APPENDIX G

Plants and Animals Reports

2018 Supplement to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report (Washington Conservation Science Institute)

2020 Mission Ridge Aquatics, Wildlife, and Botany Resources Report (Washington Conservation Science Institute)

2024 Cascade Red Fox: Supplemental to the SEPA Wildlife Report ((Washington Conservation Science Institute)

2024 Utility Corridor: Supplemental to the SEPA Fish and Wildlife Report (Washington Conservation Science Institute)

2025 Utility Corridor: Supplemental to the SEPA Fish and Wildlife Report - Amendment (Washington Conservation Science Institute)

2025 Mission Ridge Plants and Animals Resource Report (Anchor QEA)

APPENDIX G

Plants and Animals Reports

2018 Supplement to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report (Washington Conservation Science Institute)

Mission Ridge Expansion Project

Supplement to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report

Final Report – March 2018

Prepared for:

Mission Ridge Mtn Inc.
7500 Mission Ridge Rd,
Wenatchee, WA 98801

PREPARED BY:
WASHINGTON CONSERVATION SCIENCE INSTITUTE
PO BOX 494
CASHMERE, WA 98815

Table of Contents:

1. Executive Summary……4
2. Introduction 5
3. Project Summary..... 5
4. Methods and Approach.....5
   4.1. Identification of Assessment Area..... 6
   4.2. Review of Existing Information 6
   4.3. Information and Coordination.....6
5. Affected Environment ……..…….. 7
   5.1. Location and General habitat characteristics..... 7
6. Species and Habitat Assessments…….…….. 8
7. Fisheries and Aquatic Resources ……..…….. 11
8. Wildlife Species and Habitat ……..…… 20
9. Plant Species and Habitat ……..…….. 41
10. Literature Cited. ……44
11. Appendix A. Wetland Delineation Report…… 52
12. Appendix B. Chelan County Natural Resources Stream Typing for Parcel Number 212019000000 Report ……...……..…….... 110
13. Appendix C. Priority Habitat and Species Report and Map for the Mission Ridge Expansion Project Area ……..……..……..... 131

Tables

Table 1. Aquatic Federal Endangered, Threatened, and Species of Concern in the Upper Columbia River

Table 2. Aquatic State Candidate and Sensitive Species in the Upper Columbia River

Table 3. Summary of Findings for Federal and State Listed Aquatic Species

Table 4. Wildlife species that potentially occur in vicinity of Mission Ridge Proposed Expansion Project

Table 5. Summary of Findings for Federal and State Listed Wildlife Species

Table 6. Road changes proposed within the Mission Ridge Proposed Expansion Project

Table 7. Spotted owl habitat within the Mission Ridge Proposed Expansion Project

Table 8. Plant species that potentially occur in the vicinity of the Mission Ridge Project Area

Figures

Figure 1. Landownership, Land management Allocation and Assessment Areas within the Mission Ridge Proposed Expansion Project

Figure 2. Mission Ridge Proposed Expansion Project Area and Assessment Area in WRIA 40

Figure 3. Stream Type Classifications, Riparian Buffers, and Stream Gradients within Project Area

Figure 4. Location of grizzly bear management units, lynx analysis units and roads in the vicinity of the Mission Ridge Proposed Expansion Project

Figure 5. Northern spotted owl suitable habitat within the vicinity of the Mission Ridge Proposed Expansion Project

Figure 6. Proximity of Mission Ridge Expansion Project relative to Rocky Mountain elk and mule deer winter range and calving areas as mapped by the Okanogan-Wenatchee National Forest and WDFW Priority Habitat and Species

Figure 7. Potential summer habitat for Rocky Mountain elk in the vicinity of the Mission Ridge Proposed Expansion Project

EXECUTIVE SUMMARY

The Supplemental Resources Report provides a synthesis of information and data collected within the proposed Mission Ridge expansion area with regard to fish, wildlife and plant species and habitat. It is intended to serve as a Supplemental Assessment to the State Environmental Policy Act (SEPA) Checklist developed for the proposed Project. The purpose of the Supplemental Assessment is to evaluate proposed construction and operation of the Mission Ridge Expansion with respect to species and critical habitats that are protected under the Endangered Species Act (ESA) of 1973 (as amended) or Washington state law, or receive special consideration under federal and state regulations, such as Priority Habitat Species. The Supplemental Assessment is intended to provide state and county regulatory agencies with information to assess potential impacts to fish, wildlife and plant resources to comply with SEPA. Where necessary, the Supplemental Resources Report also includes conditions designed to mitigate impacts to a level of non-significance. Accordingly, these measures would be incorporated into the County's SEPA determination, as well as the permits and approvals necessary to implement the Project as enforceable conditions of development. Our assessment of potential impacts to aquatics, wildlife and plant resources and incorporation of mitigation measures into the project design adhered to all guidance found in Chelan County Code Chapter 11.78 - FISH AND WILDLIFE HABITAT CONSERVATION AREAS OVERLAY DISTRICT (FWOD) and Chapter 11.80 WETLAND AREAS OVERLAY DISTRICT (WOD).

The proposed project area and surrounding lands provide habitat for a wide variety of native wildlife species common to mixed-conifer, high elevation forests. Two non-fishbearing, perennial streams and associated riparian habitat are located within the immediate project area. No aquatic species listed as endangered or threatened are known to occur in the project area or immediate vicinity. Terrestrial species listed as endangered or threatened have some potential to occur in the project area or immediate vicinity, but none were observed during field visits. Two small Class III wetlands were identified and delineated within the project area. The proposed project includes construction of roads, multiple-use buildings, ski runs, ski lifts and associated infrastructure. Implementation of the proposed expansion project may impact some aquatic and terrestrial resources through disturbance and habitat removal and may slightly reduce suitability for some native wildlife species. These impacts may be offset by implementation of ski runs and open space within the site design. No stream crossings or ground disturbance will occur in fish bearing streams. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers. With appropriate mitigation measures we would expect no significant long-term impacts from construction or operation activities. As such, we would not expect population level effects.

1. Introduction

This Aquatics, Wildlife and Botany Resources Report (Resources Report) provides a synthesis of information and data collected relative to the proposed Mission Ridge Expansion Project (the proposed Project) with regard to fish, wildlife and plant species and habitat. It is intended to serve as a Supplement to the SEPA Checklist developed for the proposed Project. The purpose of this assessment is to discuss potential effects of the proposed project on species that are protected under the Endangered Species Act (ESA) of 1973 (as amended) or Washington state law, or receive special consideration under federal and state regulations. This assessment is intended to provide state and county regulatory agencies with information to assess potential impacts to fish, wildlife and plant resources in order to comply with State Environmental Policy Act (SEPA). This assessment is not intended to fulfill section 7 (c) of the ESA nor meet the requirements of Forest Service Manual direction (FSM 2670) including compliance with Code of Federal Regulations (CFR) 50-402.12. The Okanogan-Wenatchee National Forest (OWNF) will conduct a comprehensive environmental assessment to meet the standards set forth in the National Environmental Policy Act (NEPA), 40 CFR §1500-1508, Forest Service policy (identified in FSH 1909.15) for actions proposed on Federal Lands as well as indirect and cumulative impacts of actions on private lands associated with this project.

2. Project Summary

A complete project description can be found in the Application narrative and details are not repeated here. To summarize, Mission Ridge Resort Inc. is proposing to expand the Mission Ridge Ski Area. Two major components of the expansion include the following: 1) Expand operations in Okanogan-Wenatchee National Forest Sections 24 and 25 and the privately held Sections 19 and 30; and 2) Expand the Special Use Permit Area and permitted operations into the northeast corner of Okanogan-Wenatchee National Forest Section 30. The full proposed project occurs on land under multiple ownerships, including: private, US Forest Service – Okanogan-Wenatchee National Forest (Wenatchee River Ranger District) and Washington Department of Fish and Wildlife. Figure 1 and Figure 2 provide an overview of the location of the proposed Project.

The information presented in this Resources Report is an approximation of the proposed Project activities. Any substantial changes to the following proposed activities will result in additional review. The activities considered here that may potentially impact aquatics, wildlife and/or botany resources include:

- Approximately 4.8 miles of new road.
- Stream crossings.
- Vegetation removal and ground disturbance for construction of building lots, buildings, roads, trails. The private land parcels encompass 773 acres with proposed construction (resulting in ground disturbance) occurring on approximately 160 of those acres. Construction is proposed to occur on approximately 72 acres of public lands. The total area of ground disturbance is approximately 232 acres.
- Operational activity during construction and final operation

3. Methods and Approach

The preparation of this Resources Report included conducting two points of investigation to assess the existing environmental conditions of and the potential impacts of the proposed project to aquatic and terrestrial species and habitats. The two points of investigation included the following: 1) a review of existing information; and 2) field site visits of the potential project footprint of the Mission Ridge Proposed Expansion. Available information was reviewed to determine presence of wetlands, streams, and potential fish, wildlife and plant habitat. A separate Wetland Report summarizes the existing conditions of wetlands and wetland species found in the Project Area (Appendix A).

3.1 Identification of Assessment Area

For the purposes of this assessment we have defined a Project Area, which encompasses all areas of proposed construction and ground disturbance or habitat modification and includes a 100 foot buffer (for analysis purposes).The Project Area includes US Forest Service land within Section 24 (T21NR19E) and Section 30 (T21NR20E), Washington Department of Fish and Wildlife land (Administered by US Forest Service) within Section 25 (T21NR19E), and Private Land within Sections 19 and 30 (T21NR20E). The Project Area encompasses approximately 1,058 acres and will be used to assess direct and indirect effects. The Project Site defines those portions of the Project Area that will likely experience actual ground disturbance or vegetation modification and encompasses approximately 232 acres (Figure 1). The Project Site will be used to assess direct effects of ground or vegetation disturbance.

The overall Assessment Area is the Squilchuck and Stemilt Subwatersheds, within WRIA 40 (Figure 2). The Assessment Area is the area to be affected directly or indirectly by the private party action and not merely the immediate area involved in the action. The Assessment Area provides a basis for describing existing conditions and potential impacts at a scale and within a context appropriate for aquatic species and mobile species such as spotted owls and wide-ranging carnivores. The Squilchuck and Stemilt Subwatersheds encompass approximately 28 square miles (mi^2) and 33 mi^2, respectively.

3.2 Review of Existing Information

We consulted a combination of available species lists and spatial databases to identify species and habitats of concern that are known to occur or have the potential to occur in the study area vicinity. A description is provided for each resource in the following sections. We narrowed down available data to a list of those species and habitats that occur or potentially occur in the vicinity of the proposed Project. Species that are currently on or under consideration for the ESA or state endangered, threatened, or species of concern lists are identified. Additional information on those fish, wildlife and plant species and typical habitat they use is provided below.

3.3 Information and Coordination

The proposed Project is located on multiple ownerships and jurisdictions. As such we have begun coordination with each of the following agencies and entities:

- Washington Department of Fish and Wildlife - biologists were contacted on 18 August 2017 for information about species and habitat concerns relative to the Project Area. Obtained data relative to sensitive species.
- Chelan County Natural Resources - Stream Typing
- Washington State Department of Ecology – input on wetland and riparian habitats.
- Washington State Department of Natural Resources – input on riparian habitat, spotted owl habitat, vegetation management.
- US Forest Service – The Okanogan-Wenatchee National Forest will be conducting a National Environmental Policy Act (NEPA) analysis for actions on federal lands. We are coordinating with the Wenatchee River Ranger District on this process.
- US Fish and Wildlife Service (Wenatchee Field Office) - potential impacts to listed species.
- Confederated Tribes of the Colville Nation – cultural and environmental concerns
- Confederated Tribes and Bands of the Yakama Nation - cultural and environmental concerns

4. Affected Environment

4.1 Location and General Habitat Characteristics

The proposed Project is adjacent to the existing Mission Ridge Ski Area and adjoins the northeast border of the existing ski area boundary. Part of the proposed Project is located on land administered by the Wenatchee River Ranger District, Okanogan-Wenatchee National Forest, while the private parcel is under the jurisdiction of Chelan County, Washington. The proposed Project encompasses: Sections 19, and 30, Township 21N, Range 20E, W.M. and Sections 24, and 25, Township 21N, Range 19E, W.M.

Habitat and topography in the Project Area are similar to the existing ski area with a mix of alpine meadows, primarily subalpine forest (with some small areas of Douglas-fir and ponderosa pine), basalt rock outcrops and talus. The proposed Project is located within the East Cascades Slopes and Foothills Ecoregion. Elevation of the proposed Project Area ranges from 3,100 feet at the junction with the existing Mission Ridge Base Area to 6,700 feet along the highest ridges in the greater Assessment Area. Aspect varies across the Project Area. The terrain is steep, with slopes varying from 0 to 178 percent, and the majority of the slopes less than 60 percent.

Part of the proposed Project is located within the ponderosa pine (*Pinus ponderosa)* cover type (historical database) within the East Cascades Ecoregion (Washington Natural Heritage database, version July 2017). The Eastern Cascades Ecoregion is described as (EPA, 2017):

> "The Eastern Cascade Slopes and Foothills ecoregion is in the rainshadow of the Cascade Range. It has a more continental climate than ecoregions to the west, with greater temperature extremes and less precipitation. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher ecoregions to the west where hemlock and fir forests are common, and the lower, drier ecoregions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry, continental climate and frequent fire. Historically, creeping ground fires consumed accumulated fuel and devastating crown fires were less common in dry forests. Volcanic cones and buttes are common in much of the region. A few areas of cropland and pastureland occur in the lake basins or larger river valleys."

Ecological Systems provide a mid-scale ecological classification for uplands and wetlands. Ecological Systems represent recurring groups of terrestrial plant communities that are found in similar climatic and physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding, share similar substrates, and/or environmental gradients (Rocchio and Crawford, 2015).

Ecological System Classes within the Project Area include: Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland, with a very small area of Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland and Northern Rocky Mountain Ponderosa Pine Woodland and Savanna.

Vegetation is primarily closed-canopy single-story stands dominated by Douglas-fir (*Pseudotsuga menziesii*) with a mixed conifer component consisting of grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*) and larch (*Larix occidentalis*). The area is a mix of very dense stands with little understory vegetation to more open canopy. Understory vegetation is primarily comprised of upland type vegetation such as pine grass (*Calamagrostis rubescens*), serviceberry (*Amelanchier alnifolia*), twinflower (*Linnaea borealis*), kinnikinnick (*Arctostaphylos uva-ursi*), pipsissewa (*Chimaphila umbellata*), oceanspray (*Holodiscus discolor*), and vine maple (*Acer circinatum*). Bitterbrush (*Purshia tridentata*) and yarrow (*Achillea millefolium*) can be found in the drier parts of the Project Area.

