Jackrabbit	*Lepus californicus*	SC	-	Semi-arid Columbia Plateau shrubsteppe and grassland habitats.	Not documented in the study area.	
Bufflehead	*Bucephala albeola*	PS	-	Cavity-nesting duck	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Burrowing owl	*Athene cunicularia*	SC	-	Associated with shrubsteppe and grassland habitats, but have now become rare in Klickitat County. Use abandoned mammal burrows for nesting.	Not documented near the study area, but appropriate habitat exists.	
California mountain kingsnake	*Lampropeltis zonata*	SC	-	The Columbia River Gorge is considered the northern extreme of its range.	Not documented in the study area.	
Cascade red fox	*Vulpes vulpes cascadensis*	SC	-	Subspecies that occupies alpine and subalpine habitats in the southern Cascade Mountain Range.	Not likely to occur in study area.	
Cassin's Finch	*Carpodacus cassinii*	-	BCC	Conifer belts of North America's western interior mountains, from central British Columbia to northern New Mexico and Arizona (Cornell Lab of Orinthology 2019).	Documented in study area.	WEST 2006

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Chukar	*Alectoris chukar*	PS	-	Dry high-elevation shrublands between 4,000 and 13,000 feet. They usually occur on steep, rocky hillsides with a mixture of brush, grasses, and forbs. They also occur across barren plateaus and deserts with sparse grasses (Cornell Lab of Orinthology 2019).	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Clark's grebe	*Aechmophorus clarkii*	SC	BCC	Found on inland freshwater lakes and marshes in eastern Washington in the summer, the Pacific coast in the fall, and marine waters of Washinton in the winter. PHS if breeding.	Not documented in study area.	
Columbia Oregonian (Snail)	*Cryptomastix hendersoni*	SC	-	East end of the Columbia Gorge on Oregon and Washington sides.	Not documented in the study area. Four sites in Klickitat County with most eastern known population in Rufus, Oregon.	
Common Goldeneye	*Bucephala clangula*	PS	-	Cavity-nesting duck.	Not documented in study area.	
Dalles sideband (Snail)	*Monadenia fidelis minor*	SC	-	Cool, moist talus habitat and upland forest areas that are near riparian corridors.	Not documented in the study area but appropriate habitat exists.	
Evening grosbeak	*Coccothraustes vespertinus*	-	BCC	Mature and second-growth coniferous forests of northern North America and the Rocky Mountains. Found in Urban and suburban areas in the winter (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Ferruginous hawk	*Buteo regalis*	SE	-	Migratory and occur in arid grasslands and shrubsteppe habitats. Nests occur on small rock outcrops on the slope of steep hillsides or canyons or in isolated trees, such as junipers. Less commonly documented in central Klickitat County.	Uncommon, but documented near the study area in at least one bird survey. Migrants may pass through the study area.	WEST 2006
Fisher	*Pekania pennanti*	SE	-	Coniferous and mixed coniferous-deciduous forests and tend to avoid areas without substantial tree cover.	Not likely to occur in study area.	

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Flammulated owl	*Psiloscops flammeolus*	SC	-	Forests of large diameter (>50 cm dbh) ponderosa pine/Douglas-fir or grand fir with ponderosa pine in the overstory.	Not documented near the study area.	
Franklin's gull	*Leucophaeus pipixcan*	-	BCC	Nest in freshwater marshes with abundant emergent vegetation and patches of open water and feed in agricultural areas, pastures, and many sorts of wetlands, including sewage ponds, lakes, lagoons, esturaies, and bays (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Golden eagle	*Aquila chrysaetos*	SC	-	Associated with steep terrain and is found mostly in dry open forests of eastern Washington, shrubsteppe, canyonlands, in high-elevation alpine zones of all regions. Hunts for prey in grasslands and shrublands. Nests are situated on cliff ledges, rocky outcrops, large trees, or human-made structures.	Commonly documented in the study area.	WDFW 2021e, WEST 2006, 2010, 2011
Gray wolf	*Canis lupus*	SE	PE[3]	Highly adaptable and can live in a variety of habitats if sufficient prey is available. Most common in relatively flat forested areas, rolling hills, or open spaces such as river valleys and basins, where prey animals are easier to chase and catch.	Extremely unlikely to be present. There are currently no known wolf packs in Klickitat County.	WDFW 2021
Great blue heron	*Ardea herodias*	PS	-	Found in freshwater and saltwater habitats and forage in grasslands and agricultural fields (Cornell Lab of Orinthology 2019).	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Greater sage-grouse	*Centrocercus urophasianus*	SE	-	Large areas of shrubsteppe habitat dominated by sagebrush. Some degraded habitat that lacks the grass and forb understory is needed for nesting and brood rearing.	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Harlequin duck	*Histrionicus histrionicus*	PS	-	Washington streams in the Cascade and Olympic mountain ranges. Found on both coasts, north from New Jersey and San Francisco.	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Hooded merganser	*Lophodytes cucullatus*	PS	-	Spruce-fir forest in the Northwest to pine-hardwood forest and cottonwood-elder riparian forests in the Midwest, to oak-cypress-tupelo forests in the Southeast (Cornell Lab of Orinthology 2019).	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Juniper hairstreak (Butterfly)	*Callophrys gryneus*	SC	-	Requires its larval host plant, western juniper.	Not documented in the study area but appropriate habitat exists.	
Lesser yellowlegs	*Tringa flavipes*	-	BCC	Fresh and brackish wetlands, including mudflats, marshes, lake and pond edges, wet meadows, sewage ponds, and flooded agricultural fields such as rice paddies. They tend to be found in vegetated wetlands rather than in bare habitats (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Lewis's woodpecker	*Melanerpes lewis*	-	BCC	Open ponderosa pine forests and burned forests with a high density of standing dead trees. They also breed in woodlands near streams, oak woodlands, orchards, and pinyon-juniper woodlands (Cornell Lab of Orinthology 2019).	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Loggerhead shrike	*Lanius ludovicianus*	SC	-	Open country, including shrubsteppe and grasslands throughout eastern Washington. They generally nest in dense, thorny trees, or shrubs.	Documented near the study area.	WEST 2006
Long-eared owl	*Asio otus*	-	BCC	Found in dense vegetation and forage in open grasslands or shrublands; also open coniferous or deciduous woodlands. They occur at elevations ranging from near sea level to above 6,500 feet (Cornell Lab of Orinthology 2019).	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Mallard	*Anas platyrhynchos*	PS	-	Vulnerable aggregation.	Documented near the upper study area. Mortality at Columbia Plateau windfarms.	WEST 2006, 2010, 2011
Marbled godwit	*Limosa fedoa*	-	BCC	Tidal mudflats and sandflats, but small numbers at times also use coastal beaches. In the Columbia Basin, where it is very uncommon, short grass areas and shorelines are used.	Not documented in study area.	
Mardon skipper (Butterfly)	*Polites mardon*	SE	-	Montane meadows 1,800 to 5,500 feet in elevation in the southeastern Cascade Mountain Range.	Not likely to occur in study because of lack of appropriate habitat.	

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Mountain quail	*Oreortyx pictus*	PS	-	Dense shrub cover, brushy, riparian habitat in dry areas, and brushy slopes. They are found in dense cover with scattered open areas on slopes in foothills and mountains.	Not documented in study area.	
Northern goshawk	*Accipiter gentilis*	SC	-	Woodland raptor that can occur in all forested regions of Washington.	Documented near the study area in at least one bird survey.	WEST 2006
Northern pintail	*Anas acuta*	PS	-	Vulnerable aggregation.	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Northern spotted owl	*Strix occidentalis caurina*	SE	FT	Inhabits mid and late seral coniferous forests with generally high canopy closure, complex canopy structure involving trees of multiple age or size classes, large decaying trees and/or snags, and a high volume of downed wood.	Extremely unlikely to be present because there is not appropriate habitat in the study area. Critical habitat is present at eastern edge of Klickitat County approximately 40 miles away.	
Olive-sided flycatcher	*Contopus cooperi*	-	BCC	Boreal forest and western coniferous forests, from sea level to over 10,000 feet elevation in some parts of the Rockies (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Peregrine falcon	*Falco peregrinus*	PW	-	Nest on cliffs near water and also on human-built structure (WDFW 2021h).	Documented nesting near study area.	FFP 2020
Pileated woodpecker	*Dryocopus pileatus*	SC	-	Mature deciduous or mixed deciduous-coniferous woodlands of nearly every type, from tall western hemlock stands of the Northwest to beech and maple forests in New England and cypress swamps of the Southeast (Cornell Lab of Orinthology 2019).	Not observed at nearby wind farm. No recorded mortality in Klickitat County windfarms.	WEST 2006, 2010, 2011
Praire falcon	*Falco mexicanus*	PS	-	Inhabits the arid environments of eastern Washington, nesting on cliffs and hunting in steppe and shrubsteppe habitat.	Nests documented in the study area.	WDFW 2021f
Ring-necked pheasant	*Phasianus colchicus*	PS	-	Agricultural areas west of the Cascades, but the grain-producing lands on the east side of the state provide the best pheasant habitat and the highest ring-neck populations (Cornell Lab of Orinthology 2019).	Documented near study area.	WEST 2006, 2010, 2011

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Rufous hummingbird	*Selasphorus rufus*	-	BCC	Open or shrubby areas, forest openings, yards, and parks, and sometimes in forests, thickets, swamps, and meadows from sea level to about 6,000 feet (Cornell Lab of Orinthology 2019). PHS if breeding.	Documented near study area.	WEST 2005
Sage thrasher	*Oreoscoptes montanus*	SC	BCC	Large patches and expanses of sagebrush for breeding as well as small fragments of sagebrush among agricultural fields	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Sagebrush lizard	*Sceloporus graciosus*	SC	-	Vegetated sand dunes and associated sandy habitats that support shrubs and have large areas of bare ground.	Not documented, but the study area is in a watershed of known occurrence.	
Sagebrush sparrow	*Artemisiospiza nevadensis*	SC	-	Sagebrush/bunchgrass shrubsteppe landscapes of the Columbia Basin. Summer resident in the shrubsteppe of eastern Washington.	Documented mortality at Columbia Plateau windfarms.	WEST 2010, 2011
Sandhill crane	*Antigone canadensis*	SE	-	Wetlands, grassy uplands, partially forested uplands, and wet meadows. In winter they live in more open grassland and river valleys, and often feed in agricultural fields.	Not documented in study area.	
Sharp-tailed snake	*Contia tenuis*	SC	-	Various, including shrub-steppe uplands with riparian areas that support deciduous trees and have accumulations of woody debris and rocks.	Not documented in the study area.	
Sooty grouse	*Dendragapus fuliginosus*	PS	-	Coniferous forests in mostly mountainous areas (up almost to treeline), although they breed in forests at sea level in the northern part of the range (Cornell Lab of Orinthology 2019).	Not documented in study area.	
Striped whipsnake	*Masticophis taeniatus*	SC	-	Shrubsteppe obligates and occur primarily in the driest areas of the central Columbia Basin.	Not documented in the study area.	
Townsend's big-eared bat	*Corynorhinus townsendii*	SC	-	Found in westside lowland conifer-hardwood forest, ponderosa pine forest and woodlands, mixed highland conifer forest, eastside mixed conifer forest, shrubsteppe, and both eastside and westside riparian forest/wetlands and open fields. Roosts include caves, abandoned mines, buildings, concrete bunkers, tunnels, bridges, and buildings. Flight activity is typically late night to before sunrise.	Documented near the study area.	WEST 2006

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
Townsend's ground squirrel	*Urocitellus townsendii townsendii*	SC	-	Shrubsteppe, native grasslands, pastures, orchards, vineyards, highway margins, vacant city lots, and the banks of canals.	Not documented in the study area.	
Vaux's swift	*Chaetura vauxi*	SC	-	Prefers to forage for insects over forests, grasslands, and aquatic habitats. Mainly associated with old-growth and mature forests in the eastern Cascades. Will gather at communal roosts in brick chimneys.	Uncommon, but documented near the study area in at least one bird survey. Migrants may pass through the study area.	WEST 2006
Washington ground squirrel	*Urocitellus washingtoni*	SC	-	Shrubsteppe and steppe in eastern Washington.	PHS mapped in study area.	
Western gray squirrel	*Sciurus griseus*	ST	-	Oak woodlands and conifer forests in Klickitat County.	PHS mapped in study area.	
Western grebe	*Aechmophorus occidentalis*	SC	-	Often found in large freshwater lakes, reservoirs, and marshes in eastern Washington during the summer breeding season.	Documented near the study area.	WEST 2006
Western pond turtle	*Actinemys marmorata*	SE	-	Open upland habitats that receive extensive sun exposure such as oak-pine savanna and other more open forest types in the Columbia Gorge, and pasture. There are four occurrences in the Columbia River Gorge.	Not documented in the study area.	
White-headed woodpecker	*Dryobates albolarvatus*	SC	-	Dry forests in the range of ponderosa pine in Washington's eastern Cascade Range. Conifer forests dominated by ponderosa pine, Douglas-fir, and occasionally other tree species such as aspen.	Unlikely to be present. One individual was observed in a Christmas Bird Count circle that included the study area.	WEST 2006

Table 2-3
Special Status Species

COMMON NAME	SPECIES NAME	STATE	FEDERAL	HABITAT[1]	PRESENCE IN STUDY AREA[2]	SOURCE
White-tailed jackrabbit	*Lepus townsendii*	SC	-	Common in bunchgrass habitats with less shrub cover.	Not documented in the study area.	
Wild turkey	*Meleagris gallopavo*	PS	-	Wide variety of landscape types including mixed tree, shrub, and grass types. However, turkeys also thrive in urban areas.	Not documented in the study area.	
Wolverine	*Gulo gulo luscus*	SC	-	Alpine and subalpine forest habitats.	Not likely to occur in study area.	
Wood duck	*Aix sponsa*	PS	-	Cavity-nesting duck.	Not documented in the study area.	

Notes:

1. Habitat information was retrieved from WDFW 2021d unless otherwise referenced.

2. No wildlife studies have been conducted in the lower reservoir area of the study area. No wildlife studies have been conducted specifically for the proposed project. Where presence is documented near the study area it is based on wildlife surveys conducted for the nearby wind farm or from available WDFW data.

3. The final rule delisting the gray wolf went into effect on January 4, 2021 (USFWS 2020). On September 15, 2021, USFWS completed intial review of two petitions to relist western population of gray wolf and present substantial, credible information indicating that a listing action may be warranted (USFWS 2021d).

Ecology: Washington Department of Ecology

PHS: Priority Habitats and Species

WDFW: Washington Department of Fish and Wildlife

State Designations (WDFW 2021g)

SE: State Endangered

ST: State Threatened

SC: State Candidate

SS: State Sensitive

PS: State Priority Species

Federal Designations (USFWS 2021c)