Riparian areas near streams consist of vegetation types such as elderberry (*Sambucus* spp.), bead lily (*Clintonia borealis*), sedges (*Carex* spp.) and mosses. A small, scattered aspen (*Populus tremuloides*) stand is located on the private parcel. A large (greater than 20 inches diameter at breast height (DBH)) tree and snag component is lacking. Much of the Project Area is even-aged resulting from harvest activities in the mid-20th century. More than 250 acres are open, rolling, talus fields with little vegetation.

The proposed Project Area is generally dry with numerous ephemeral hydrologic drainage paths that terminate in perennial creeks on the west side of Section 19. Two small emergent wetlands were identified on the northeast corner of the Project Area (see attached Wetland report, Appendix A). The majority of the soil types within the Project Area consist of Stemilt silt loam series, rubble and rock outcrops, loneridge very stony loam series and naxing very stony loam series.

Lands under US Forest Service jurisdiction are managed to provide developed recreation (RE-1) opportunities per the Wenatchee Land Management Plan (USFS, 1990) and as Administratively Withdrawn or within Riparian Reserves per the Northwest Forest Plan (USDA and USDI, 1994). The proposed Project Area adjoins lands managed by Washington State Department of Natural Resources to the east. The Project Area is located within water resource inventory area (WRIA) 40 and the Squilchuck and Stemilt Sub-watersheds (HUC12).

5. Species and Habitat Assessments

In the following sections we provide resource specific information to describe the existing habitat condition and species occurring or potentially occurring in the vicinity of the proposed Project and evaluate potential impacts to species of special status. A summary of proposed conservation measures, designed to avoid, minimize or mitigate impacts with the intent to prevent any adverse impacts, is also provided for each resource.

Based on our assessments, the Mission Ridge Proposed Expansion Project will have no adverse impacts to special status aquatic, wildlife or plant populations or habitats. The project is consistent with all local, state and federal regulatory guidance. The project is designed to limit impacts and conserve resources when possible and incorporates mitigation and conservation measures to achieve these objectives. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential effects to discountable levels.

Figure 1. Landownership and Land Management Allocation relative to Project Site and Project Area within the Mission Ridge Proposed Expansion Project

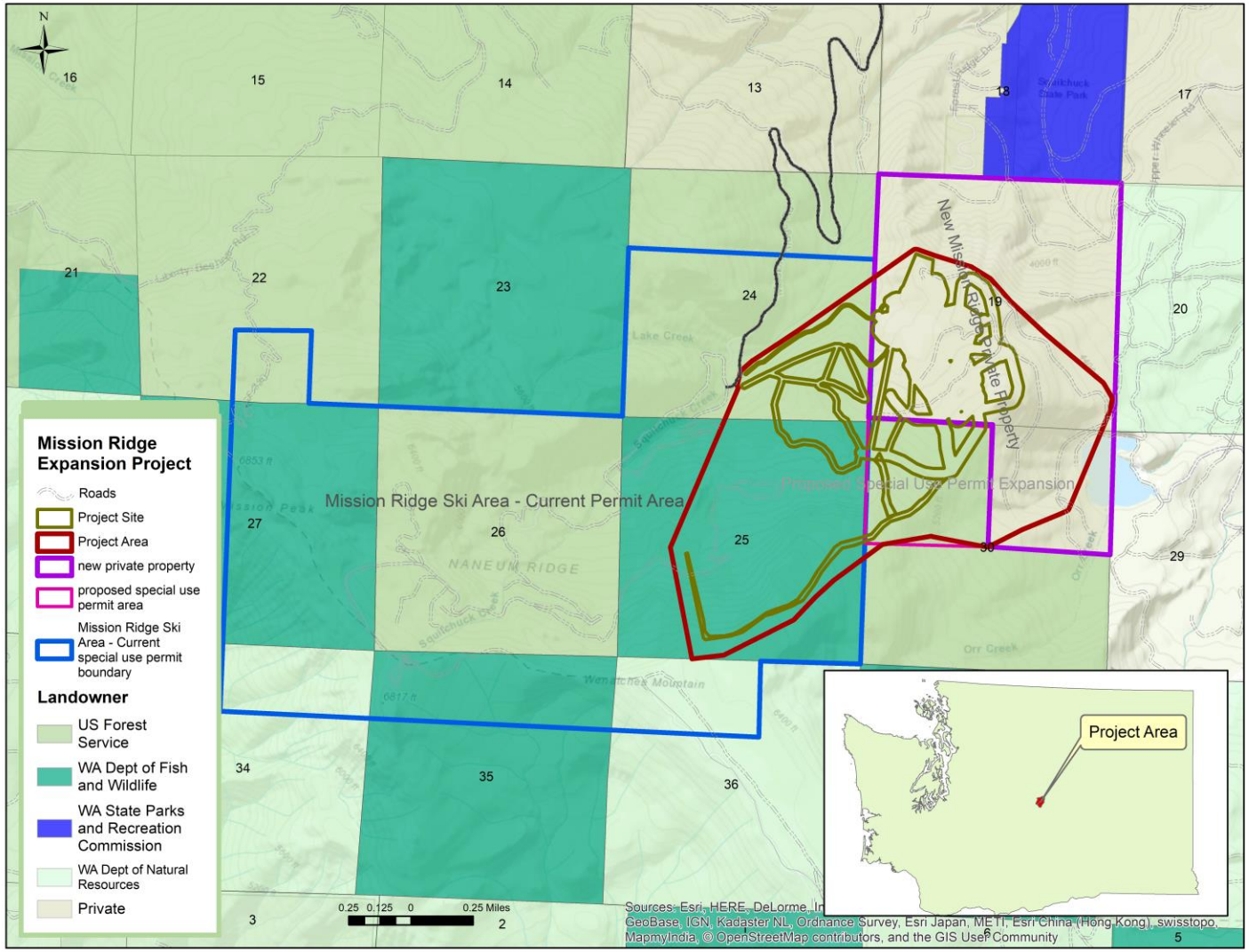
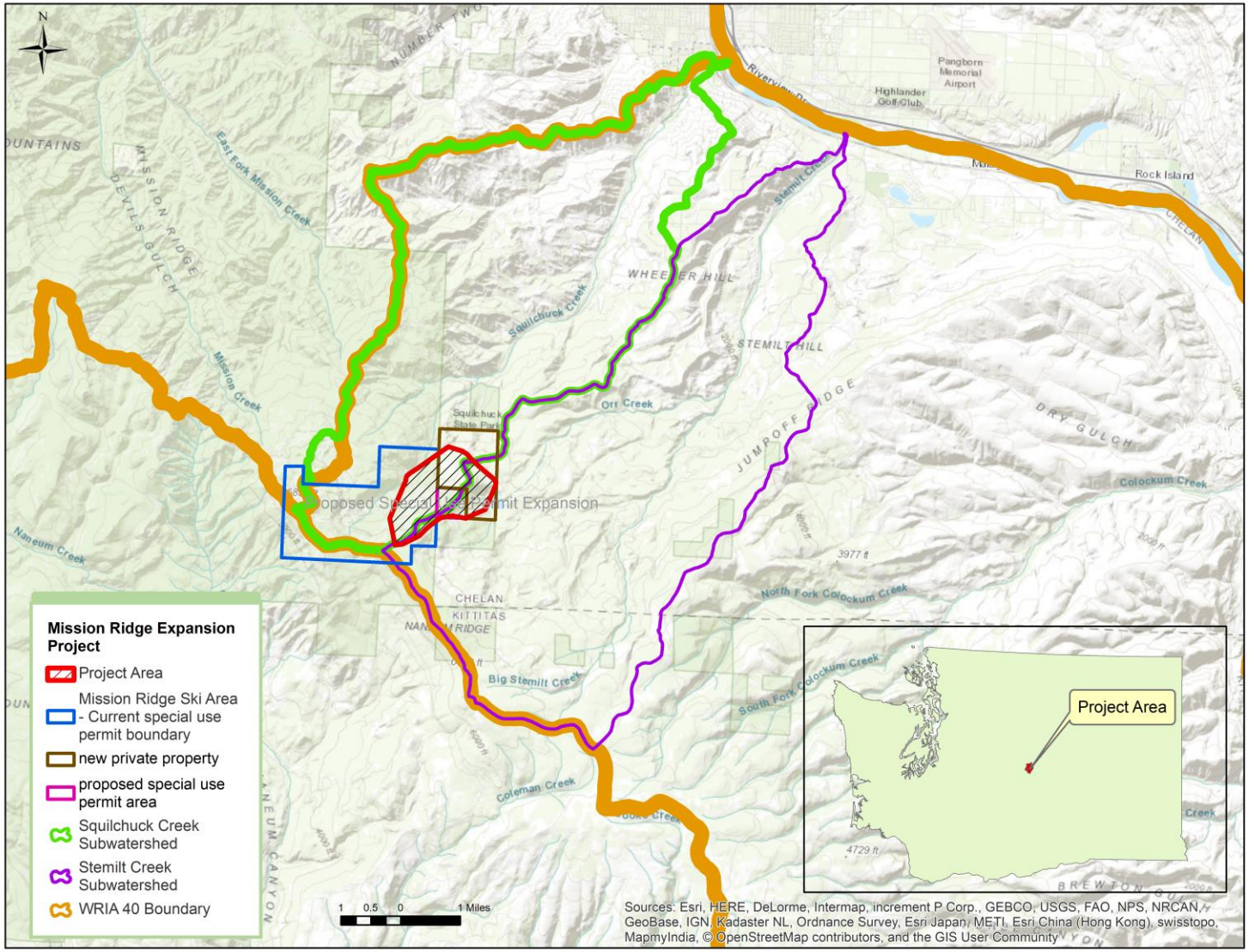


Figure 2. Mission Ridge Proposed Expansion Project Area and Assessment Area in WRIA 40



6. Fisheries and Aquatic Resources

This Resources Report provides a summary of aquatic resources, including federal and state listed fish species and associated habitats, that may be found in the Squilchuck Creek Watershed, the Mission Ridge Proposed Expansion Project Area and larger Assessment Area (Figure 1 and Figure 2).

Review of Existing Information

The preparation of this Resources Report included review of several existing documents, sources of habitat and environmental information and review of various agencies' GIS data and maps. A summary of the review of existing information is provided throughout this Resources Report.

The following provides an example of the types of sources that were included in the review:

- Chelan County Natural Resource Department. 2017. Stream Typing for Parcel Number 212019000000 Report.
- Forest Practices Board. 2002. Forest Practices Board Manual Section 13 Determining Fish Use for the Purpose of Typing Water.
- National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017. Species Under the Endangered Species Act (ESA). NMFS Office of Protected Resources. Available at: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish.
- National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017. Endangered Species Act Critical Habitat. West Coast Region. Available at: http://www.westcoast.fisheries.noaa.gov/maps_data/endangered_species_act_critical_habitat.html.
- United States Fish and Wildlife Service (USFWS). 2014b. Final Critical Habitat for Bull Trout Upper Columbia River Basins Unit: 10. Available at: https://www.fws.gov/pacific/bulltrout/finalcrithab/index.cfm?unit=10.
- United States Fish and Wildlife Service (USFWS). 2017. National Wetland Inventory (NWI) Wetlands Map. Available at: http://www.fws.gov/wetlands/Data/Mapper.html.
- United States Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.
- Upper Columbia Regional Technical Team (RTT). 2003. A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region. Discussion Draft.
- Washington Conservation Commission (WCC). 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages)., Olympia, WA.
- Washington Department of Fish and Wildlife (WDFW). 2017. SalmonScape Mapping System. Available at: http://apps.wdfw.wa.gov/salmonscape/.
- Washington Department of Fish and Wildlife (WDFW). 2006. WRIA 40 Diversion Screening and Fish Passage Inventory Report.
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington State Department of Natural Resources (WDNR). 2017. Washington Natural Heritage Program GIS data set. Available at: http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html.

Site Visits

Several site reconnaissance visits have been conducted to become familiar with and characterize the Project Area and Assessment Area. Two of the site visits, conducted in August 2017, focused on preliminary assessment and documentation of aquatic habitat including streams, riparian buffers, and

wetlands. The first site reconnaissance was conducted on August 3, 2017. During this field visit streams, riparian areas, and wetlands were identified in the Project Area and their locations were documented to create a GIS layer to develop baseline habitat maps. A preliminary assessment of existing conditions was also conducted for these areas.

The first field reconnaissance provided information and maps for the second site visit conducted on August 16, 2017. During the second site visit, the Chelan County Natural Resource Department conducted a stream typing determination for streams in the private land portion of the Project Area.

The intent of the stream typing effort was to locate, and type streams identified as present in the Project Area on the Washington Department of Natural Resources (WDNR) Forest Practices Application Review System (FPARS) mapping tool. Results of the Chelan County stream typing effort and determinations are summarized in the Salmonid and Fish Use in Squilchuck Creek Watershed section of this Resources Report. The complete Chelan County Natural Resource Department 2017 Stream Typing for Parcel Number 212019000000 Report is in Appendix B.

Salmonid and Fish Use in the Columbia River

The Columbia River and its tributaries supports numerous anadromous salmonid species including Chinook, chum, coho, pink, and sockeye salmon; coastal cutthroat, steelhead, and bull trout; as well as resident and migratory lamprey. Other fish include but are not limited to sturgeon, rainbow trout, American shad, smelt and mountain whitefish. The Columbia River also provides rearing, foraging, spawning and adult habitat for numerous resident fish, shellfish, plants, and wildlife species unique to the Pacific Northwest.

The Upper Columbia River provides migration, rearing, foraging, overwintering, and spawning habitat for Chinook and sockeye salmon, steelhead trout, bull trout, lamprey, and mountain whitefish. Coho salmon are considered extirpated from the Upper Columbia River but in recent years the Yakama Nation has started a program to reintroduce them to the system (WCC, 2001). Native and hatchery produced anadromous species of salmon and trout are found in the Upper Columbia River throughout every month of the year.

Several wild salmonid species found in the Upper Columbia River and Chelan County are federally listed as endangered, threatened, or species of concern by the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS). The listed species, their evolutionary significant unit, and their critical habitat and federal status are provided in Table 1 (NOAA Fisheries, 2017a; USFWS, 2017). Table 2 provides Washington Department of Fish and Wildlife (WDFW) listing status for state candidate and sensitive fish species.