FT: Federal Threatened

PE: Proposed for re-listing as Federal Endangered

BCC: Bird of Conservation Concern

PW: protected wildlife under WAC 220-200-100

Attachment 3
Mule Deer Concentration Area Map

Source: WDFW 2016

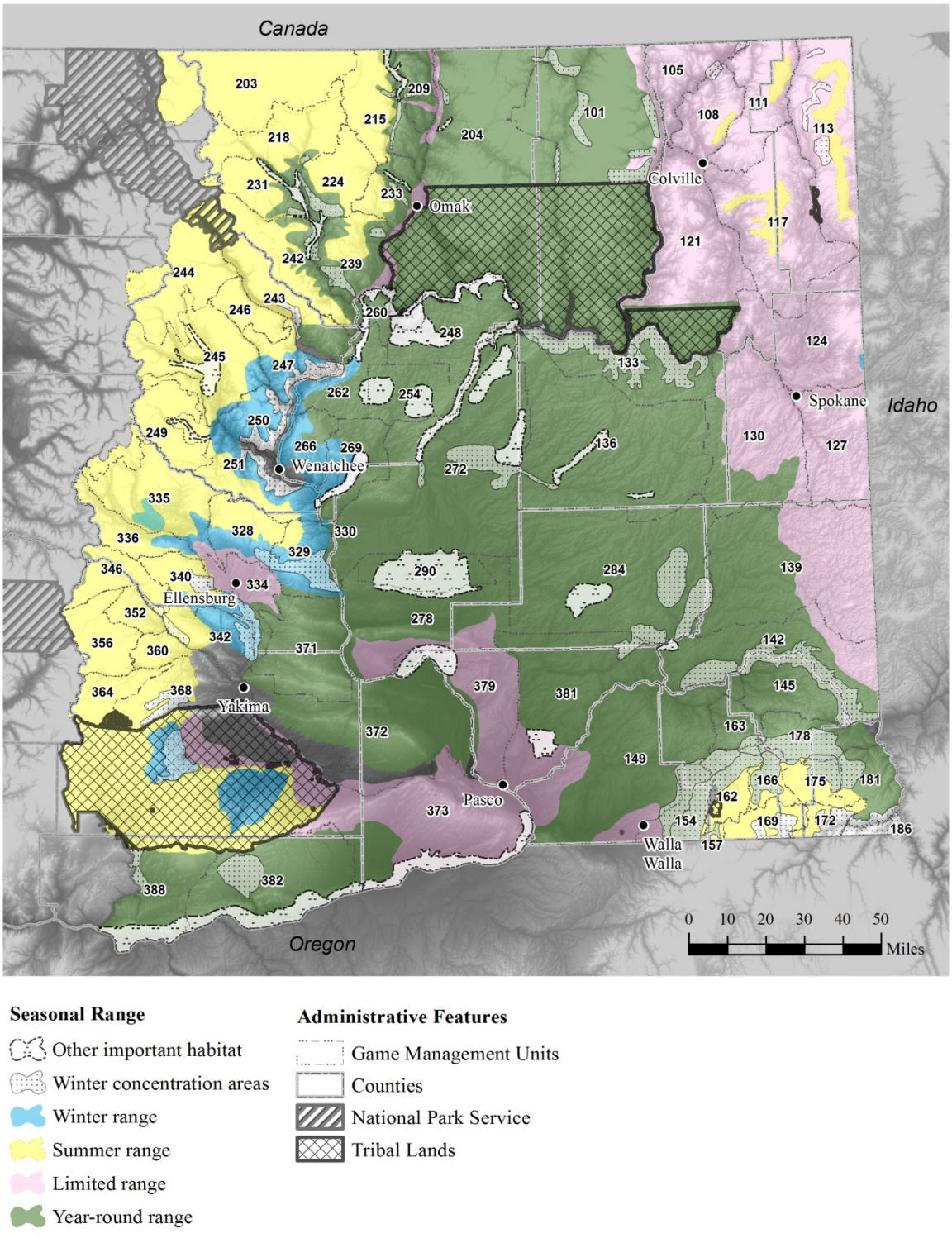


Figure 2. Overview of general mule deer distribution and seasonal ranges in Washington State based on spatial data from the Western Association of Fish and Wildlife Agencies Mule Deer Working Group (WAFWA 2004).

Attachment 4
The Applicant's Draft Vegetation Management and Monitoring Plan

GOLDENDALE ENERGY STORAGE HYDROELECTRIC PROJECT

Federal Energy Regulatory Commission Project No. 14861

Klickitat County, Washington

FINAL LICENSE APPLICATION
Appendix E: Vegetation Management and Monitoring Plan

For:

FFP Project 101, LLC

June 2020

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Acronyms and Abbreviations

Applicant	FFP Project 101, LLC
BMP	best management practice
FERC	Federal Energy Regulatory Commission
Project	Goldendale Energy Storage Project No. 14861
VMMP	Vegetation Management and Monitoring Plan
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

The Goldendale Energy Storage Project No. 14861 (Project) will be a new power generation and energy storage facility in Klickitat County, Washington as described in the Draft License Application.

The purpose of this Vegetation Management and Monitoring Plan (VMMP) is to establish the programs needed to effectively guide the management of vegetation now and in the future within the Project area. The VMMP is intended to cover all Project-related construction, operation, and management activities. Specific vegetation management and monitoring practices for native vegetation and noxious weeds are presented. The VMMP establishes goals for managing vegetation within the Project Boundary, defines specific activities for processes or measures to meet those goals, and describes how these activities are to be implemented. The VMMP will be further developed as the Project moves through the Federal Energy Regulatory Commission (FERC) licensing process.

1.1 Goals

Goals and objectives were developed to guide vegetation management activities and meet the purpose and intent of the VMMP. Three goals and their respective objectives are listed below.

- **Goal 1:** Promote the establishment and maintenance of native vegetation communities while allowing for continued Project operations in a safe and effective manner.
    - Protect sensitive habitats and plant species within the Project Boundary.
    - Prevent the establishment of woody riparian vegetation at reservoir edges in order to reduce any attraction for riparian-dependent wildlife species to the reservoir and prevent their injury during Project operations and to limit the attraction of predatory golden eagles. (Additional features to reduce reservoir attraction by birds and animals are discussed in the Project Wildlife Management Plan.)
- **Goal 2:** Minimize the establishment and spread of noxious weed species within the Project Boundary.
    - Implement procedures to prevent the establishment of noxious weeds in areas disturbed by Project construction activities.
    - Implement a process and schedule to monitor and prevent the spread of noxious and invasive weeds.
- **Goal 3:** Revegetate areas disturbed during Project construction and operations.
    - Implement a plan for revegetation of areas temporarily disturbed during construction.

- Monitor revegetated areas and develop measures for continued maintenance or replanting if revegetation does not meet performance standards.
- Implement standards and guidelines for plant material selection, site preparation, and planting procedures.
- Provide information for planning revegetation projects to ensure use of certified weed-free seed.

2.0 PROPOSED MEASURES

Impacts to vegetation will generally be minimized by burying several Project features (i.e., access tunnel, headrace tunnel, and tailrace tunnel), selective siting of permanent and temporary disturbance areas, minimization of the surface area of Project features, and other measures developed in consultation with agencies. Permanent impacts to sensitive areas (wetlands and streambeds) will be avoided.

The VMMP includes the following components, which will continue to be developed based on comments received throughout the licensing process:

- Noxious weed management
- Protection of special status species
- Revegetation at temporary disturbance areas

2.1 Noxious Weed Management

FFP Project 101, LLC (the Applicant) will implement the following measures to limit the establishment of noxious weeds within the Project Boundary and control the spread of existing populations.

Prior to Project construction, the Applicant has proposed a formal invasive plant survey to establish baseline environmental conditions, which will be more fully described in this VMMP as it is developed. The survey will develop a list of target invasive species to be surveyed, and identify the location and extent of any target species. This information will be used to aid in the development of a comprehensive plan to control the spread of invasive plants within the Project Boundary and that will maximize the effectiveness of restoration efforts following ground disturbance. After completion of this survey, weed control measures will be developed with the objective of reducing the spread of noxious and invasive weeds within and from outside the Project area.

Revegetation and weed control measures will follow all applicable guidelines and best management practices (BMPs) as recommended by the Washington State Noxious Weed Control Board. Given adequate and appropriate implementation of the protection and mitigation measures outlined in the VMMP, negative effects on local plant communities will be minor and

largely temporary. Net benefits to the area will include reduction of weeds already present and prevention of establishment of new infestations.