Table 1: Aquatic Federal Endangered, Threatened, and Species of Concern in the Upper Columbia River

Common Name	Scientific Name	Evolutionary Significant Unit	Critical Habitat	Regulatory Agency Status
Chinook salmon	*Oncorhynchus tshawytscha*	Upper Columbia River Spring Run	Yes	NOAA / Endangered
Bull trout	*Salvelinus confluentus*	Washington	Yes	USFWS / Threatened
Steelhead trout	*Oncorhynchus mykiss*	Upper Columbia River	Yes	NOAA / Threatened
Pacific lamprey	*Lampetra tridentata*	Washington	No	USFWS / Species of Concern
Pygmy whitefish	*Prosopium coulteri*	Washington	No	USFWS / Species of Concern

Table 2: Aquatic State Candidate and Sensitive Species in the Upper Columbia River

Common Name	Scientific Name	Evolutionary Significant Unit	Regulatory Agency Status
Chinook salmon	*Oncorhynchus tshawytscha*	Upper Columbia River Spring Run	WDFW / Candidate
Bull trout	*Salvelinus confluentus*	Washington	WDFW / Candidate
Steelhead trout	*Oncorhynchus mykiss*	Upper Columbia River	WDFW / Candidate
Leopard dace	*Rhinichthys falcatus*	Washington	WDFW / Candidate
Mountain sucker	*Catostomus platyrhynchus*	Washington	WDFW / Candidate
Pygmy whitefish	*Prosopium coulteri*	Washington	WDFW / Sensitive
Umatilla dace	*Rhinichthys umatilla*	Washington	WDFW / Candidate

Salmonid and Fish Use in the Squilchuck Creek Watershed

The Project Area and larger Assessment Area are within the Squilchuck and Stemilt Watersheds, which are part of the Alkali-Squilchuck Watershed Resource Inventory Area (WRIA) 40. This northern portion of WRIA 40 is south of the City of Wenatchee, in Chelan County, Washington (Figure 2). All three streams drain directly to the Columbia River, at river mile 464.0, 461.9, and 450.0, respectively. The majority of the Project Area encompasses a portion of the Squilchuck Creek Watershed and a very small portion of the Stemilt Creek Watershed. Ground disturbance and habitat modification is only proposed to occur within the Squilchuck Creek Watershed. Therefore, the Squilchuck Creek Watershed will be the focus of this section of Resources Report. Riparian areas and streams, in both the Squilchuck Creek and Stemilt Creek Watersheds, will have established riparian buffers to protect aquatic resources. Stream crossings and ground disturbance will avoid all fish bearing streams.

From its headwaters, Squilchuck Creek flows just over 1.5 miles through federal lands, including the Mission Ridge Ski Area, and continues to flow for approximately nine miles thru private and state lands to its confluence with the Columbia River. Squilchuck Creek flows from Mission Ridge Ski Area through mountainous forested areas, shrub-steppe areas, orchards and other agricultural, residential, and small industrial areas, and the larger developed City of Wenatchee. Major highways, roads, and railways exist in the watershed.

According to the Salmon, Steelhead and Bull Trout Limiting Factors Report for WRIA 40 (WCC, 2001), Squilchuck Creek is characterized as a naturally low surface water producer with arid geology. While the mouth of Squilchuck Creek at its confluence with the Columbia River is expected to support rearing of Chinook salmon and steelhead trout, the upper extent of Squilchuck Creek habitat is limited to anadromous salmonids by natural fish passage barriers, steep gradients, stream channel size, and insufficient flows. Other habitat limiting factors in Squilchuck Creek include roads, floodplain and riparian buffer conversion to agriculture and residential development, water diversion for irrigation, reduced large wood recruitment and instream habitat complexity, flood control practices such as berms disconnecting floodplain habitat from the stream channel and stream channelization. Compacted fines and gravel and high turbidity found throughout the nine miles of the system further limit habitat.

The WDNR FPARS mapping tool lists 14 streams in the Project Area. Thirteen of the streams are classified as non-fish bearing (N) and one is listed as unknown (U). The Chelan County stream typing effort resulted in the following stream type determinations:

- Ten of the 14 listed streams were determined to not qualify as streams
- Two of the 14 listed streams were determined to qualify as non-fish bearing perennial streams (Np)
- One of the 14 listed steams was determined to qualify as a non-fish bearing seasonal stream (Ns)

- One of the 14 listed streams, Squilchuck Creek, was determined to be on federal land and was not typed. Squilchuck Creek is classified on the WDNR FPARS as a fish bearing stream.

Figure 3 provides an overview of the Project Area showing the location of streams, updated stream type classifications, stream gradients, and riparian buffers. The majority of the streams within the Project Area are considered steep, with gradients greater than 20 percent which is considered a threshold for fish use (FPB, 2002; Washington Administrative Code, WAC-222-031).

In addition to the natural limiting factors described above, Squilchuck Creek has numerous human constructed fish passage barriers throughout the system, particularly in the lower elevations of the watershed. Aside from culverts and water diversions, the major barriers preventing access to spawning and rearing habitat include the Burlington Railroad culvert at RM 0.1, a partial fish passage barrier, and the Wenatchee Avenue culvert at river mile 0.3, a full fish passage barrier to Chinook salmon (WCC, 2001). Approximately 1.2 miles above the mouth, a natural barrier exists that limits migration for adult Chinook and coho salmon (WDFW, 2006). In high water events, steelhead trout may be able to migrate past these barriers, but seasonal low flows and severely degraded habitat limits their productivity (WCC, 2001).

The Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region classifies the Squilchuck Creek Watershed as a Category 4 watershed due to fish passage barriers and intermittent stream flows that limit the distribution of anadromous salmonids, and likely isolate populations of inland trout. Category 4 watersheds contain both functional and non-functional habitats that historically supported populations of one or more federally listed species. Exotic species may now be dominant in one or more subwatersheds and native species are typically not present in sustainable numbers (RTT, 2003).

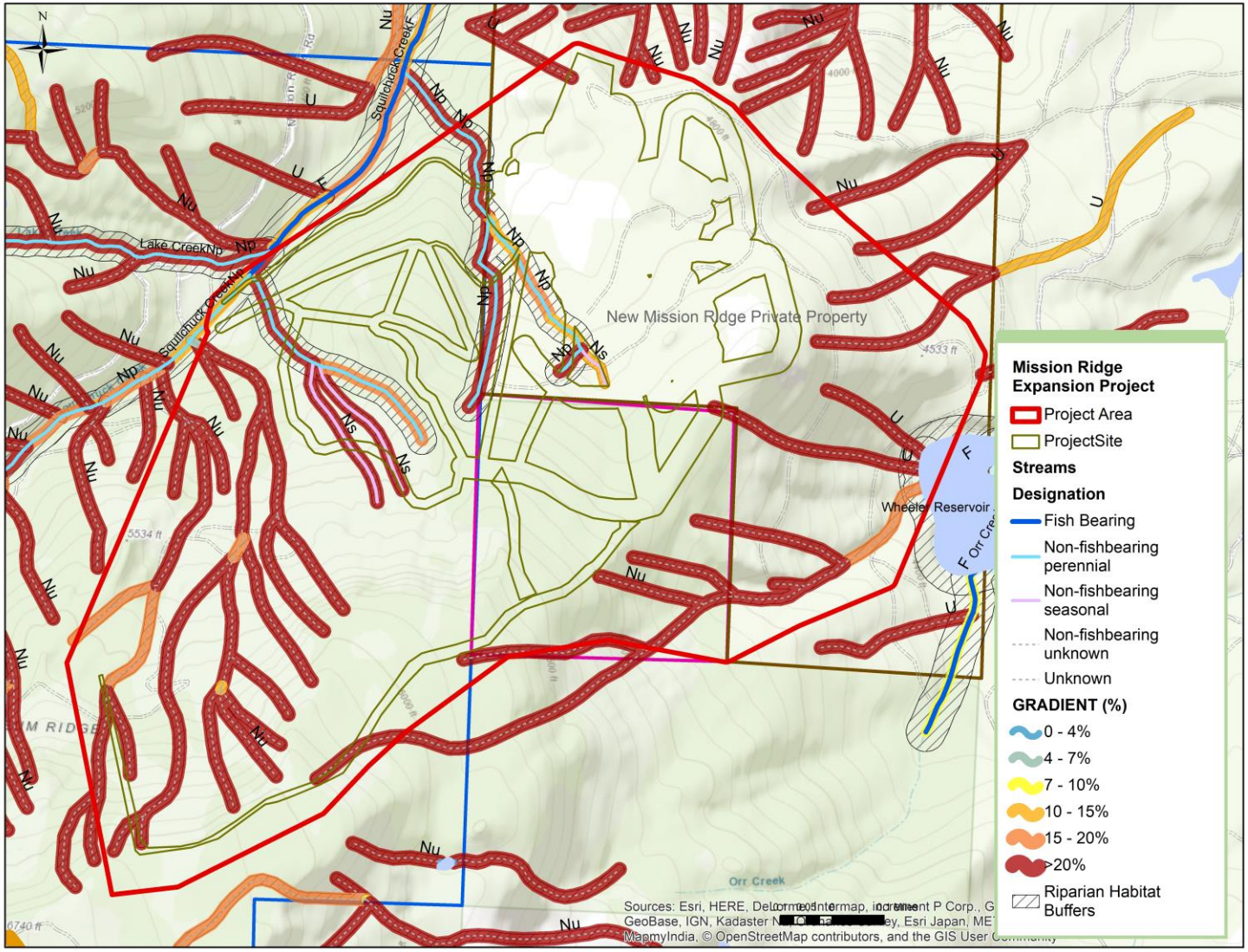
Native salmonid species expected to use Squilchuck Creek include Chinook and coho salmon and steelhead trout, primarily for rearing in the lower elevations below fish passage barriers and at the confluence of the Columbia River. Because of the natural limiting factors, bull trout are not expected to be found in Squilchuck Creek. Resident rainbow trout and west slope cutthroat trout are expected to be found throughout the system but as mentioned above are expected to be isolated populations with limited productivity (RTT, 2003).

The following provides a brief description of federally listed endangered and threatened salmonid species that use the lower portions of Squilchuck Creek. A brief description of mountain sucker, a state listed fish species of concern, and that may have the potential to be in the upper portions of Squilchuck Creek, is also provided. Table 3 provides a summary of effects determinations for the federal and state listed fish species discussed below. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Chinook Salmon (*Oncorhynchus tshawytscha*) - Endangered

Chinook salmon have a historic range extending from the Ventura River in California to Point Hope, Alaska, in North America and from Hokkaido, Japan, to the Anadyr River in Russia. Chinook salmon require varied habitats during different phases of their life cycle. Spawning habitat typically consists of riffles and the tailouts of pools with clean silt-free substrate dominated by gravel in the mainstem of rivers and large tributaries (WDF et al., 1993). Chinook salmon are most frequently observed spawning in water with a daily average temperature ranging from 4 to 14°Celsius (C). Rearing of juvenile Chinook salmon usually occurs in water with temperatures ranging from 10 to 17°C (EPA, 2003). Chinook salmon spend three months to two years of their lives rearing in fresh water before migrating to the ocean, where they spend six months to seven years maturing.

Figure 3. Stream Type Classifications, Riparian Buffers, and Stream Gradients within Project Area.



Juvenile Chinook salmon require estuarine and nearshore marine habitat for migration, foraging, refuge, and osmoregulation processes. Juveniles spend from several days to months in estuarine habitat before migrating into marine waters (Kerwin, 1999). Juveniles rely on shallow nearshore habitats such as eelgrass meadows, intertidal flats, tidal marshes, and subtidal channels near estuaries (Steelquist, 1992). Once juvenile Chinook are large enough to eat small fish and have grown larger than their prey, they move away from the shore into deeper marine waters.

Chinook salmon are opportunistic feeders. Juveniles prey on a wide variety of food such as benthic, epibenthic, and pelagic crustaceans, as well as insects, fish larva, and juvenile fish. Adult salmon feed on fish such as surf smelt, longfin smelt, Pacific sandlance, and herring while in the estuarine and marine environment.

Squilchuck Creek is expected to support rearing of Chinook salmon in the lower portions at its confluence with the Columbia River. The upper extent of Squilchuck Creek habitat is naturally limited to anadromous salmonids by steep gradients, stream channel size, and insufficient flows. Aside from numerous fish passage barriers in the system, a full passage fish barrier to Chinook salmon exists at RM 0.3. and approximately 1.2 miles above the mouth, a natural barrier exists that limits migration for adult Chinook salmon.

Direct and Indirect Effects

Implementation of the proposed Project is expected to have no effect to Chinook salmon due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and existence of full fish passage barriers. To protect designated critical habitat, NOAA Fisheries has identified three physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of Chinook salmon. The freshwater PCEs are related to spawning, rearing, and migration. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (NOAA Fisheries, 2017b).

Bull Trout (*Salvelinus confluentus*) - Threatened

The historical distribution of bull trout extends from northern California to Alaska. In Washington, bull trout are found throughout coastal and inland streams and lakes (WDFW, 1998). Bull trout have a complex life history, with two primary life-history types: a resident form and a migratory form. Bull trout that are considered migratory may be stream-dwelling (fluvial), lake-dwelling (adfluvial), or ocean- or estuarine-dwelling (anadromous) (Behnke, 2002; USFWS, 2006). Individuals of each form may be represented in a single population, although migratory populations may dominate where migration corridors and subadult rearing habitats are in good condition (USFWS, 2006).

As opportunistic feeders, juvenile anadromous bull trout migrate to estuaries in the summer months, when salmon fry and smolts become plentiful. Adult anadromous bull trout migrate between fresh, estuarine, and saltwater environments, depending on food availability. Most inland populations of bull trout are either fluvial or adfluvial, migrating from larger rivers and lakes to spawn in smaller tributary streams from August through October (Wydoski and Whitney, 2003). Bull trout spawn in streams with clean gravel substrates and cold (less than 9°C) water temperatures (Behnke, 2002; USFWS, 2006). Spawn timing is relatively short, occurring from late October through early November. Redds are dug by females in water 8 to 24 inches in depth in substrate gravel 0.2 to 2 inches in diameter (Wydoski and Whitney, 2003); emergence generally occurs in the spring. Bull trout are opportunistic feeders, consuming fish in the water column and insects on the bottom (WDFW, 1998).

While bull trout are in the Upper Columbia River, they are not expected to be found in Squilchuck Creek, the Assessement Area or the Project Area because of natural limiting factors (WCC, 2001).

Direct and Indirect Effects

Implementation of the proposed Project is expected to have no effect to bull trout due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and other natural limiting factors. To protect designated critical habitat, the USFWS has identified nine physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of bull trout. The PCEs are related to water quality; migration habitat; food availability; instream habitat; water temperature; substrate characteristics; stream flow; water quantity; and nonnative species. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (USFWS 2014b).

Steelhead Trout (*Oncorhynchus mykiss*) - Threatened

Steelhead are considered by many to have the greatest diversity of life history patterns of any Pacific salmonid species, including varying degrees of anadromy, differences in reproductive biology, and plasticity of life history between generations (Busby et al., 1996). Steelhead spend one to four years in freshwater and one to four years at sea; in Washington, a two year freshwater/two years at sea life history is most common (Steelquist, 1992). Because they can survive spawning, some can spawn a second or third time (Steelquist, 1992). Juvenile steelhead trout utilize estuaries as rearing and foraging habitat.

Steelhead are not expected to be found in the upper extent of Squilchuck Creek because of habitat that is naturally limited to anadromous salmonids by steep gradients, stream channel size, and insufficient flows. While steelhead trout may be able to migrate past the full and partial fish barriers in the lower portions of Squilchuck Creek during high flow events, seasonal low flows and severely degraded habitat are expected to limit their productivity.

Direct and Indirect Effects

Implementation of the proposed Project may affect, but is not likely to adversely affect steelhead trout due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and fish passage barriers that would preclude steelhead trout from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers. To protect designated critical habitat, NOAA Fisheries has identified three physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of steelhead trout. The freshwater PCEs are related to spawning, rearing, and migration. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (NOAA Fisheries, 2017b).

Mountain Sucker (*Catostomus platyrhynchus)*

Mountain sucker are found in high elevation mountainous areas in western North America. In Washington, Mountain sucker are only found in the Columbia River basin, east of the Cascade mountain range, in the Columbia River and its tributaries including the Cowlitz, Yakima, Wenatchee, and Palouse River basins (Wydoski and Whitney, 2003). Mountain sucker inhabit small mountain streams, generally less than 40 feet wide with summer water temperatures ranging from 12 to 21°C. They are small fish reaching up to nine inches in length and can live up to nine years. Preferred substrates are comprised of sand, gravel, and boulders. They can also be found in large rivers and lakes and reservoirs. In early to mid-summer, mountain sucker generally spawn in riffles below pools. Mountain sucker feed primarily on algae and diatoms and invertebrate larvae. They may provide a food source for other fish species such as

trout and aquatic birds. In 1998, mountain sucker was listed as a state candidate species by WDFW because of lack of information on its distribution and status in Washington (Wydoski and Whitney, 2003).

Direct and Indirect Effects

The presence of mountain sucker in the upper extent of Squilchuck Creek is unknown. Implementation of the proposed Project may affect, but is not likely to adversely affect mountain sucker due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and potential fish passage barriers that would preclude mountain sucker from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.

Design Criteria and Mitigation Measures for Aquatic Resources

All work conducted below the ordinary high water mark will require obtaining appropriate permits such as a Hydraulic Project Approval. In general, to address potential impacts from the proposed expansion to aquatic resources and fish species, the following mitigation measures and design criteria will be developed and employed:

1. Riparian areas and streams in the Project Area will have established riparian buffers per Chelan County Code 11.78.090 and US Forest Service Northwest Forest Plan (USDA and USDI 1994). Fish bearing streams on federal lands will be protected by a 300-foot riparian buffer; fish bearing streams on private land will be protected by a 200-foot buffer; and non-fish bearing streams on private land will be protected by a 150-foot buffer.
2. Stream crossings and ground disturbance will avoid and not be conducted near any fish bearing streams.
3. Stream crossings or ground disturbance below the ordinary high water mark on non-fish bearing streams, will be conducted during in-water work windows, and all erosion and pollution control best management practices (BMPs) will be employed.
4. Sediment will be prevented from entering streams and wetlands through the use of BMPs.
5. Equipment and machinery will be maintained and stored in a manner to prevent spread of aquatic invasive species and to protect riparian buffered habitat from hazardous materials (ie. fuel and oil leaks).

Table 3. Summary of Findings for Federal and State Listed Aquatic Species**.**

Evolutionary Significant Unit Common Name	**Scientific Name**	**Life History Stages**	**Effects Determination***
Upper Columbia River Spring Chinook salmon	*Onchorhynchus tshawytscha*	Juvenile rearing-migration	No effect due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and full fish passage barriers.
Bull trout	*Salvelinus confluentus*	Adult-subadult migration	No effect due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and other natural limiting factors.
Upper Columbia River Steelhead Trout	*Oncorhynchus mykiss*	Adult migration and juvenile rearing-migration	May affect but, is not likely to adversely affect due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and fish passage barriers that would preclude steelhead trout from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.
Mountain Sucker	*Catostomus platyrhynchus*	Adult migration and juvenile rearing-migration	May affect but, is not likely to adversely affect due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and potential fish passage barriers that would preclude mountain sucker from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.

*In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

7. Wildlife Species and Habitat

This section of the Resources Report provides a summary of wildlife species, including federal and state listed species and associated habitats, that may be found in the Mission Ridge Proposed Expansion Project Area (Figure 1 and Figure 2).

Review of Existing Information

The preparation of this Resources Report included review of several existing documents, sources of habitat and environmental information, and review of various agencies' GIS data and maps. A summary of the review of existing information is provided throughout this Resources Report.

The following provides an example of the types of sources that were included in the review:

- United States Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2016. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2017. Management Recommendations For Washington's Priority Habitats and Species: various volumes. Available at: http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/
- Washington State Department of Natural Resources (WDNR). 2017. Washington Natural Heritage Program GIS data set. Available at: http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html.
- United States Fish and Wildlife Service (USFWS). 2017. Species information and Recovery Plan, Northern Spotted Owl. Available at: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B08B
- United States Fish and Wildlife Service (USFWS). 2017. Critical Habitat - Northern Spotted Owl. Available at: https://ecos.fws.gov/ecp/report/table/critical-habitat.html
- Washington Department of Fish and Wildlife. 2017. Northern Spotted Owl data. Sensitive species data provided by WDFW.
- Washington Department of Natural Resources (WADNR). 2017. Spotted owl emphasis areas, GIS data set. Available at: https://www.dnr.wa.gov/programs-and-services/forest-practices/providing-gis-data-forest-practices-activities-throughout
- United States Forest Service Sensitive Species List (R6 ISSSSP). Available at: https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/

Site Visits

Walk-through reconnaissance field surveys were conducted in 2017 (June 2, July 27, Aug. 3, Aug. 16 and Oct. 2) to validate spatial data, document existing habitat conditions, identify fish, wildlife and plant habitats and determine presence of listed species and/or their prey base at the proposed expansion site and in surrounding areas. All streams and riparian areas were walked as part of the stream-typing assessment conducted by Chelan County Natural Resources (see Appendix B).

Table 4. presents those wildlife species or habitat that potentially occur in the vicinity of the proposed Project. Species that are currently on or under consideration for the ESA or state endangered, threatened, species of concern or sensitive species lists are identified. Additional information on those likely wildlife species and typical habitat use is provided below.

Table 4. Wildlife species that potentially occur in vicinity of Mission Ridge Proposed Expansion Project.

	Species/ Habitats*	***Scientific Name***	**State Status/ PHS Criteria**	**Priority Area (PHS)**	**Federal Status**
Amphibians	Columbia Spotted Frog	*Rana luteiventris*	Candidate. Species of Concern (due to regional decline)	Any occurrence	none
	Western Toad	*Anaxyrus boreas*	Candidate. Species of Concern (due to regional decline)	Any occurrence	none
Birds	Golden Eagle	*Aquila chrysaetos*	Candidate	Breeding Areas, Foraging Areas	none
	Northern Goshawk	*Accipiter gentilis*	Candidate	Breeding Areas, including alternate nest sites, post-fledging foraging areas	Species of Concern. USFS sensitive
	Dusky Grouse	*Dendragapus obscurus*	PHS - Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Regular Concentrations	none
	Sooty Grouse	*Dendragapus fuliginosus*	PHS - Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Regular Concentrations	none
	Flammulated Owl	*Otus flammeolus*	Candidate	Breeding Areas, Regular Occurrences	none
	Spotted Owl	*Strix occidentalis*	Endangered	Any occurrence	Threatened
	Pileated Woodpecker	*Dryocopus pileatus*	Candidate	Breeding Areas	none
	White-headed Woodpecker	*Picoides albolarvatus*	Candidate	Breeding Sites, Regular Occurrences	FS sensitive
Mammals	Townsend's Big-eared Bat	*Corynorhinus townsendii*	Candidate. PHS - Vulnerable Aggregations	Any occurrence.	Species of Concern. USFS sensitive
	Roosting Concentrations of: Big-brown Bat, Myotis bats, Pallid Bat		PHS - Vulnerable Aggregations.	Regular concentrations in naturally occurring breeding areas and other communal roosts	none
	Cascade Red Fox	*Vulpes vulpes cascadens*	Candidate	Any occurrence	none
	Gray Wolf	*Canis lupus*	Endangered	Regular occurrences	Endangered
	Grizzly Bear	*Ursus arctos*	Endangered	Any occurrences	Threatened

	Lynx	*Lynx canadensis*	Endangered	Any occurrence	Threatened
	Marten	*Martes americana*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Regular occurrences	none
	Wolverine	*Gulo gulo*	Candidate	Any occurrence	Candidate, proposed threatened
	Elk	*Cervus elaphus*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Calving Areas, Migration Corridors, Regular concentrations in winter and in foraging areas along coastal waters	none
	Rocky Mountain Mule Deer	*Odocoileus hemionus hemionus*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Migration Corridors, Regular Concentrations in Winter	none

*Species listed were obtained from USFWS Federally Listed species, USFS Sensitive Species and WDFW Priority species list for species in Washington and Chelan County.

The PHS interactive website indicated only spotted owl and elk as PHS species that occur in the Project Area. Freshwater emergent wetland habitats were identified on the PHS database more than one mile west of the Project Area. Wheeler Reservoir is identified as a wetland and is located adjacent to the southeast part of the Project Area (Appendix C). Of the species described in Table 4., only grouse were observed, although evidence of elk and mule deer (tracks, scat, wallow) were observed within the Project Site. No federal- or state-listed threatened or endangered species were observed during field visits. As described previously, two unmapped wetlands were identified in the Project Area during field visits.

Wildlife Species and Habitat

In this section, the habitat resources and wildlife identified within the vicinity of the proposed Project Area are described. This description includes identification of suitable habitat types, identification of wildlife species that are known to or potentially occur in the area, and identification of endangered, threatened, proposed, and candidate species for protection on state and federal species lists. We examined direct and indirect effects and identify measures that will be implemented to minimize or mitigate specific anticipated impacts.

Federally Listed Species

Four wildlife species that are currently protected under the ESA have potential to occur within the vicinity of the proposed Project. These species include: gray wolf, Canada lynx, northern spotted owl and grizzly bear. Effects determinations are summarized in Table 5, followed with detailed summaries for each of the four species in the following pages. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Table 5. Summary of Findings for Federal and State Listed Wildlife Species.

Evolutionary Significant Unit Common Name	Scientific Name	Effects Determination*
Gray wolf	*Canis lupus*	May affect, but is not likely to adversely affect the gray wolf. Effects will be negligible because although habitat for both wolves and their prey exists in the Project Area, wolves have not been documented using the area, impacts to ungulate habitat would be minimal and increases in road density are minimal at the watershed scale. Any negative effects to wolves would be due to disturbance from noise and human presence during project implementation and subsequent increased human activity. This project would be consistent with recovery regulations; there would be no effect to known denning habitat or rendezvous sites.
Canada lynx	*Lynx canadensis*	May affect, but is not likely to adversely affect the Canada lynx. The Project Area is on the edge of the range of Canada lynx within designated peripheral habitat. Although habitat conditions may be suitable in patches, lynx are highly unlikely to use the Project Area due to the fragmented and isolated nature of the habitat.
Northern Spotted Owl	*Strix occidentalis*	May affect, but is not likely to adversely affect the northern spotted owl. This determination was made because approximately eight acres of potential suitable habitat may be degraded, and noise created above ambient conditions in suitable habitat could cause disturbance, although the likelihood of occupancy at this elevation on the fringe of spotted owl range is minimal.
Critical Habitat - Northern Spotted Owl (Designated)		Designated critical habitat for the northern spotted owl does not occur within the Project Area. Therefore, project implementation would have no effect on spotted owl critical habitat.
Grizzly bear	*Ursus arctos*	May affect but is not likely to adversely affect grizzly bear. The addition of 4.8 miles of road would have no effect on core habitat for grizzly bears because implementation would occur outside of a BMU. Although the Project Area is located outside of Grizzly Bear Management Units, and is on the fringe of grizzly bear range in the North Cascades, the site is near BMUs and may provide potential habitat. The project will result in an increase in human activity in the area. Because grizzly bears are wide-ranging, disturbance could occur during project activities from noise. The likelihood of this is extremely small though, including potential disturbance to denning habitat, because bears have not been reported near the Project Area in decades.

*In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Gray Wolf (*Canis lupus*) – Endangered

The gray wolf in Washington is listed as an endangered species under the ESA (USFWS, 1967) west of U.S. Highway 97 (USFWS, 2003). Recovery regulations require consideration of potential impacts to known denning habitat or rendezvous sites (USFWS 2003). Wolves in Washington are also managed under the Wolf Conservation and Management Plan of Washington State (finalized in December 2011, Wiles et al., 2011).

Although gray wolves historically occurred in Washington, wolves were nearly extirpated by the 1940s through aggressive predator control (Laufer and Jenkins 1989; Gaines et al. 2000). Wolves have since been documented in Washington (Fritts 1992; Gaines et al., 1995) with at least 90 known wolves in 18 known packs (Becker et al. 2016). A new pack was detected west of Wenatchee in 2013 near the Project Area but has since disbanded and is no longer considered a pack by WDFW. Wolves have been reported in the vicinity of the Project Area and likely cross the area periodically.

Project effects that are generally considered relative to wolves include potential disturbance, effects to security habitat, and effects to prey base. Wolves generally den between April and June, then move pups to a series of rendezvous sites for the remainder of the summer. They are believed to be sensitive to disturbance during this time (Mech et al., 1991), particularly early in the denning period when pups are more vulnerable (Frame et al., 2007). Roads can influence security of habitat for wolves (Thiel, 1985; Mech et al., 1988; Mladenoff et al., 1995). Security habitat for wolves is defined as areas with open road and motorized trail densities less than one mile/square mile of habitat.

Deer and/or elk are common in the area and could provide a suitable prey base. Roads and human activity can also influence habitat effectiveness and reproductive capacity for ungulates. The fawning/calving period for mule deer is 15 May to 30 June; and for elk 15 May to 15 July (W. Meyers, pers. comm. 2002). Because deer and elk are considered a priority species please see page 31 for further discussion.

Direct and Indirect Effects

Roads were analyzed within the Squilchuck and Stemilt Watersheds to determine their potential effects on gray wolves (Gaines et al., 2003). Currently Chelan County Road 711 (Mission Ridge Road) is the only open road in the immediate vicinity of the Project Area. There are a number of roads that access the property from the east. These roads are technically closed but still receive public use. Mission Ridge Road is 0.2 to 0.4 miles west of the proposed Project Area. The proposed action would allow motorized access along a 0.6 mile access road, that originates from the existing Mission Ridge Ski Area parking lot, and approximately 4.2 miles of road within Section 19. Implementation of this project would not cause disturbance to any known gray wolf den or rendezvous site in the area.