This will be accomplished through BMPs including:

- Training to encourage weed awareness and prevention efforts among Project and contractor staff. This will be included in the Environmental Training seminars, to be further described in the Wildlife Management Plan. Training will include distribution of noxious weed identification materials. The Applicant will develop a manual with photos and identifying characteristics of the priority weed species currently known to occur in the Project Boundary, as well as others that are likely to occur. The manual will also include procedures for reporting and confirming any new noxious weed infestations. It will be designed to be easily carried in a field vest or vehicle. The manual will be given to all staff and contractors who patrol or inspect Project features and/or perform vegetation maintenance in the Project Boundary, as well as personnel involved in any ground-disturbing activity.
- Planning and scheduling of construction and maintenance activities will incorporate treatment of existing infestations before maintenance activities occur.
- Cleaning machinery and other equipment prior to use to remove seeds and prevent new noxious weed introductions. At a minimum, cleaning will occur prior to equipment transfer between the lower and upper sites. Cleaning station locations will be determined based on the noxious weed survey and will be coordinated with construction scheduling.
- Minimizing devegetation and ground disturbance, and avoiding disturbance in riparian, wetland, and other sensitive areas.
- Revegetating with a native plant seed mix after ground disturbing activities. The seed mix will be developed in consultation with the Washington Department of Fish and Wildlife (WDFW) and will follow guidelines described in Benson et al. (2011). A suggested seed mix is provided in Table 2.4-1.
- Use of certified weed-free hay, straw, and topsoil, where available.

2.2 Preconstruction Surveys for Special Status Plants

Prior to Project construction, surveys will be conducted for federally listed special status plant species in all areas that will be disturbed to establish baseline environmental conditions. Surveys will be conducted during anticipated flowering windows of all sensitive species with potential to occur in the area. Updated surveys will be conducted after final design and prior to construction to confirm information collected in previous surveys.

2.3 Employ BMPs to Protect Native Vegetation

Construction activities will be planned and implemented to avoid disturbance to existing native and/or sensitive plant communities and prevent the spread of noxious weeds. These BMPs include those listed under Section 2.1. Further, the Applicant will limit construction related

disturbance of native vegetation as much as possible by flagging or fencing off sensitive areas and designating specific areas for work and equipment movement.

2.4 Revegetation at Temporary Disturbance Areas

Any vegetated area temporarily disturbed during Project construction will be hydroseeded with native upland species following completion of the disturbance. The seed mix will be developed in consultation with WDFW and will follow guidelines described in Benson et al. (2011). A suggested seed mix used by the U.S. Department of Agriculture Forest Service at the Columbia River Gorge National Scenic Area, approximately 9 miles west of the Project, is included below as Table 2.4-1. Additional guidance is provided in Bureau of Land Management Technical Note 443 (Dunwiddie and Camp 2013). These guidelines will be followed where applicable.

Table 2.4-1. Suggested Seed Mix

Grasses	Percent Composition
Pseudoroegneria spicatum (Blue bunch wheat grass)	30%
Festuca idahoensis (Idaho fescue)	25%
Bromus carinatus (Calif. Brome)	15%
Elymus glaucus (blue wild rye)	10%
Stipa comata (Needlegrass)	10%
Sitanion hystrix (Bottlebrush squirreltail)	5-10%
Oryzopsis hymenoides (Indain ricegrass)	5-10%
Poa sandbergii (*P. secunda*) (Sandberg bluegrass)	5-10%
Forbs	
Lupine (select an appropriate native species for the area)	2 ounces per acre
Achillea millefolium (Yarrow)	1-2 ounces per acre
Balsamorhiza deltoidea (Balsam root)	6 ounces per acre
Eriogonum strictum	1-2 ounces per acre
Lupinus bicolor	1-2 ounces per acre
Eriophyllum lanatum (Oregon sunshine)	1-2 ounces per acre

Revegetation will adhere to particular goals, as practicable based on current and impacted conditions and these areas will be included in subsequent weed survey and treatment efforts. The goal of revegetation will be to create sites with the following characteristics:

- Vegetation contains a characteristic assemblage of the species that occur in the reference ecosystem and that provide appropriate community structure.
- Vegetation consists of indigenous species to the greatest practicable extent.
- Sites include functional groups necessary for continued development and/or stability.
- Sites are capable of self-sustaining, reproducing populations.

- Sites are appropriately integrated into a larger ecological matrix or landscape, in which potential threats (e.g., weed infestations, excessive grazing) have been eliminated or reduced as much as possible.
- Sites are resilient and able to endure normal periodic stress events in the local environment (e.g., fire, drought, etc.).
- If needed, a monitoring program will be established to evaluate the efficacy of revegetation efforts and a filing schedule for periodic monitoring reports. This program also describes procedures to be followed if monitoring indicates that revegetation is not successful.

2.5 Vegetation Management During Project Operations

Noxious weeds will be managed as discussed above during construction and operations (Section 2.1). After Project construction and revegetation is complete, revegetated areas will be monitored as discussed below in Section 3.0. During operations, new disturbance to vegetation will be avoided. If the vegetation is not meeting performance standards, additional revegetation amendments may be applied, as discussed in Section 3.3.

2.6 Grazing Control for New Plantings

If planting of individual trees and shrubs are required, protective enclosures will be used to protect the young plants from consumption by wildlife such as deer, antelope, or elk. These enclosures may consist of wire cages or rigid protection tubes.

3.0 MONITORING PLAN

Restored areas will be monitored annually for compliance with performance standards listed below for a minimum of 5 years or until those performance standards are met. Subsequent monitoring and maintenance will vary annually depending on the success of previous activities and the need for continued maintenance. If performance standards are not achieved within 5 years, monitoring and maintenance activities will continue until standards are met. The revegetation program and maintenance activities will continually be evaluated in consultation with affected landowners and agency stakeholders (i.e., the Bureau of Land Management, WDFW, and the U.S. Fish and Wildlife Service).

Once vegetation cover and composition are in compliance with revegetation goals, the area will be inventoried less frequently and managed based on the results of that inventory. Management summaries will be prepared at 5-year intervals.

3.1 Objectives and Performance Standards

Objectives and performance standards are presented in Table 3.1-1, specific to vegetation cover, species composition, and invasive species. The performance standards present the measurable criteria to determine whether each objective has been met. Objectives related to erosion control

will be covered under a Soil Erosion Control Plan, to be developed by the Applicant for construction.

Table 3.1-1. Objectives and Performance Standards

	Objective	Performance Standard
Vegetation cover	Vegetate disturbed sites with appropriate cover of desired species	By year 5, total percent cover of desired species (collectively) on disturbed areas will be >70% of percent cover of desired species in reference areas. (For cut/fill areas, total cover of desired species will be >70%; no use of reference areas.)
Species composition	Establish a species composition on disturbed sites that is similar to reference sites	By year 5, at least 70% of total plant species must be either from the seed mix or plantings or from the plant species present in the reference areas or on the location prior to disturbance.
Invasive plants	Minimize the introduction or spread of invasive species	Percent cover of non-designated invasive weeds will not exceed the percent cover of weeds in the reference areas; monitoring to occur through year 5.

3.2 Monitoring Methods

Monitoring methods are intended to be relatively simple and repeatable over time, with methods and performance standards distinct for the three disturbance types: damaged vegetation areas, graded areas, and cut/fill areas. Monitoring will be conducted by a qualified vegetation specialist familiar with the species and vegetation types found within the Project Boundary.

For the damaged vegetation and grading areas, revegetation success (establishment and planting survivorship) will be assessed by comparing the revegetated condition to the reference areas condition over time. Areas of cut/fill will be monitored by qualitatively assessing the general condition and any erosion that may be occurring, and documenting percent cover and species composition within a survey plot (size and dimension to be determined based on the cut/fill area).

3.2.1 Reference Area Conditions

Reference plots adjacent to disturbed areas of the Project will be established to compare and evaluate revegetation success. The Project area's vegetation types are outlined in the FLA Exhibit E Section 3.3.1.2, Vegetation Types. The vegetation types include:

- Columbia Plateau Steppe and Grassland
- Inter-Mountain Basins Cliff and Canyon
- Inter-Mountain Basins Big Sagebrush Steppe
- Columbia Plateau Scabland Shrubland
- Columbia Plateau Western Juniper Woodland and Savanna

- Introduced Upland Vegetation—Annual Grassland
- Introduced/Invasive Wooded
- Introduced Upland Vegetation—Annual Grassland with Rock Outcroppings

At least two permanent reference plots will be established within each vegetation type disturbed by the Project. Coverages in these reference plots will be averaged by vegetation type for the basis of the performance standards above in Table 3.1-1.

Reference plots will be selected randomly but will be representative of the area's conditions. To document reference plot conditions, the data should include the following metrics: total percent cover, species composition, percent bare ground, woody species number, and density. Photos should also be of sufficient quantity and quality to illustrate the general vegetation conditions present across a site.

Plot size will vary with strata. For example, herbaceous plants and shrubs may be surveyed within 1 and 10 meter square nested plots, respectively. One or more smaller herbaceous plots could also be surveyed within the shrub plot.

3.2.2 Revegetation Monitoring

Revegetated areas will be monitored for germination success (initially) and establishment success thereafter to determine whether the revegetation objectives are being met, based on the performance standards presented in Table 3.1-1. The amount of erosion (e.g., rilling or gullying) present in steeper areas will also be documented during the annual revegetation monitoring.

Germination success will be assessed qualitatively for all seeded areas at the start of the first growing season after seeding (e.g., late April-early May) to determine whether seeds are germinating and whether additional seeding or other corrective actions should be implemented. Grasses and forbs would be expected to begin germinating during the first growing season after seeding, while shrubs can take longer to germinate (e.g., up to 3 years). Therefore grass and forb germination will be assessed in the first year after seeding, and shrub germination will continue to be assessed in subsequent years.

To measure establishment success, permanent plots will be established in areas of homogenous vegetation cover and landscape features. Monitoring plots will be selected randomly but will be representative of the area's conditions. The following metrics will be collected at each permanent monitoring plot: total percent cover, species composition, percent bare ground, woody species number, density, and survivorship of planted individuals. Photo points will also be installed at each plot to provide visual representation of change over time. Within each revegetation area, results will be averaged across vegetation types (e.g., within each big sagebrush steppe or juniper woodland plot type). Plot size will vary with strata. For example, herbaceous plants and shrubs

may be surveyed within 1 and 10 meter square nested plots, respectively. One or more smaller herbaceous plots could also be surveyed within the shrub plot.

While invasive species will be documented as part of the annual plot monitoring (e.g., species composition and percent cover metrics), weeds will further be monitored across all revegetated areas. Weed monitoring will involve walking revegetated areas to document the presence and percent cover (within a patch) of target weed species. Target weed species include all noxious weeds listed on the 2017 State of Washington and Klickitat County Noxious Weeds Lists (Klickitat County 2017). Locations of weed patches will be mapped using a handheld GPS unit with sub-meter accuracy.

3.2.3 Monitoring Schedule

- Reference areas: Plots will be monitored annually starting in the first growing season after seeding or planting the revegetation areas, and each year thereafter, for a total of 5 years or until performance standards are met (Section 3.1).
- Germination success: Grass and forb germination monitored at the start of the first growing season after seeding (e.g., late April-early May); shrub germination (if included in seed mix) monitored for a total of three growing seasons after seeding.
- Establishment success and erosion: Plots will be monitored annually starting in the first growing season after seeding or planting, and each year thereafter, for a total of 5 years or until performance standards are met (Section 3.1).
- Weeds: Monitored annually starting in the first growing season after seeding or planting, and each year thereafter for a total of 5 years or until performance standards are met.

3.3 Additional Revegetation Amendments

Additional revegetation amendments will be determined on an as needed basis. For example, additional planting, hydroseeding, fertilizer application, and irrigation may be considered if the site is not meeting performance standards.

4.0 REFERENCES

Benson, J. E., R.T. Tveten, M. G. Asher, and P.W. Dunwiddie. 2011. *Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin*.

Dunwiddie, P., and P. Camp. 2013. *Enhancement of Degraded Shrub-Steppe Habitat with an Emphasis on Potential Applicability in Eastern Washington*. Teach Note 443. Bureau of Land Management, Spokane District, Spokane, WA.

Klickitat County. 2017. *Klickitat County Noxious Weed List, Washington State Noxious Weed Control Board*. Accessed January 2019. https://www.klickitatcounty.org/575/Klickitat-County-Weed-List-PDF.

ATTACHMENT 1:

LEVEL A—FIELD DATA FORM

ATTACHMENT 1: LEVEL A—FIELD DATA FORM

Site Name	
Wildlife area unit	
Date:	
Recorded by	
Survey Distance or Area	
Time since planted	

Abundance rating

1=Rare
2=Occasional
3=Frequent
4=Common
5=Abundant

Table 1: Project Objectives Being Evaluated/Monitoring Conclusions

Insert list of objectives. Add rows as necessary Draw conclusions as to whether or not objectives were met.

Objective	Met?	Notes
Example #1: Within 3 years, establish two or more native bunchgrasses at abundance level 5	*Yes*	*Dominants match reference dominants*

Table 2: Vegetation Observations. *Add/remove rows or columns as necessary*

Species	Observed Abundance	Objectives and associated success criteria.				
		1	2	3	4	5
Seeded grasses						
Seeded forbs						
Shrubs						
Non-seeded native species						
Exotic species						

Observations: Erosion, use by wildlife, patterns of vegetation establishment, success or failure of plantings and weed control, etc.

Attachment 5
The Applicant's Draft Wildlife Management Plan

GOLDENDALE ENERGY STORAGE HYDROELECTRIC PROJECT

Federal Energy Regulatory Commission Project No. 14861

Klickitat County, Washington

FINAL LICENSE APPLICATION
Appendix D: Wildlife Management Plan

For:

FFP Project 101, LLC

June 2020

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Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
Applicant	FFP Project 101, LLC
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
GPS	Geographic Positioning System
Licensee	FFP Project 101, LLC
MBTA	Migratory Bird Treaty Act
PM&Es	protection, mitigation, and enhancement
Project	Goldendale Energy Storage Project No. 14861
USFWS	United States Fish and Wildlife Service
WMP	Wildlife Management Plan
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

The purpose of this draft Wildlife Management Plan (WMP) is to develop voluntary guidelines that FFP Project 101, LLC (the Applicant and eventual Licensee) will adopt to reduce impacts to wildlife (including avian species) associated with the construction and operations of the Goldendale Energy Storage Project No. 14861 (Project). This WMP has been developed for submittal to the Federal Energy Regulatory Commission (FERC) in concert with the Project's Final License Application (FLA) and will be further developed as the Project moves through the FERC licensing process. This WMP establishes goals for managing wildlife resources in the Project area and vicinity; identifies measures for existing and proposed wildlife habitat management, mitigation, and improvement; and describes programs designed to implement those measures.

This WMP provides guidance for overall habitat management and specific concerns related to mammals and reptiles that utilize habitat in the Project area; summarizes environmental conditions at the Project; identifies avian species potentially occurring in the Project area and the associated potential impacts to birds, including eagles; and provides measures to address the risks to wildlife, including avian species. The management strategy discussed herein takes into account the developed nature of properties within and adjacent to the Project area and potential cumulative impacts to avian species in the Project area and vicinity. The term "Project vicinity" is used to describe areas adjacent to and near the defined Project area included in previous studies of energy development in the immediate area. The Project vicinity discussed for wildlife includes areas where wildlife could be directly or indirectly affected by Project activities, and takes into account far-ranging species such as mule deer (*Odocoileus hemionus hemiqnus*) and migratory birds.

This draft WMP will be updated in consultation with the United States Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDFW), and the Oregon Department of Fish and Wildlife. The consultation and outreach process is described in greater detail in Exhibit E, Section 10.3.3 of the FLA. Consultation will be ongoing throughout the licensing and license implementation phases of the Project.

1.1 Goals and Objectives

The Applicant's management of wildlife resources in the Project area is defined in Exhibit E, Section 3.2 of the FLA and is further focused by the goals listed below.

- Goal 1. Avoid, reduce, and mitigate impacts to wildlife, including avian species.
    - Develop best management practices (BMPs). Construction will be timed to reduce impacts to wildlife resources in the Project vicinity, particularly during critical time periods (e.g., courtship, breeding, nest building, egg laying).