The Project Area provides summer range for mule deer and elk (prey base for wolves). Fawning and calving habitat is also present in the Project Area, typically in areas with little disturbance and heavy cover, such as riparian vegetation away from more heavily travelled roads. It is unlikely that the Project Area provides spring and fall migration habitat. During the winter season, part of the Project Area is currently under the Mission Ridge Ski Area Operating permit and gets some use by skiers and snowshoers. The Project Area is not considered winter range for deer or elk.

Wolves are not currently known to reside in the Project Area. However, because wolves are wide-ranging, and the Project Area does provide potential habitat, disturbance could occur during project activities from noise caused by heavy equipment during construction and increased human activity during and after completion of the project. The duration, intensity and extent of these activities will vary depending on the phase of construction. Completion of the project would result in long-term human use along roads and within the development footprint. Although the project would increase the amount of human activity in

the area and could cause disturbance, the likelihood of additional disturbance is small, including the potential disturbance to denning habitat, because the Project Area is already impacted by human activity and noise (Thiel 1985; Mech et al., 1988).

The project would increase the amount of motorized human activity in the area. Project implementation would result in an increase of approximately 4.8 miles of new road, concentrated within the Project Site, potentially impacting less than one acre of potential calving or fawning habitat in riparian areas. Effects to riparian areas will be limited to crossings. Within the 28 mi^2 Squilchuck Creek Watershed and 33 mi^2 Stemilt Watershed, open road density would change by less than 0.2 mi/mi^2. Although gray wolf security habitat may decrease slightly due to increased motorized use, impacts will be negligible at the scale detected by wide-ranging carnivores.

Table 6. Road changes proposed within the Mission Ridge Proposed Expansion Project.

Analysis Area	Size of Area (mi^2)	Total Open Road (miles)		Open Road Density (mi/mi^2)	
		Existing Condition	Proposed Action	Existing Condition	Proposed Action
Squilchuck Watershed	28.0	112	116.8	4.03	4.20
Stemilt Watershed	33.1	174	178.8	5.26	5.40

Implementation of the proposed Project may affect, but is not likely to adversely affect the gray wolf. Effects to gray wolf will be negligible because although habitat for both wolves and their prey exists in the Project Area, wolves are not presently known to be using the area, impacts to ungulate habitat would be minimal and increases in road density are minimal at the watershed scale. Any negative effects to wolves would be due to disturbance from noise and human presence during project implementation and subsequent increased human activity. This project would be consistent with recovery regulations (USFWS 2003) as there would be no effect to known denning habitat or rendezvous sites. If wolf use is discovered at any time during the project, conservation measures such as area closures, would be implemented to reduce potential effects to discountable levels.

Canada Lynx (*Lynx canadensis*) – Threatened

The Canada lynx was listed as a Washington State threatened species in 1993, and became a Threatened species under the ESA in April 2000 (USFWS, 2000). State management guidance was originally found in the *Washington State Recovery Plan* for the Lynx (Stinson, 2001) and included designated Lynx Management Zones (LMZ). Washington Department of Fish and Wildlife up-listed lynx to Endangered in December 2016. US Fish and Wildlife Service (USFWS) designated critical habitat - revised as of 2014 (USFWS 2014a).

The lynx recovery outline stratified lynx habitat into three categories: core, secondary, and peripheral areas (USFWS, 2005). The Project Area is located within peripheral habitat. Lynx guidance also stratifies the landscape into Lynx Analysis Units (LAU), although it is no longer necessary to delineate LAUs in secondary/peripheral areas (Figure 4). The conservation measures in the recovery outline are intended to provide a greater degree of flexibility for management activities in secondary/peripheral areas as compared with the core areas. The focus of management is on providing a mosaic of forest structure to

support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area and maintaining landscape connectivity to allow for lynx movement and dispersal.

Lynx are generally associated with moist boreal forests with cold, snowy winters. The forest vegetation types consist of predominantly Engelmann spruce (*P.engelmanii*), subalpine fir (*A. lasiocarpa*) and lodgepole pine (*P. contorta*) (von Kienast 2003; Maletzke 2004; Koehler et al. 2008). Lynx avoid Douglas-fir, ponderosa pine forests, openings, recent burns, open canopy, and steep slopes (Koehler et al., 2008). In Washington, lynx are found above 1,250 meters (4,101 feet) (McKelvey et al., 2000; von Kienast, 2003; Maletzke, 2004). Lynx habitat includes dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multi-story stands with conifer boughs touching the snow surface (Interagency Lynx Biology Team, 2013). Lynx habitat is generally classified into foraging, denning and travel habitat. Lynx rely on a prey base that is primarily snowshoe hares. Foraging habitat consists of dense horizontal understory that provides food, cover and security from predators. Hares feed on conifers, deciduous trees, and shrubs (Hodges, 2000) and are often more dense in 20-year-old lodgepole pine stands with high tree and shrub densities (6,415 stems per acre) and a dense understory (Koehler, 1990). Lynx denning habitat consists of coarse woody debris, such as downed logs and windfalls, that provide security and thermal cover for lynx kittens (McCord and Cardoza, 1982; Koehler, 1990; Slough, 1999; Squires and Laurion, 2000).

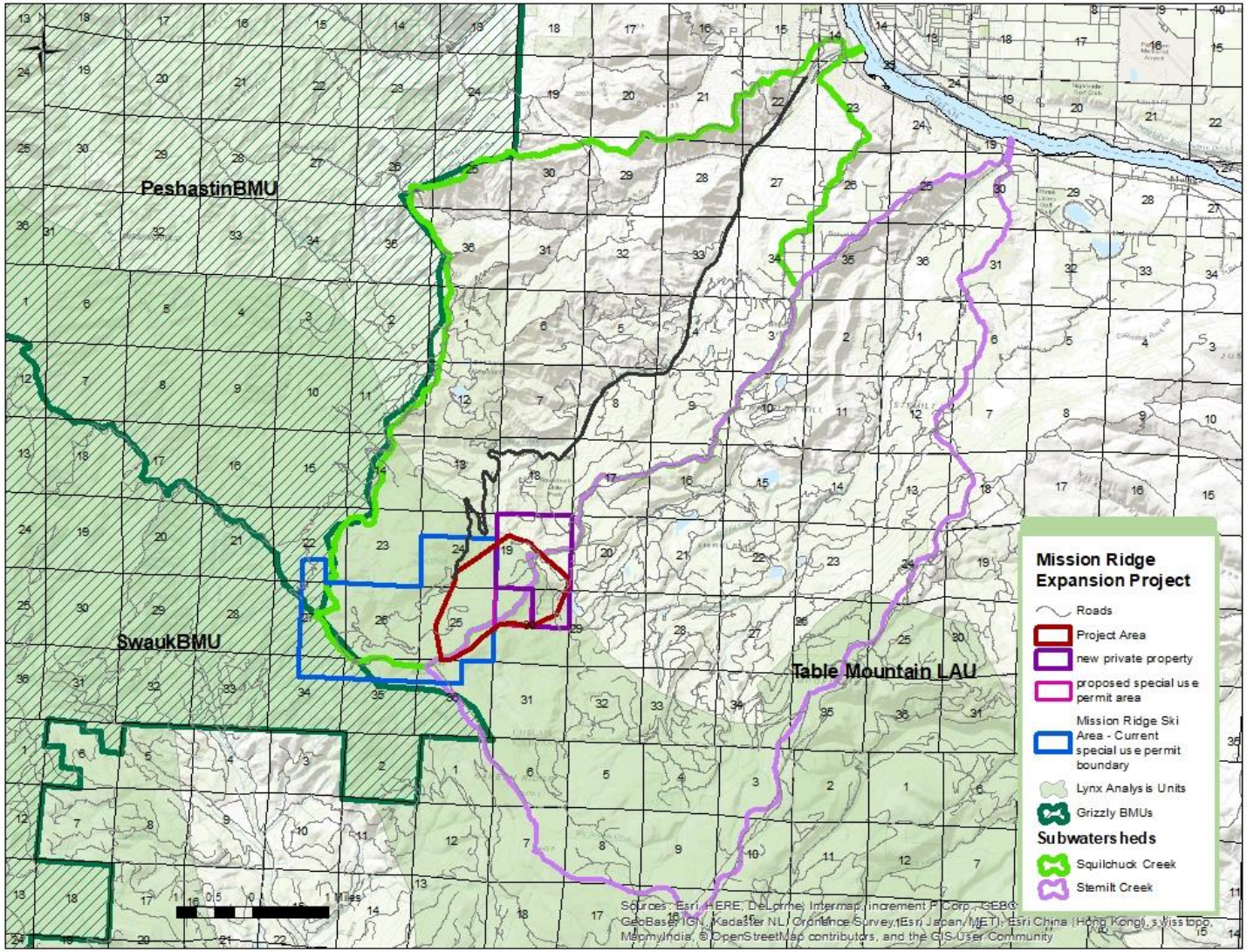
The boreal forest landscape is naturally dynamic. Forest stands within the landscape change as they undergo succession after natural or human-caused disturbances such as fire, insect epidemics, wind, ice, disease, and forest management (Elliot-Fisk, 1988; Agee 2000). Because wildfire, pathogens, wind, etc. lead to a naturally dynamic landscape within the boreal forest, lynx habitat is typically patchy. The boreal forest contains stands of differing ages and conditions, some of which are suitable as lynx foraging or denning habitat (or will become suitable in the future due to forest succession) and some of which serve as travel routes for lynx moving between foraging and denning habitat (McKelvey et al., 2000).

Lynx surveys following the national protocol (McDaniel et al., 2000) were conducted during the summers of 1998 to2003 on the Okanogan-Wenatchee National Forest, including the Wenatchee River Ranger District. Lynx presence has not been documented on the Wenatchee River Ranger District or the Project Area.

Direct and Indirect Effects

Portions of the Project Area occur within the Table Mountain LAU (Figure 4). The propose Project is not within a Washington State Lynx Management Zone. Mapped potential lynx habitat within the Project Area is classified as peripheral (unoccupied) (USFWS, 2005). Peripheral habitat areas are defined as follows: 1) Quality and quantity of habitat to support adequate snowshoe hare or lynx populations are questionable; 2) Habitat may occur in small patches and is not well-connected to larger patches of high quality habitat; and 3) May sustain short-term survival during lynx dispersal. Although LAUs are not required in peripheral habitat and there are no federal requirements to manage for lynx in unoccupied habitat, the Table Mountain LAU was delineated in the early 90's and is used for analysis purposes. The effects on lynx prey (snowshoe hare) habitat is still considered within unoccupied lynx habitat. A large percentage of vegetation in the Project Area is made up of non-prey habitat and consists of more mature, heavily stocked, decadent stands of Douglas-fir and lodgepole pine with little understory, open conifer stands or talus slopes.

Figure 4. Location of grizzly bear management units, lynx analysis units and roads in the vicinity of the Mission Ridge Proposed Expansion Project. Road data was obtained from DNR and is approximate.



The proposed project has the potential to affect the Canada lynx indirectly by altering prey habitat, primarily snowshoe hare, or directly through disturbance. However, the potential for lynx to be disturbed by project activities is very unlikely due to the lack of known lynx anywhere near the Project Area. In summary, implementation of the proposed Project may affect but is not likely to adversely affect the Canada lynx. The Project Area is on the edge of the range of Canada lynx within designated peripheral habitat. Although habitat conditions may be suitable in patches, lynx are highly unlikely to use the Project Area due to the fragmented and isolated nature of the habitat.

Grizzly Bear *(Ursus arctos)* – Threatened

The grizzly bear is listed as a Threatened species, with a determination of warranted for endangered status in the North Cascades (USFWS, 1975, 1998). Although grizzly bears once occurred throughout the North Cascades, their population has declined due to intensive historical trapping, hunting, predator control, and habitat loss (USFWS, 1997, 2011). The North Cascades Grizzly Bear Recovery Zone (NCGBRZ) was designated in 1997 (USFWS, 1997) and includes portions of the Okanogan-Wenatchee National Forest. The Project Area straddles the Recovery Zone boundary with the federal portion within the Recovery Zone and the private parcel adjacent but outside of the Recovery Zone. Although part of the Project Area is within the Recovery Zone, the entire Project Area is located outside of any Bear Management Unit (BMU) (Figure 4). The Project Area is 1.5 miles east of the Peshastin BMU and 1.5 miles north of the Swauk BMU. Core area for grizzly is defined as areas that are greater than 500 meters from an open road, motorized trail or high-use trail (IGBC, 1998) and is one metric to assess potential impacts to grizzly bears. However, because the project occurs outside of the recovery zone and any BMU, core was not evaluated.

A key component of grizzly bear management is sanitation planning. Careful planning and implementation of appropriate sanitation measures can reduce potential for wildlife-human conflicts and not only benefits bears but other wildlife species as well. The Applicant plans to include wildlife resistant sanitation measures in design plans for Resort operations and CCRs.

Direct and Indirect Effects

The addition of 4.8 miles of road would have no effect on core habitat for grizzly bears because implementation would occur outside of a BMU. Although the Project Area is located outside of grizzly BMUs, and is on the fringe of grizzly bear range in the North Cascades, the site is near BMUs and may provide potential habitat. The proposed Project will result in an increase in human activity in the area. Because grizzly bears are wide-ranging, disturbance could occur during project activities from noise. The likelihood of this is very small though due to the extremely low numbers of grizzly bears in the North Cascades, the long-term presence of human activities in the area, and the Project Area occurring outside areas deemed important for grizzly bear recovery. Project implementation may affect but is not likely to adversely affect grizzly bear.

If grizzly bear use is discovered at any time in the Project Area, conservation measures would be implemented to reduce potential affects to discountable levels. Conservation measures for the specific situation would be designed in cooperation with the USFWS and the WDFW, and could include an area closure.

Northern Spotted Owl (*Strix occidentalis caurina*) – Threatened

The spotted owl was federally listed as threatened on June 26, 1990 (USFWS, 1990). A revised recovery plan was signed on June 28, 2011 (USFWS, 2011). The spotted owl was listed within Washington in 1988 and is considered a state endangered species. WDFW completed a Periodic Status Review of the spotted owl in February 2016 (Buchanan, 2016) with a determination that in the absence of management

that effectively addresses competitive interactions with barred owls it is likely the spotted owl could become functionally extirpated in Washington in the near-term future and should maintain the endangered designation.

Despite over 25 years of federal protection, spotted owl populations have declined due to continued widespread habitat loss across the species range resulting from timber harvest and wildfire, and more recently due to competition from the barred owl (Livezey and Fleming, 2007; USDI Fish & Wildlife Service, 2011). For the Eastern Washington Cascades physiographic province, ongoing loss of habitat to wildfire and the effects of fire exclusion on vegetation were ranked as the greatest current threats (USDI Fish & Wildlife Service, 2011).