- Goal 2. Work in concert with existing developments in the Project area to reduce Project impacts to wildlife, including avian species.
    - Nearby wind turbines pose a threat to raptors and other birds; therefore, habitat for raptors and their prey will not be improved in the Project area, so as to not encourage their use of these habitat areas.
- Goal 3. Comply with existing and proposed state and federal resource management plans, laws, and regulatory frameworks including the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA).
    - Work in consultation with WDFW and USFWS to develop specific eagle conservation measures, if deemed necessary, to reduce risk to the golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*), as well as compliance with the MBTA and BGEPA.

1.2 Project Area and Planning Area

The Project is situated on a bench above the Columbia River near John Day Dam on river mile 215.6, about 8 miles southeast of the city of Goldendale in Klickitat County, Washington, as illustrated in Exhibit G of the FLA.

The proposed Project area is included in the regional Columbia Hills Important Bird Area designated by the National Audubon Society (National Audubon Society 2015). Results of resource studies in areas adjacent to or near the Project area are included in this WMP and referred to as the "Project vicinity."

1.3 Regulations Protecting Wildlife and Avian Species

This section describes the applicable regulations pertinent for the development of this WMP. Native wildlife and birds in the United States are protected primarily under three main pieces of legislation: the Endangered Species Act (ESA), MBTA, and BGEPA.

The purpose of the ESA is "to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species." Section 9 of the ESA prohibits "take" of threatened or endangered species, which includes killing, injuring, or harming a listed species or its habitat. Any activity that may result in the "incidental take" of a threatened or endangered species requires permits issued from the USFWS under Sections 7 or 10 of the ESA. There are no documented threatened or endangered species or their designated critical habitats in the Project area (see FLA Exhibit E, Section 3.2).

The BGEPA is the primary law protecting eagles. BGEPA prohibits "take" of eagles without a permit (16 United States Code 668-668c). BGEPA defines "take" to include "pursue, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and prohibits take of individuals

and their parts, nests, or eggs. The USFWS expanded this definition by regulation to include the term “destroy” to ensure that “take” includes destruction of eagle nests. The term “disturb” is further defined by regulation as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause,…injury to an eagle, a decrease in productivity, or nest abandonment” (50 Code of Federal Regulations [CFR] 22.3).

Under MBTA (16 United States Code 703), it is illegal for anyone to "take" migratory birds, their eggs, feathers, or nests. "Take" includes by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. The MBTA does not distinguish between intentional and unintentional take. Additional protections are provided to migratory birds by FERC through a memorandum of understanding with the USFWS (FERC and USFWS 2011). The USFWS is, in part, responsible for the protection of wildlife including avian species.

Golden eagles have been listed as a Washington state candidate species since 1991, under review for possible listing as State Endangered.

2.0 PROPOSED MEASURES

This section identifies measures, including BMPs, that will be incorporated into planning, design, construction, and operational phases of the Project in order to avoid and reduce impacts on wildlife, including raptors. The Licensee will continue to develop and refine these BMPs and this WMP in consultation with the USFWS and WDFW. Wildlife protection and eagle conservation measures are further described below and may also include the following:

- Identification and implementation of potential compensatory mitigation approaches; and
- Cumulative effects analysis to assess take in combination with take from previously authorized actions and reasonably foreseeable future actions.

2.1 Raptor Studies

The Applicant recognizes the role of monitoring studies as essential components for avoiding and reducing disturbance and other forms of take. Surveys will be conducted by a qualified and experienced raptor biologist. Data gathered from survey and monitoring studies will be used to conduct informed impact analyses and mitigation decisions.

2.1.1 Raptor Nest Surveys and Monitoring

Prior to construction, surveys will be conducted to locate and identify raptor nests within the Project area based on historic nest locations. Historic raptor nest locations identified in the John Day Dam territory during WDFW raptor surveys and surveys completed prior to the Windy Point project construction that overlap the Project area will be used as a point of reference. Specifically, golden eagle and prairie falcon surveys will be focused on historically documented

nest locations near the Project area. Pre-construction surveys for bald eagles will also be conducted within the Project area, and will include documenting any bald eagle communal winter roosts.

Location: Surveys will be conducted within and near the Project area in the areas of all known nest sites and in all suitable nesting habitat in the study area, within a maximum of a 1-mile buffer around the Project area. Bald eagles nest in mature trees, typically conifers (e.g., juniper, pine, or Douglas-fir trees). Golden eagles typically nest on cliffs or rock outcrops but will occasionally nest in mature trees. Prairie falcons nest on bluffs and cliffs.

The three historic golden eagle nest locations near the Project area range from approximately 50 to 300 feet from the Project Boundary to the west/southwest of the lower reservoir. These historic golden eagle nest locations will be included in the raptor survey area. In addition to those three historic golden eagle nest locations, there are four historic nest locations to the east of project Boundary and just below the access road. Since these nest locations are within the golden eagle territory and within line of sight of the Project, they will also be surveyed. The Licensee will consult with the WDFW and USFWS area biologists as well as guidance found in the *Interim Golden Eagle Inventory and Monitoring Protocols*; *and Other Recommendations* (Pagel et al. 2010) and *Management Recommendations for Washington's Priority Species, Volume IV: Birds* specific for golden eagles (Watson and Whalen 2004).

A historic prairie falcon eyrie within territory FAME 289 (John Day Dam Substation; previously provided to the Applicant) is located within the Project Boundary. The historic prairie falcon eyrie within territory FAME 288 (John Day Dam; previously provided to the Applicant) is also in close proximity to the Project Boundary. These historic eyries will be included in the raptor survey area.

Methods: The Licensee plans to conduct pre-construction surveys to document nesting activity (or lack thereof), which will support the development of appropriate mitigation measures (e.g., buffer distances, seasonal timing restrictions). Specifically, the Licensee will conduct surveys of bald eagle, golden eagle, and prairie falcon nests for two breeding seasons prior to initiating construction, and will implement avoidance measures as appropriate depending on the results of the surveys.

Raptor occupancy will be determined by two ground surveys between February 1 and April 30 for the 2 years preceding disturbance activities. Each survey consists of two field events, such that all suitable habitat is searched at least twice per season. Field events should ideally be scheduled in the early and later part of the breeding season (e.g., in February and in April). Surveys should be conducted earlier in the morning hours. Duration of individual surveys will be 4 or more hours and conducted at a minimum of 30 days apart. Locations of other raptor nests will be noted concurrently with occupancy surveys.

A third survey will be conducted from June through the first week in July to evaluate productivity. Specific protocols and techniques will be developed in accordance with WDFW survey guidelines, in consultation with WDFW and USFWS area biologists as well as guidance provided in Pagel et al. 2010 and Watson and Whalen 2004 documents referenced above. In addition, bald eagle surveys and management recommendations will be developed using the *National Bald Eagle Management Guidelines* (USFWS 2007).

In areas where nests are determined to be active by monitoring studies, raptor-specific conservation measures and general nest protection measures will be developed in consultation with the USFWS and WDFW. These additional mitigation measures will be submitted to USFWS and WDFW for final review and subsequent approval and filed with FERC.

Breeding survey field methods are described below to identify nests in suitable habitat and observe nests to confirm whether a nest is active.

- Identify nests in areas of suitable habitat using ground-based survey methods:
    - Establish transects near the upper and lower reservoirs, and traverse the area at intervals no greater than 0.25 mile (approximately 400 meters). Pause frequently (at least every 0.25 mile) for periods of at least 3 minutes and use binoculars to scan the surrounding area for signs of raptor activity. Nests may be detected by visually following bird movements. Careful visual searches of the cliffs, rock outcrops, low hills, trees, and other potential nesting substrates may also yield nests.
    - To avoid disturbing nests, mark nest locations on the field maps for later mapping in a geographic information system (e.g., ArcGIS).
- Observe known or new nest locations to confirm occupancy:
    - Observe the nest ideally from a minimum distance of 0.5 mile (800 meters).
    - Observe nests for 2 to 3 hours (CPW 2018), or until occupancy is confirmed. Nests should not be considered unoccupied until they have been observed for 2- to 3-hour periods during at least two survey periods, at least 7 days apart.
- Identify nests in areas of suitable habitat using aerial-based survey methods:
    - In order to survey steep terrain and cliff and/or bluff habitat, helicopter surveys may be utilized to conduct raptor surveys within and near the Project area. The survey area would include the areas of all known nest sites and in all suitable nesting habitat in the study area, within a maximum of a 1-mile buffer around the Project area.