Management of spotted owl habitat focuses on suitable nesting, roosting, and foraging habitat and dispersal habitat types. A general definition of nesting and roosting habitat includes multi-layered, multi-species forests with closed-canopies (60 to 90 percent), with a component of Douglas-fir, and some old forest structural attributes (eg; large trees (greater than 30 inches DBH), Class IV snags) (Buchanan et al., 1993). Suitable nesting and roosting habitat was defined as having greater than 60 percent canopy closure for this project (USDI Fish and Wildlife, 1990; USFWS, 2011). Most nests occur in mistletoe platforms and/or abandoned goshawk nests in Douglas-fir (Buchanan, 1991; Sovern et al., 2011). Nesting habitat is generally below 5,000 feet in elevation (USFS, 2000). Nesting and roosting habitat are considered very similar (USFWS, 2011) although a decrease in the size and cover of overstory trees is associated with diminished habitat suitability (WAC 222-16-085). Foraging habitat may be similar to nesting and roosting habitat but not to the extent that may support successfully nesting owl pairs. Foraging habitat provides a mix of dry and mesic forest types that provide habitat for spotted owl prey species such as the northern flying squirrel, bushy-tailed woodrat, deer mouse, and voles (Richards, 1989; Forsman et al., 2001; Lehmkuhl et al., 2006a, b).

Spotted owls begin nesting activities in early March with juvenile dispersal from natal areas in August and September. Site specific monitoring has shown that within the Eastern Washington Cascades Province, after July 31, spotted owl young are mobile and generally considered to be able to move from disturbance. Dispersal habitat has been used to define the conditions necessary for spotted owls to move between patches of nesting, roosting and foraging habitats. Dispersal habitat does not contain the structural attributes, such as high canopy closure, and presence of large trees, and snags, associated with nesting and roosting habitats. In general, dispersal habitat is composed of single or multi-layered forests with moderate sized trees (10 to15 inches DBH), and canopy closure greater than 40 percent. Little research has been conducted to quantitatively define dispersal habitat for spotted owls. In general, nesting and roosting habitat provides all or most of spotted owl's habitat requirements, whereas foraging and dispersal habitats provide only a subset of the habitat requirements (USFWS, 2011).

The Project Area does not fall within designated spotted owl critical habitat or spotted owl emphasis areas. Designated spotted owl critical habitat is located two miles northwest of the Project Area. WDNR has designated spotted owl special emphasis areas (SOSEA) to provide for demographic and/or dispersal support as necessary to complement the northern spotted owl protection strategies on federal land within or adjacent to the SOSEA (Washington State's Forest Practices Rules, 222-16-086). The Project Area is approximately six miles southwest of the nearest SOSEA.

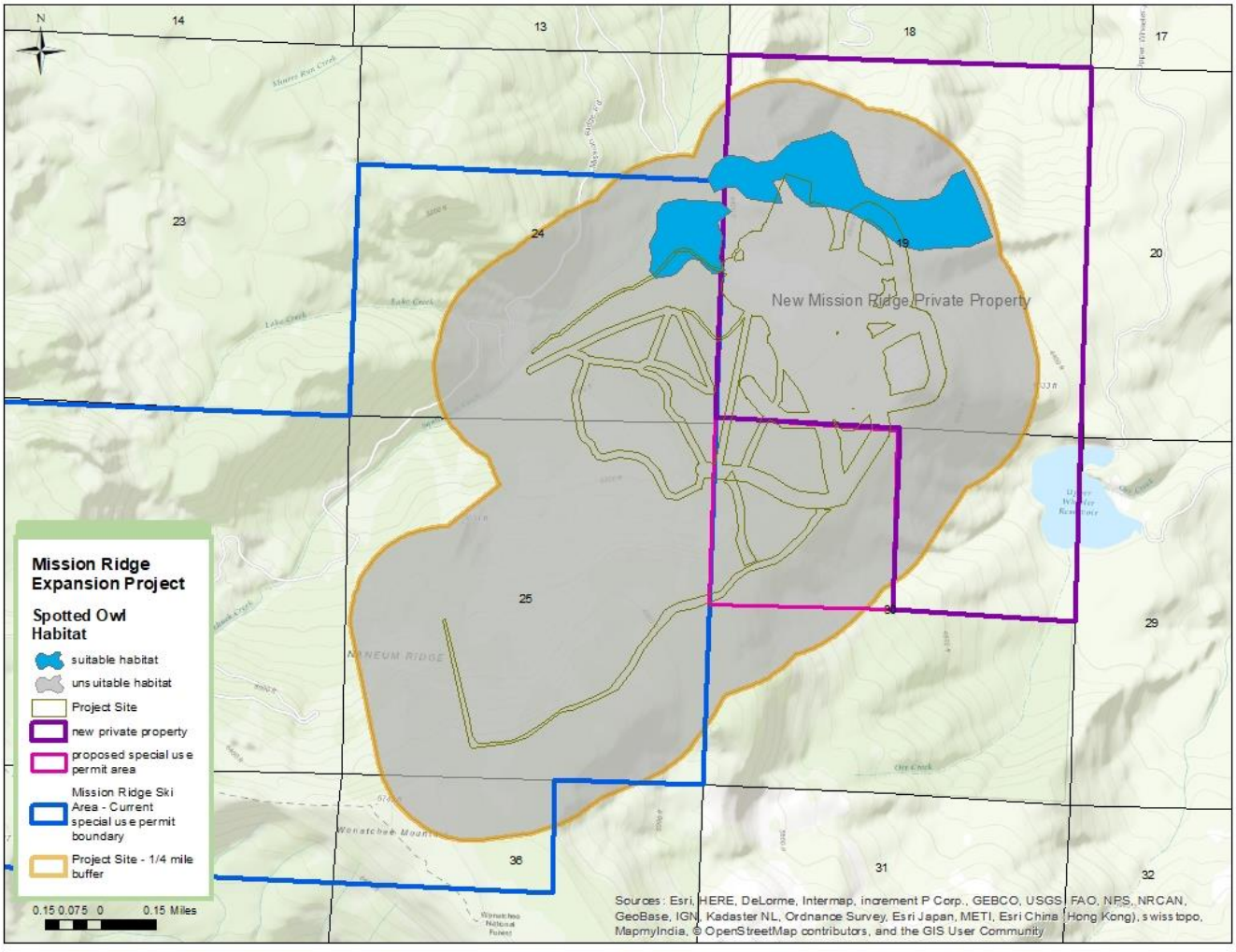
Habitat Conditions Assessment

Because spotted owl habitat had not been previously mapped in fine-scale detail in the Project Area we conducted a photo-interpretation and field verification to identify areas with suitable spotted owl habitat conditions. The habitat definition we used (USFS, 2012) is comparable to the habitat definition in WAC 222-16-085. We delineated habitat within one quarter mile of the Project Site to assess for potential habitat removal or disturbance.

We photo-interpreted vegetation polygons and attributed each polygon with detailed estimates of key spotted owl habitat components. These habitat components included: tree species, tree size classes, canopy cover, number of canopy layers, and presence of snags. From these data we derived a habitat map that was then taken to the field to validate the habitat mapping delineations. We then adjusted the habitat map based on our field verification to develop a final suitable spotted owl habitat map (Figure 5).

Because this map provides fine-scale habitat details, it was used to assess potential project impacts to spotted owl habitat in lieu of broader-scale habitat mapping done for regional spotted owl habitat mapping (Davis et al., 2016).

Figure 5. Northern spotted owl suitable habitat within the vicinity of the Mission Ridge Proposed Expansion Project.



Stands within the Project Area primarily consist of even aged, single story trees. The necessary large and old tree component and multi-layer canopy is often missing and there is little mistletoe that could support a nest, likely due to the younger age of the trees and preponderance of lodgepole pine. Based on our

habitat mapping, approximately 85 acres within a quarter mile area around the Project Site would qualify as suitable spotted owl habitat (Table 7, Figure 5). These stands are all under 50 percent overstory canopy and do not have many large trees or mistletoe so would be considered moderate to low quality suitable habitat. These stands are most likely used for dispersal and do not have the characteristics of nesting or roosting habitat, although they may provide foraging opportunities. Of those 85 acres, approximately eight acres may be impacted by project implementation and vegetation removal which could result in a degrade of habitat. Changes to the habitat quality of the stand would not result in a downgrade of the habitat classification.

We obtained historical spotted owl data from WDFW (October 2017) that indicated a single owl (unknown status) was located approximately 0.4 miles north of the Project Area in 1996, and a single resident owl was located approximately 0.6 miles to the southeast in 1998. Aerial imagery indicates the latter location has been heavily harvested since then. Surveys were conducted throughout the area from the late 1980s through 2006, and no spotted owls were detected on Forest Service land within 1.8 miles of the Project Area at that time. The closest spotted owl on Federal land was located 3.5 miles to the northwest in 1997. Surveys for northern spotted owls were not conducted in the area for the Mission Ridge Proposed Expansion because of poor habitat quality.

Table 7. Spotted owl habitat within the Mission Ridge Proposed Expansion Project.

	Potential for Disturbance (Within 0.25 mile of Project Site)			**Potential for Vegetation Removal** (Within Project Site Boundary)		
Habitat Type	acres (proportion)			acres (proportion)		
Landowner	Private	Federal	WDFW/ WADNR	Private	Federal	WDFW/ WADNR
Suitable	62	23	0	7	1	0
Unsuitable	420	450	559	148	58	18

Direct and Indirect Effects

The likelihood of resident, territorial spotted owls being present in the Project Area is extremely low. Although there are some small patches of forest along the northern boundary of the project that may be classified as lower quality suitable spotted owl habitat, there is generally an insufficient amount of suitable habitat in this landscape to support resident, territorial pairs. Spotted owls occupy large territories that encompass thousands of acres of suitable habitat. Although Forest Practice Rules require a minimum of 2,605 acres of suitable habitat within a home range (or 40 percent of the home range), Forsman et al. (2015) found home ranges consisted of much more suitable habitat (62 percent of home range). The small, fragmented patches of habitat, juxtaposed with larger areas of unsuitable habitat, at this elevation currently only function as dispersal habitat for transient spotted owls dispersing across the landscape, with limited foraging opportunities. Although dispersal habitat is important to spotted owls to provide habitat connectivity, the Project Area is located along the fringe of spotted owl range and at an elevation that is generally not occupied by owls. Implementation of the proposed Project will not change the function of suitable habitat and will not reduce the capacity of this landscape to support dispersing spotted owls.

Noise disturbance could affect owls during construction activities and increased human activity. The likelihood of disturbance would be small, and any impacts would be minor because suitable nesting habitat conditions do not occur within a 0.25 mile disturbance buffer of the project activities.

Based upon the available information and the evaluation of the direct and indirect effects, implementation of the Proposed Action "may affect, but is not likely to adversely affect" the northern spotted owl. This determination was made because approximately eight acres of potential habitat may be degraded. In addition, the potential for disturbance to nesting spotted owls from noise created above ambient conditions is low due to the lack of suitable nesting habitat conditions within a 0.25 mile disturbance buffer of project activities. Designated critical habitat for the northern spotted owl does not occur within the Project Area (USFWS 2012). Therefore, project implementation would have no effect on spotted owl critical habitat.

WDFW Priority Species with potential for occurrence

The Washington Department of Fish and Wildlife has identified fish, wildlife and habitat resources that are important for conservation through the Priority Habitats and Species (PHS) Program. We examined the PHS species list (WDFW, 2016b) for the Project Area to identify species and habitats that are likely to be in the vicinity. The following species were determined to have a high likelihood of occurrence in the Project Area: elk and mule deer, dusky and sooty grouse, western toad and northern goshawk.

Rocky Mountain Elk and Mule Deer

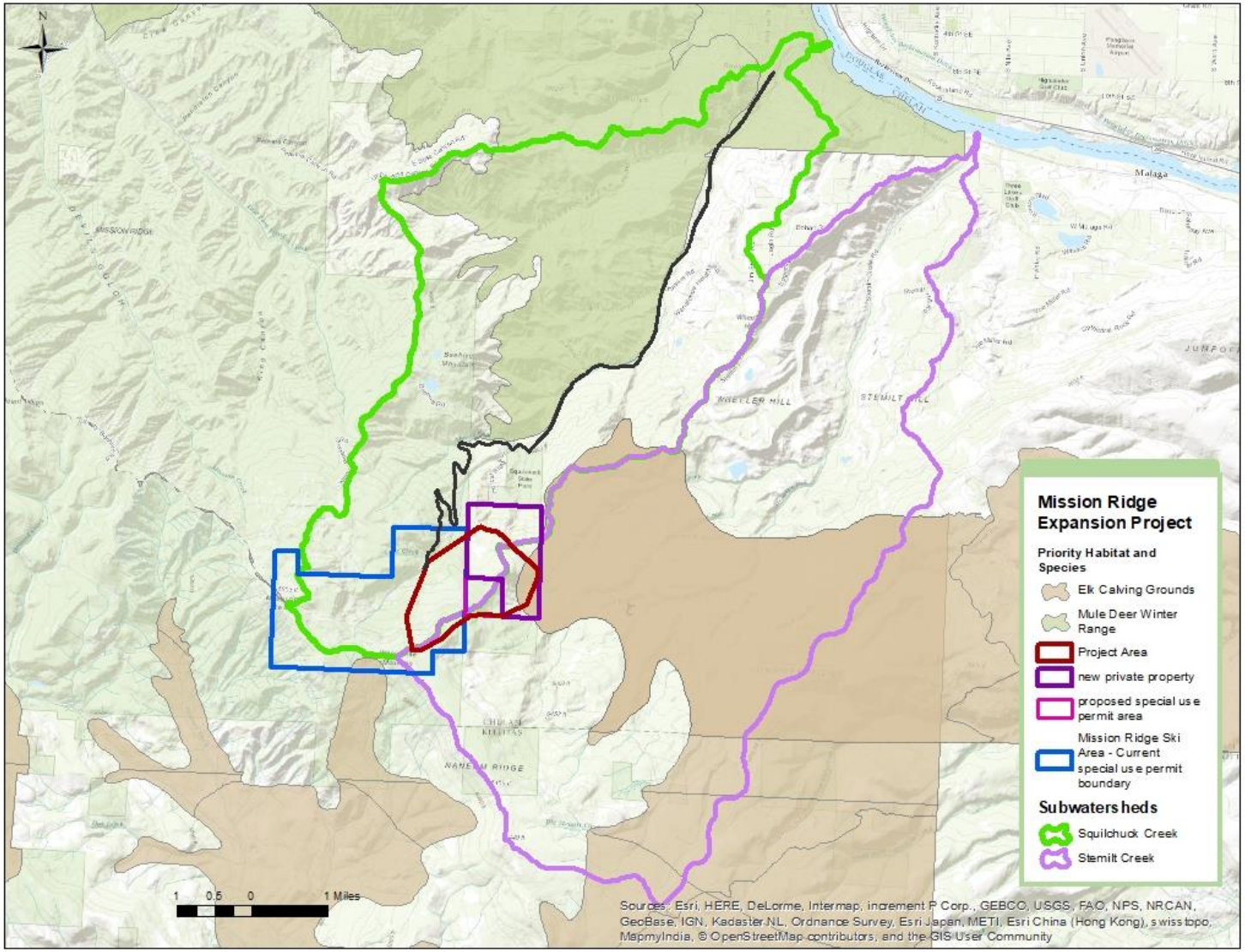
Rocky mountain elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus hemionus*) are considered priority species by WDFW and fall within the category of Species of Recreational, Commercial, and/or Tribal Importance. Priority areas include calving and fawning areas, migration corridors and winter range. Both elk and deer are classified as game animals (WAC 232-12-007) in Washington.