Monitoring: Based on raptor survey results, monitoring of raptor use and productivity will occur prior to construction and during operations. In accordance with USFWS recommendations and based on site-specific environmental conditions and raptor nesting status, the appropriate spatial and temporal restrictions on construction activities will be implemented.

Reporting: Monitoring observations and survey results will be submitted as part of a summary report as described in Section 3.0 below.

2.1.2 Winter Roost Surveys

Pre-construction surveys will include winter roost surveys prior to Project construction.

The winter roost surveys are primarily to identify bald eagle roosting areas as it is less common for golden eagles to communally roost in winter. Roost surveys will be conducted in all suitable roosting habitat in the study area where disturbance is proposed (and where landowner permission is granted). Suitable habitat includes tall deciduous or coniferous trees, typically with an open branching structure. Standing snags and utility poles have also been recorded as bald eagle communal roost sites (USFWS 2020). Roost grove size can vary from 1 to 30 acres, and several roosts can exist within a general wintering area, with perching locations moving within a grove depending on the prevailing wind or other weather. Bald eagle winter roost locations can also be located based on identification of the eagles' foraging areas. Once observations of the foraging areas are made, eagles can potentially be tracked back to their communal roost. If the biologist locates four to five birds foraging in one area, then their flights can be observed and a directional bearing can be recorded to help identify the flight corridors and locate the roosting grove.

Roosting surveys will be conducted during leaf-off conditions, between December and February. Surveys can be conducted at dawn or dusk; however, dusk observations are usually more reliable as eagles are visible at the roost longer and lighting is typically better. Dawn observations should extend 30 minutes before and after sunrise. Dusk surveys should be conducted at least 1 hour prior to sunset, and extend 30 minutes after sunset. Surveys should be avoided during inclement weather (e.g., fog, snow, rain, or high wind). Winter roost survey methods are described below.

- Establish observation locations from open areas with a clear line of sight to observe a known portion of the study area. Mark the observed area on the field maps to ensure all potential habitat areas in the study area are observed.
- Using binoculars and a spotting scope, observe at each location for approximately 1 hour. Scan potential flight paths for eagles arriving or departing from roosting areas. Perching birds may also be observed.
- Observation locations should be established at a minimum of 0.25 mile (400 meters) from potential roost areas to avoid disturbing eagles (CPW 2018). Effort should be made to appear non-threatening, such as remaining inside a vehicle or using a pop-up blind.
- If a probable roost is identified but not confirmed, visit the area during the day to search for any eagle evidence (e.g., features or castings).
- Mark roosting locations on the field map during the survey. Record the actual roosting tree/grove location and document using a handheld Geographic Positioning System (GPS)

unit during the day when eagles are not roosting to avoid disturbance. Take photos of the roosting tree when the GPS point is recorded and identify the tree species.

- In addition to documenting roosting areas, record any incidental observations of raptor stick nests.

2.1.3 Literature Review

The WDFW May 28, 2019, letter (see Appendix F) recommended a review of similar impacts on migratory birds from other projects. Specifically, they requested that a literature review be conducted to gather information that will provide information on impacts and use of pump storage projects where new reservoirs were constructed adjacent to wind turbines.

The Applicant agrees that a literature review will provide useful information. However, the Applicant cannot be held accountable for wind project effects that are unrelated to the Goldendale Project. The Applicant will continue to research options and measures to reduce attraction to the reservoirs, including looking into how this issue is addressed at airport storm water detention basins.

In the same 2019 letter, the WDFW recommended pre- and post-construction bat surveys during spring, summer, and fall for 2 consecutive years as well as acoustic bat surveys. However, pre-construction studies conducted by the wind farms already document species presence. The Applicant will continue to conduct a literature review of the nearby wind farms and associated bat studies.

2.2 Construction Phase Protection, Mitigation, and Enhancement Measures

Construction disturbance will be avoided by flagging the limits of the construction zone to avoid sensitive areas designated for preservation. These areas may include high quality native plant communities and priority habitats (e.g., John Day Talus and John Day Cliffs).

Construction activities will be limited to the hours of 8:00 a.m. to 6:00 p.m. to avoid disrupting crepuscular foraging activity by species such as ungulates and raptors (e.g., owls) and to minimize impacts to nocturnal activity.

Construction activities will generate short-term increases in sound levels; therefore, the Project will concentrate construction activities with the loudest noise to occur outside of the critical nesting periods to minimize effects on migratory birds and bald and golden eagles as much as possible. When feasible, on- and near-surface blasting and helicopter use will be prohibited from 0.25 to 1 mile of an active nest, depending on the species. Site-specific studies and consultation with a knowledgeable area biologist will be used to refine spatial buffers. Additional actions may include the submission of an application for permitted take (e.g., non-purposeful take), 50 CFR 22.26, (Form 3-200-71).

2.2.1 Raptor-safe Transmission Construction

Project transmission within the Bonneville Power Administration (BPA) right-of-way will utilize existing BPA structures and connect at the John Day substation (see FLA Exhibit A, Figure 1.1-1). In accordance with the standards and guidelines outlined by the Avian Power Line Interaction Committee (APLIC) and USFWS (APLIC and USFWS 2005; APLIC 2012) and the Electrocution Mitigation Basics (Eagle Electrocution Solutions 2018), protection, mitigation, and enhancement (PM&E) measures and BMPs will be implemented to minimize risk of electrocution and collision mortality to raptors.

The Eagle Electrocution Solutions (2018) states "Eagle electrocutions occur on distribution power poles where clearances between electrified or electrified and grounded parts are shorter than metacarpal-to-metacarpal or head-to-foot distances. When perching or landing on a power pole, eagles can be electrocuted by simultaneously contacting two different phase conductors (phase-to-phase), or a conductor and a path to ground (phase-to-ground)." A power pole is considered "eagle-friendly" when there are 40 inches or more of vertical clearance and 60 inches or more of horizontal clearance between energized conductors or energized conductors and grounded hardware (Eagle Electrocution Solutions 2018; APLIC and USFWS 2005). Insulation of the center conductor can allow eagles to safely perch; however, this is not a permanent solution because insulators need to be replaced (Eagle Electrocution Solutions 2018). Perch discouragers (e.g., spikes on pole cross arms) are a less reliable mitigation option because determined eagles may still attempt to perch on them (Eagle Electrocution Solutions 2018).

Birds are more likely to collide with smaller diameter wires (e.g., overhead static wire), which may be less visible than larger diameter wires (APLIC and USFWS 2005). The installation of visibility enhancement devices can reduce the risk of collision on new or existing lines (e.g., marker balls, bird diverters) (APLIC and USFWS 2005).

The Project will ensure that the transmission line is sited on the existing poles so that appropriate clearance between energized conductors or between energized conductors and grounded hardware is applied. If the existing transmission lines already have visibility enhancement devices installed, no new ones will be added. If no visibility enhancement devices are on the existing lines, the Project will install appropriate devices after consultation with USFWS and WDFW. New poles and lines will be designed with appropriate conductor spacing and visibility enhancement devices.