Mule deer are abundant in the East Cascades. Mule deer use a mosaic of habitat types that provide cover and forage in lower elevation winter ranges and higher elevation summer ranges. Habitat quality in these summer and winter ranges has a great effect on potential mule deer abundance and recruitment. The majority of summer range in the East Slope Cascades Mule Deer Management Zone is managed by the Okanogan-Wenatchee National Forest and WDNR, and high elevation summer range is readily available (WDFW, 2016). Mule deer populations in north-central and eastern Washington are stable to increasing (WDFW, 2014). Unlike elk, mule deer fawning is much more closely associated with riparian areas and often occurs where there is protective cover in the form of dense shrubs or forest that offer access to both water and abundant forage (NRCS, 2005). Fawns are born May through July, peaking in mid-June in the eastern Cascades (WDFW, 2016).

Similar to mule deer, elk are found in a wide variety of habitats, using alpine and mixed forest types for cover and more open areas that provide foraging habitat. Calving areas are not particularly different from general habitat. The calving season in Washington is from mid-May to mid-July (W. Meyers, pers. comm. 2002). Both elk and deer migrate to lower elevations in winter.

Elk and mule deer are common in the Stemilt and Squilchuck subwatersheds. The Project Area provides summer range for mule deer and elk in the Colockum Elk Herd. The WDFW Elk Management Plan Herd Population Objective for the Colockum elk herd is 4,050 to 4,950 and the herd is estimated at 6,018 individuals (WDFW 2014). Although the Colockum herd currently exceeds population objectives, WDFW has identified available habitat, hunting, and lethal removals related to resolving agricultural damage as limiting factors (WDFW, 2014). WDFW has set priorities for the Colockum herd around habitat conservation, habitat enhancement, resolving wildlife damage conflicts, and bull escapement. Fawning and calving habitat is present in the Project Area, typically in areas with little disturbance and heavy cover, such as riparian vegetation away from more heavily travelled roads. It is unlikely that the Project Area provides spring and fall migration habitat. The Project Area is not considered winter range for deer or elk. The closest winter range identified by the Okanogan-Wenatchee National Forest is over

Figure 6. Proximity of Mission Ridge Proposed Expansion Project relative to Rocky Mountain elk and mule deer winter range and calving areas as mapped by the Okanogan-Wenatchee National Forest and WDFW Priority Habitat and Species.



3.5 miles northwest of the Project Area. Mule deer winter range has been mapped just over two miles north of the Project Area in the Squilchuck Watershed (Figure 6).

Potential Impacts

There is a great deal of information on the effects of human activity, particularly roads and recreation, on ungulates (see Gaines et al., 2003 for review). Effects to elk vary from displacement due to human activity on hiking and ski trails, (Schultz and Bailey, 1978; Ferguson and Keith, 1982; Cassier et al., 1992) as well as roads (Johnson et al., 2000), to elevated levels of stress hormones (Creel et al., 2002, Millspaugh et al., 2001). Elk reproductive success has been shown to decrease following human disturbance to calving areas (Phillips and Alldredge, 2000). However, all disturbances are not created equal. Motorized vehicles, including ATVs, are more disruptive than hiking and mountain biking (Naylor et al., 2009) and road density has been implicated in increased hunting mortality (Hayes et al., 2002).

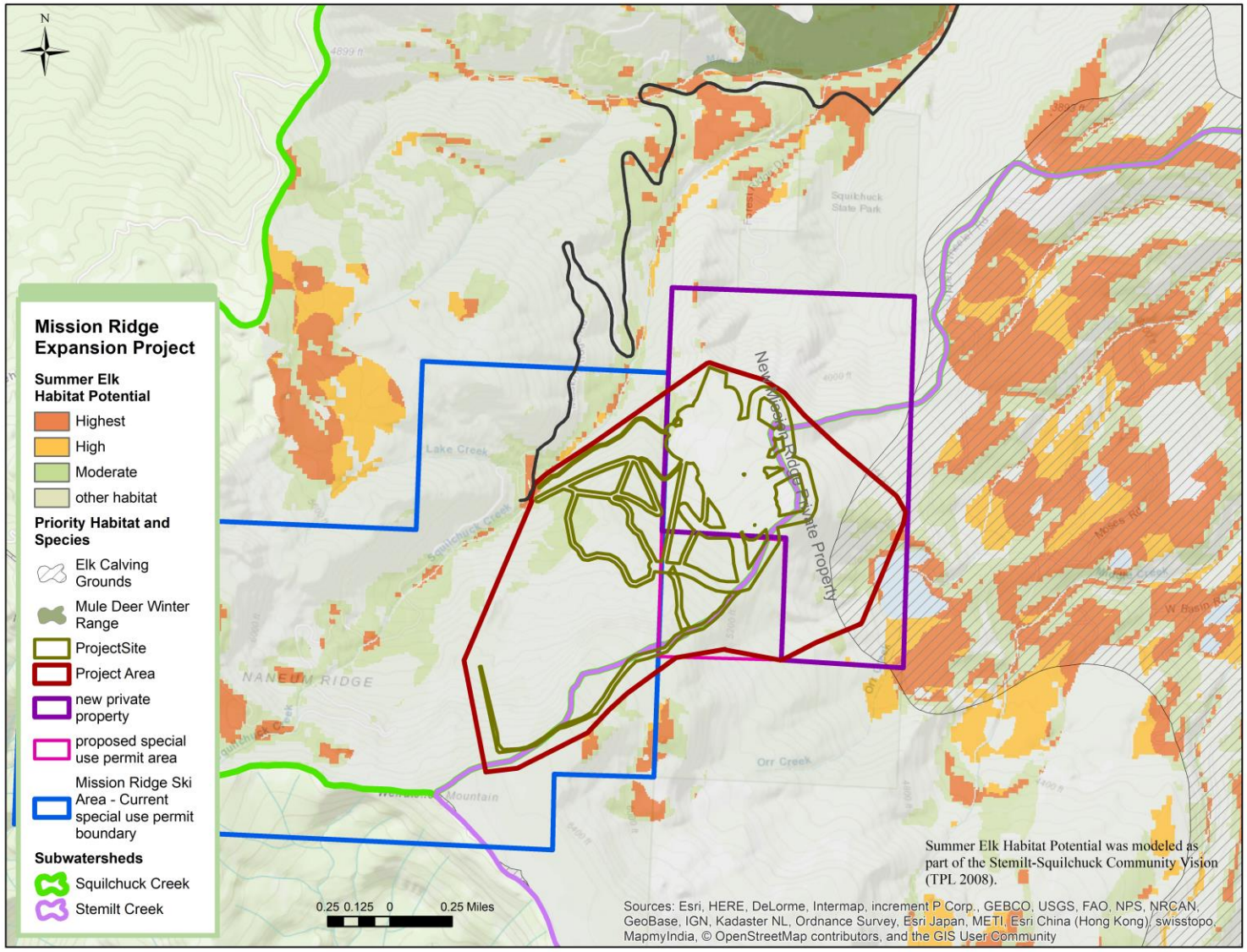
Because of the impact of human access on elk, assessing habitat effectiveness for summer elk range is a useful index to examine potential effects. Similar to gray wolves and grizzly bears, the addition of 4.8 miles of road to this landscape will have a negligible effect on the local mule deer and elk populations as road density within the subwatersheds would increase by less than 0.2 mi/mi^2. The area currently has road access from the east and is frequented by recreationists on motorized vehicles.

Human development has been shown to have mixed effects on elk. Morrison et al. (1995) found ski area development reduced elk use in specific areas. However, elk use increased following completion. Ciuti et al. (2012) found effects of human disturbance on elk behavior exceeded those of habitat and natural predators. In a human dominated landscape elk displayed increased vigilance and decreased foraging. However, they also discovered that it is not just the number of people but also the type of human activity that influences elk behavior (e.g. hiking vs. hunting). The greatest influence was recorded on public lands where hunting and motorized recreational activities were cumulative as compared to the national park in summer, where influence was less.

Potential summer elk habitat has been mapped for the Stemilt-Squilchuck subwatersheds as part of the Stemilt-Squilchuck Community Vision (Figure 7; TPL, 2008). Summer elk habitat was mapped based on proximity to water and food supply, slope and tree cover. Within the Project Area, 90 percent of the area is classified as “other habitats”, nine percent is classified as “moderate potential” and approximately one percent is classified as “high/highest potential” (Figure 7). Project implementation has potential to modify some summer habitat. Habitat removal may occur through construction of roads and infrastructure. Habitat loss may be mitigated however through creation of new foraging habitat within new ski runs. There could be an increase in noxious weeds as a result of construction activities. Weeds could compete with forage species, lowering forage habitat quality. Project activities would follow design criteria and mitigation measures for prevention of invasive weed spread, minimizing any effects.

A small area in the southeast portion of Section 19 and northeast corner of Section 30 is considered part of the Colockum Elk Calving Area – a priority habitat and species designation (Figure 6). Approximately 70 acres of the Calving Area would be within the Project Area. This area will not be part of proposed resort development but may be considered for Nordic skiing and summer activities such as hiking and mountain biking. As such habitat is this area will not be modified, but human activities in the area may necessitate seasonal restrictions to protect calving. Nordic skiing would generally be done by the time elk calving takes place, however, seasonal restrictions on summer hiking or biking on these trails may be necessary. In order to avoid disturbances and impacts to elk and deer during calving and fawning season the Applicant will coordinate with WDFW to incorporate best management practices, including seasonal trail restrictions.

Figure 7. Potential summer habitat for Rocky Mountain elk in the vicinity of the Mission Ridge Proposed Expansion Project (TPL, 2008).



The Project Area overlays a small portion of the Colockum Elk Herd and East Slope Cascade Mule Deer ranges. Although project implementation has the potential to displace these ungulate species and slightly decrease available habitat, increased forage availability in new ski runs may offset habitat loss and conservation measures to limit impacts to calving will protect elk during an important time period. Although project implementation may temporarily displace ungulates from parts of the Project Area, it is unlikely to have population level effects.

Western toad, Dusky and Sooty grouse, and northern goshawk

The western toad is a medium to large sized toad that is found throughout Washington. Although local populations may be healthy, populations across the range have declined precipitously. Western Toads occur in a variety of terrestrial habitats including prairies, forests, canyon grasslands and ponderosa pine-Oregon Oak habitat. They appear absent from most of the shrub steppe and steppe zones with the exception of the canyon grasslands in southeast Washington. Adult toads are primarily terrestrial, but often occur near permanent water bodies, especially in drier climates and during breeding (Hallock and McAllister, 2005). Riparian habitats will be protected by buffers and effects to toads should be minimal.

Dusky grouse and sooty grouse (previously known as blue grouse) are found in mountainous areas with open coniferous forests. The grouse in the Project Area are most likely Dusky grouse or a hybrid of the two subspecies (Schroeder 2006), and have been observed on the site. They are closely associated with true fir (*Abies* spp.) and Douglas fir (*Pseudotsuga menziesii*) forests that provide streams, springs and meadows. Nesting habitat covers a range of types and includes shrub-steppe, mountain shrub, open coniferous forest, clearcuts, old growth forest, and alpine tundra (Schroeder 2006). There is quite a bit of this habitat available within the Project Area, only a portion of which will be impacted. Effects to grouse populations would be minimal.

Northern goshawk are generally associated with forested areas with a large and old tree component. Northern goshawk select for mature conifer forests for nesting (USFS, 2012). We mapped approximately 110 acres of potential northern goshawk habitat within the Project Area, with less than one acre located on the private parcel. This habitat is considered lower quality because it does not provide the large and old forest structure northern goshawk use for nesting. Goshawk surveys were conducted within the Mission Ridge Ski Area in the late 1990's and no goshawk were located. Project implementation may result in limited habitat impacts on approximately 13 acres of lower quality habitat for construction of access roads and ski runs. The Project Area has very little old forest structure and impacts to lower quality goshawk habitat would not negatively impact goshawk populations.

PHS Species with low potential for occurrence

Of the list of potential wildlife species, several species were identified with a low likelihood of occurrence in the Project Area. These species included: Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed woodpecker, American marten, roosting concentrations of bat species, Cascade red fox, white-tailed jackrabbit and wolverine.

The Columbia spotted frog is associated with riparian habitat along permanent bodies of water and wetlands. Columbia spotted frogs are generally located in habitats from 520 to 950 meters (Leonard et al., 1993). Although it is possible that the Columbia spotted frog may occur within the riparian habitat along the perennial creeks and in the depressional wetlands when they hold water,

the Project Area is likely too high in elevation. They are *not* likely to be residents of the wetland habitat due to the ephemeral nature of the wetlands.

The golden eagle is associated with dry, open canopy plateaus with deep canyons, shrub steppe and grassland communities and transition zones between shrub, grassland and forested habitat. Nests generally are located on cliffs and occasionally in trees. Foraging habitat consist of shrub-steppe and grassland communities (Watson and Whalen, 2003). Golden eagle nesting and foraging habitats are very limited and are found only in an isolated patch in the north-east portion of the Project Area. The majority of the Project Area is located above the transition zone from shrub/grasslands to forest.

Flammulated owls and pileated woodpeckers are generally found in mountainous, mature, older forests with large snags and fallen trees at low to mid-elevations (Hays and Rodrick, 2003; Lewis and Azerrad, 2003). American marten also select for undisturbed mature coniferous or mixed forest, with snags/stumps and dead or live trees or stumps and coarse woody debris that provides subnivean sites in winter (Halfpenny et al., 1995). A large part of the Project Area on the private parcel was harvested and is now composed of single-age stands of trees less than 100 years old. Large and old trees and snags were largely removed during harvest operations.