2.2.2 Noise Management Measures

Noise from blasting activities could disturb nesting bald and golden eagles. Blasting should be avoided within 0.5 mile of active nests, unless greater tolerance to the activity (or similar activity) has been demonstrated by the eagles in the nesting area (USFWS 2007). However, golden eagles may be disturbed at distances greater than 0.5 mile from nest sites. The Licensee will apply for an eagle non-purposeful take permit from USFWS if blasting would occur within

0.5 mile of the golden eagle nest sites. In the event that the *National Bald Eagle Management Guidelines* (USFWS 2007) cannot be followed, the Licensee would apply for an eagle non-purposeful take permit for the Project and coordinate with the nearest USFWS Ecological Services Field Office, USFWS Regional Migratory Birds Permit Office, and WDFW.

When feasible, high noise activities such as blasting and heavy equipment operation will be conducted simultaneously. The Licensee will equip noise-producing equipment and vehicles with exhaust mufflers and/or other type of noise control features.

2.2.3 Biological Construction Monitoring

A biological monitor will be employed to check construction sites to ensure that protected areas are not disturbed and that fencing is intact. Additionally, during open pit construction, inspections of open pits will occur daily to ensure animal safety. Open pits will be closed, temporarily fenced, or covered each evening.

Construction disturbance will be minimized by flagging the limits of the construction zone to avoid sensitive areas. Environmental monitoring will be conducted during construction activities to ensure avoidance of flagged areas.

Golden eagle survey protocols and techniques will be developed using the *Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations* (Pagel et al. 2010) as well as *Management Recommendations for Washington's Priority Species, Volume IV: Birds* (Watson and Whalen 2004).

After construction is completed, all access roads to the Project area will be gated to prevent public access without prior approval.

2.2.4 Biological Training Program

The Licensee will provide environmental training on sensitive biological resources associated with the Project area to inform their employees, as well as employees of contractors and subcontractors, who work on the Project area or related facilities during construction and operation. Training will be conducted prior to the start of construction, when new employees and contractors are hired to assist Project development and operations, as well as at other times as necessary due to implementation or operational changes.

2.2.5 Address Habitat Loss

To avoid additional loss of habitat, the proposed Project will utilize existing access roads and previously developed lands for the majority of Project features. To address loss of habitat due to the permanent Project features, the Applicant is working with USFWS and WDFW to select an off-site property for compensatory mitigation of impacted wildlife habitat (i.e., golden eagle). A mitigation ratio of 2:1 acres will be used for habitat impacts of the upper reservoir; a ratio of 1:1

acres will be used for the lower reservoir/West Surface Impoundment area because of the poor quality, degraded state.

Additional mitigations for the removal of vegetation can be found in the Vegetation Management and Monitoring Plan (Appendix E).

2.2.6 Manage Traffic

Wildlife mortalities can occur from vehicle activity during construction and operations. Key measures to reduce road fatalities include limiting speeds on all roads and the development of a Traffic Management Plan.

Mitigation measures that may be included in the Traffic Management Plan include:

- Setting appropriate speed limits to minimize collisions with wildlife or other vehicles/individuals;
- Dust and erosion control measures to limit changes to air quality and visibility;
- Controlled/limited access routes to reduce the likelihood of collisions and interference; and
- The consideration of use of muffled engines/exhaust to minimize the noise disturbance.

Additionally, appropriate signage will be placed along the roads to notify recreational users of the work that is occurring, as well as signage, speed bumps, pavement markings, and flaggers to help direct traffic as necessary.

2.3 Operational Phase Protection, Mitigation, and Enhancement Measures

Additional operational measures will be evaluated upon further details of operations schedule and maintenance.

2.3.1 Carcass Removal Program

The Licensee will monitor for and remove carcasses of livestock, big game, and other animals from the Project area that may attract scavenging wildlife, foraging eagles, or other raptors.

2.3.2 Reduce Attraction for Migratory Birds

The Licensee will implement the use of reservoir deterrents such as wildlife exclusion fencing and floating plastic shade balls to discourage migratory bird use of the reservoirs. A monitoring program to identify bird usage of the reservoirs and measure the effectiveness of bird deterrents will be developed.

The Licensee will follow a Vegetation Management and Monitoring Plan (Appendix E) that includes measures to address potential introduction and spread of undesirable plants such as

hanging riparian vegetation and grass-forb communities adjacent to the reservoirs during and after construction that may attract migratory birds, such as waterfowl. Edge habitat around the reservoirs may be modified or blocked with fences, rip-rap, or cement to make it less desirable for migratory birds.

The Project will continue to consult with USFWS and WDFW during construction and operations. Adaptive management may be implemented if PM&E measures and BMPs in place are unsuccessful. For example, bird hazing may be initiated if other measures are proven unsuccessful. A USFWS approach to adaptive management is discussed in Appendix A of the Eagle Conservation Plan Guidance (USFWS 2013).

2.3.3 Reduce Attraction for Mammals (Potential Prey Species)

The Licensee will assess the use of the deterrents, such as physical barriers, low current shocking wires and strips, modified reservoir edge habitat, and reduction of the introduction and spread of potential forage species surrounding reservoirs to discourage mammals using the reservoirs. A monitoring program to identify mammal usage of the reservoirs and measure the effectiveness of the selected deterrents will be developed.

Reservoirs will be fenced to minimum height of 8 feet with chain link fence. Weather permitting, fences will be monitored on at least a weekly basis when staff are present at the reservoirs, and any damage (e.g., vandalism) will be fixed immediately as it is practicable. Any damage or occurrences of injury or mortality to wildlife species as a result of fencing will be documented and reported to WDFW. All fences associated with the Project will also be marked with vinyl strips and/or reflective tape to reduce avian collision risks.

2.3.4 Wildlife Incident Reporting System

A wildlife incident reporting system will be developed with intent to be in place for the life of the Project. This program will accompany the USFWS Injury and Mortality Reporting System. Incidents may include mortalities, injuries, nuisance activity, and other interactions. The report may include, but not be limited to, fatality/injury details (i.e., when the animal was discovered, type of species was involved, apparent cause of injury/fatality), environmental conditions (e.g., location, time of day), existing protection measures in place, and photographs.

Any eagle injuries or mortalities encountered will be immediately reported to the USFWS and WDFW.

2.3.5 Dust Palliatives

Dust palliatives or suppressants would be applied to all ungraded roads to reduce dust clouds that could disturb wildlife, including ungulates and reduce forage quality. A number of factors contribute to road dust generation: vehicle speed, number of wheels per vehicle, number of

vehicles, vehicle weight, particle size distribution of the surface material, restraint of the surface fines, and surface moisture (Bolander and Yamada 1999). There are several types of dust suppressants to consider for the Project. Some of the options include water, water absorbing magnesium chloride, organic lignin derivatives, clay additives, and synthetic polymer derivatives (Bolander and Yamada 1999). Tables and flow charts in the USFS Dust Palliative Selection and Application Guide (Bolander and Yamada 1999) would be used to select the best and most cost effective option for the Project.

2.3.6 Manage Light Pollution

Light pollution can affect migrating and nocturnal birds through disorientation, as well as breeding behavior and reproduction of songbirds (Kempenaers et al. 2010). Artificial light will be managed through PM&E measures that will be developed in the Visual and Recreation Resources Management Plan (Appendix E of this FLA).

3.0 IMPLEMENTATION AND COORDINATION

The Licensee will be responsible for scheduling and/or performing all needed activities, including the provision of necessary personnel, equipment rentals, materials purchase, and management oversight.

Provisions in this WMP will be formally adopted and implemented by the Licensee upon FERC approval of this WMP and after issuance of the FERC license. Requisite stakeholders will be consulted well in advance of construction efforts being implemented to assure a comprehensive and collaborative planning effort for those measures described above associated with construction.

3.1 Reporting

All WMP activities will be documented as part of a summary report submitted once yearly during construction activities, and during the first 3 years of Project operations. This report will include summary of actions that the Licensee implemented, results of surveys conducted the previous year, conclusions from monitoring results (if applicable), and any proposed modifications to plans and/or additional measures to be adopted to ensure that minimal impact to avian species as a result of Project construction and operations.

3.2 Cost Estimates

Initial cost estimates for each of the proposed measures for wildlife resources described in this WMP will be developed and refined during subsequent design work.

4.0 REFERENCES

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