White-headed woodpecker is found in areas with open canopy (i.e. less than 40 percent closed canopy) pine and fir forests with large decayed snags used for nesting and foraging (Garret et al., 1996; Gaines et al. 2017). Habitat in the majority of the Project Area is too dense for white-headed woodpecker, with overstory canopy cover of ponderosa pine forested areas greater than 25 percent and total canopy covers of 65 to 75 percent. Additionally, large and old trees and snags important for nesting and foraging habitat are lacking.

Roosting concentrations of Big-brown Bat, Myotis bats, Pallid Bat, or Townsend's Big-eared Bat may possibly be located in large trees, or within cliff like habitat (Hayes and Wiles, 2013), although both habitat types are limited within the Project Area. Bat roosts are often located within human created structures such as old barns and buildings, however, there are no structures currently on the site.

The known range of the Cascade Red Fox is restricted to the upper mountain forest, subalpine parkland, and alpine meadows of the Cascade Range, primarily in Mount Rainier National Park. The park provides excellent habitat for the fox and ample prey such as pocket gopher, snowshoe hare, songbirds, and huckleberries (Akins, 2017). Aubry (1984) indicated that they may also occupy the open forests on the eastern slope of the Cascades. As such, we have included the species here because data is lacking to determine extent of their range. Habitat for Cascade red fox may be available in the southern part of Section 19 and into current ski area although use is highly unlikely given current distribution and unlikely presence.

Wolverines are wide-ranging and can wander through a wide variety of habitat. They are primarily associated with alpine and subalpine habitats. Ongoing research projects and recent carnivore surveys have detected wolverines in the North Cascades of Washington. Wolverines did not historically occur on the Olympic Peninsula or in southwest Washington (WDFW, 2013). Although the Project Area is approximately one mile north of the closest habitat (within the existing ski area), it is approximately 20 miles east of the nearest wolverine observations from the past few years, so it's highly unlikely they would visit the area. The Project Area quickly transitions out of subalpine habitat types to lower elevation habitat types.

Because of the low probability of occurrence in the Project Area, there will be no effect to Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed

woodpecker, American marten, roosting concentrations of bat species, Cascade red fox and wolverine.

Land birds (Including Neotropical Migratory Birds)

In January 2001, President Clinton issued an executive order on migratory birds directing federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. The U.S. Fish and Wildlife Service released the "Birds of Conservation Concern" (USFWS, 2008) which lists those species the USFWS feels are in greatest need of conservation action at different geographic scales. It does not include conservation measures. The Project Area is located within the Pacific Flyway and Bird Conservation Region 9 – Great Basin. Of the 28 species listed for the Great Basin, only the golden eagle and calliope hummingbird potentially occur in the Project Area. White-headed woodpecker and peregrine falcon are also on the list, but nesting habitat associations limit the likelihood of resident populations. Golden eagle nesting habitat would be limited as well. No raptor nest sites have been located within the Project Area. The calliope hummingbird is fairly common but vulnerable to habitat loss. Habitat loss as a result of this project would not likely impact these bird species at a population level. The remaining species prefer more open grasslands and pine forests, mudflats, large marsh, large hardwood riparian, or waterfall habitat and do not have habitat within the Project Area, so there would be no effect to them from project activities.

WDFW Priority Habitats and Features

Wetlands

Wetlands are important landscape features that provide habitat for many plants and animals such as water lilies, sedges, amphibians and reptiles, as well as waterfowl, migrating birds, fish, and mammals (EPA, 2004). Wetlands function to absorb floodwaters, nutrients, sediments and pollutants before they reach other waterbodies. They also provide recreational opportunities for outdoor enthusiasts.

The two previously unmapped wetlands were assessed and delineated within the Project Area by qualified professional wetland biologists. It was determined that the wetlands fit the Class III category. Category III wetlands are wetlands with a moderate level of functions and can often be adequately replaced with a well-planned mitigation project (Hruby, 2014). The wetlands are within the Project Site and will be impacted. Per Chelan County Code (11.80.070) the Applicant will coordinate with Chelan County, WDFW and Washington Department of Ecology (11.80.110) to mitigate impacts to wetland habitats and species.

Aspen

Aspen is the most widely distributed native North American tree species (NRCS, 2017). Aspen provide habitat for a wide variety of wildlife, including hare, moose, black bear, elk, deer, grouse, migratory birds, and a variety of smaller animals. Aspen stands greater than one acre are considered priority habitats by WDFW. A small aspen stand (less than one acre) with scattered trees was identified within the Project Area. The stand does not meet the definition of a priority habitat but still provides a unique habitat feature on this landscape. The Applicant has proposed to minimize impacts to the aspen stand through site design.

Talus

Talus habitat is the accumulation of broken rocks and scree, often at the base of cliffs. Talus habitat is usually open with little vegetation cover (less than 10 percent). Talus has been shown to be habitat for larch mountain and Van Dyke's salamanders as well as the American pika (*Ochotona princeps*). The Project Area contains a substantial amount of talus, as does the

adjoining Mission Ridge Ski Area. More than 250 acres within the Project Area are open, rolling, talus fields with little vegetation, just over 40 acres of which are on the private parcel. Approximately 30 acres of talus will potentially be impacted within the Project Site. The level of impact will vary, from designation as a new ski run with no changes to the talus, to ground disturbance and talus redistribution as part of resort development. The Project Area is outside of the range of both larch mountain and Van Dyke's salamanders. The Project Area is on the margin of pika range and is likely too low in elevation for pika. As such talus habitat is not limited in this area and wildlife species associated with talus will not be affected.

Snags and Logs

Snags are standing dead trees that provide important habitat for numerous cavity nesting birds, such as woodpeckers and nuthatches, and mammals, such as squirrels and bears (Brown, 2002). Logs arise from fallen trees, large branches and snags. Log habitat, also referred to as downed wood or coarse woody debris, often serves a function similar to snags and provides nesting, denning, foraging habitat, hiding cover and shelter from inclement weather for a plethora of species. Snag habitat is limited on the site, particularly large snags, as a result of past timber harvest. The Applicant will incorporate design standards to limit large snag removal where it is safe to do so. Significant wind events have created a substantial amount of downed wood in portions of the Project Area and log habitat is not limited. Much of the log habitat is located in the southwest corner of Section 19 and will not be impacted by development.

Design Criteria and Mitigation Measures for Wildlife Species

Open Space

The project design includes open space areas adjacent and intermingled within the site plan. The proposed open space covers a total of 363 acres and consists of a mix of classifications, including: ski runs (41 ac), undesignated open space (49 ac), natural open space (258 ac), and managed open space (15 ac). Open space lands shall be preserved and managed to buffer native environments from intensive development or activities; to retain native plant communities; and, for developed areas, to provide an aesthetically pleasing landscape, provide habitat connections, and minimize risk of fire (Chelan County Code Chapter 11.89.060). Ski runs will be maintained for winter skiing. Maintenance may include removal of trees and some shrubs. Ski runs create openings in the forest that can function as foraging habitat for a number of species, including elk and deer, and can act as fuel breaks within the contiguous canopy. Undesignated open space connects the natural open space to the ski runs and provides a buffer between the developed space and the natural open space. The area within the natural open space designation is adjacent to the proposed development site to the north, east and south. This is the largest open space designation and consists of a variety of habitat types and terrain. Natural open space will be retained predominantly for its wildlife habitat and recreational opportunities compatible with wildlife objectives. The natural open space will not be actively managed or maintained other than potentially to minimize risk of fire. Managed open space would be interspersed among the residential and business development and includes maintained landscaped areas. This open space will likely provide habitat for those species with a high tolerance for human activity and will provide a park-like setting within the development area.

Additional mitigation measures and design criteria were developed to address potential impacts of the proposed action.

1. Protect all known listed Threatened, Endangered, and Sensitive species sites, and those discovered prior to or during implementation of project activities. Modify implementation activities, if protective measures prove inadequate, listed species are discovered, or new species are listed that could be affected.

2. If an active wolf den or rendezvous site is discovered in the vicinity of the project, modify activities to avoid disturbance while being used during the breeding season.
3. In order to avoid disturbances and impacts to elk and deer during calving and fawning season the Applicant will coordinate with WDFW to incorporate best management practices.
4. Applicant will coordinate with Chelan County Natural Resources and Washington State Department of Ecology to mitigate for impacts to Category III wetlands identified on the private parcel (Section 19) per guidance in "Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1)" (WADOE et al. 2006).
5. Because old growth and mature forests are extremely limited in this area, Applicant will leave trees and snags greater than 21 inches DBH whenever possible.
6. Applicant will incorporate sanitation measures to reduce potential for wildlife-human conflicts during construction and as part of community operations.

8. Plant Species and Habitat

This section of the Resources Report provides a summary of plant species and habitat, including federal and state listed species and associated habitats, that may be found in the vicinity of the Mission Ridge Proposed Expansion Project Area (Figure 1 and Figure 2).

Review of Existing Information

We consulted a combination of available species lists and spatial data sets to identify potential plant species and habitat areas of concern occurring in the Project Area vicinity.

The following provides an example of the types of sources that were included in the review:

- Washington Natural Heritage database. 2017. Ecoregions and Ecological Systems. Available at: https://www.dnr.wa.gov/NHPdata.
- US Environmental Protection Agency (EPA). Level III and IV Ecoregions of the Continental United States. Available at: https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states
- Review of Endemic Plants of the Wenatchee Mountains and Adjacent Areas September 10, 2012 E2 Segment 67 Prepared for The U.S. Fish and Wildlife Service Western Washington Fish and Wildlife Office Through Section 6 funding, Region 1 by Joseph Arnett Washington Natural Heritage Program Washington Department of Natural Resources PO Box 47014 Olympia, WA 98504-7014
- Washington Natural Heritage Program (WNHP) rare plant and nonvascular species and plant communities dataset. Features represent current element occurrences. Accessed July 19, 2017. Available at: https://www.dnr.wa.gov/NHPdata.
- US Fish and Wildlife Service. 2017. Listed plants database. Available at: https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=WA&status=listed
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2016. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.
- US Forest Service Sensitive Species (R6 ISSSSP). Available at: https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/

Special Status plant species and habitats in Project Area

We narrowed down available data to a list of those species that occur or potentially occur in the vicinity of the Project Area (Table 8). Species that are currently on or under consideration for the ESA or state endangered, threatened, or species of concern lists are identified. Review of the current Natural Heritage database and current Forest Service records indicated that there are *no* federally or state listed, or proposed for listing, endangered, or threatened plant species in the Project Area. There is also no listed critical habitat for any endangered or threatened plant species in the Project Area. We assessed the rare plant list for Chelan County to identify those species that might occur within the Project Area and suggest rare/sensitive plant species. According to habitat associations and topography we have identified a subset of plant species that may be present in the Project Area. Observations were recorded for Wenatchee larkspur *(Delphinium viridescens)* in 1996 and pasqueflower (*Anemone patens var. multifida*) in 2004, approximately three miles to the west and southwest of the Project Area.

We acknowledge the WNHP data set represents an ongoing and incomplete inventory of the state and does not eliminate the need for field surveys. Additionally, the US Forest Service requires

analysis of potential impacts to Sensitive Species (R6 ISSSSP). As such, surveys will be conducted for listed and sensitive species where potential habitat is identified on Forest Service and private lands as part of the NEPA/SEPA process. Surveys for these sensitive plant species will be conducted in coordination with the Wenatchee River Ranger District botanist and WNHP. If any listed species are found during project activities, a District botanist would be notified and appropriate mitigation measures taken.

Table 8. Plant species that potentially occur in the vicinity of the Project Area.

Scientific Name	**Common Name**	**State Status**	**Federal Status***
Species with high probability of occurrence**			
Anemone patens var. multifida	pasqueflower	Threatened	none
Carex proposita	Smoky Mountain sedge	Threatened	Sensitive
Pellaea breweri	Brewer's cliffbrake	Sensitive	Sensitive
Species with low probability of occurrence - riparian buffer protections in place to protect associated habitat			
Carex magellanica ssp. irrigua	poor sedge	Sensitive	Sensitive
Cicuta bulbifera	bulb-bearing water-hemlock	Sensitive	Sensitive
Dermatocarpon meiophyllizum	silverskin lichen	Threatened	Sensitive
Peltigera hydrothyria	hydrothyria lichen	Sensitive	Strategic
Potentilla glaucophylla var. perdissecta	diverse-leaved cinquefoil	Sensitive	none
Salix pseudomonticola	false mountain willow	Sensitive	Sensitive
Salix tweedyi	Tweedy's willow	Sensitive	none
Scouleria marginata	marginate splashzone moss	Threatened	Sensitive
Swertia perennis	swertia	Sensitive	Sensitive
Species with unlikely occurrence but limited data suggests possible surveys			
Agoseris elata	tall agoseris	Sensitive	none
Alectoria nigricans	witch's hair lichen	Threatened	none
Chaenactis thompsonii	Thompson's chaenactis	Sensitive	Sensitive
Delphinium viridescens	Wenatchee larkspur	Threatened	Sensitive
Hackelia venusta	showy stickseed	Endangered	Endangered
Iliamna longisepala	longsepal globemallow	Sensitive	Sensitive
Saxifraga hyperborea	pygmy saxifrage	Sensitive	none
Saxifragopsis fragarioides	strawberry saxifrage	Threatened	Sensitive
Sidalcea oregana var. calva	Wenatchee Mountain checker-mallow	Endangered	Endangered
Silene seelyi	Seely's silene	Sensitive	Sensitive

*A federal sensitive status refers to US Forest Service Region 6.
**Due to limited data relative to species distribution, plant species are classified relative to the likelihood of occurrence and need to conduct field surveys to confirm.

Potential Impacts

The Project Site will require clearing for construction of roads and buildings and some vegetation modifications under chair lifts and in ski runs. Some vegetation management will also be implemented to address forest health and the potential for wildfire. Trees will be harvested within the Project Area on an as-needed basis for facilitating the next construction phase of the project.

The Applicant will coordinate with WDNR to harvest trees on the private parcel in accordance with the Washington Forest Practices Act and will coordinate with the US Forest Service on tree removal within the US Forest Service parcel.

Invasive Species

The Applicant recognizes the importance of managing for invasive species. As such, Applicant will develop a plan to insure invasive species are not brought into the site on construction equipment, and all disturbed sites will be promptly reseeded and/or replanted to deter invasive species. If critical or otherwise valuable habitat and plant species are identified during construction, Applicant will adjust plans to protect or replace those areas.

Design Criteria and Mitigation Measures for Plant Species and Habitats

The following measures are proposed to preserve or enhance vegetation on the site:

1. Applicant proposes to minimize vegetation removal when possible.
2. Noxious weeds will be controlled within the Project Area.
3. Clean all heavy equipment (bulldozers, graders, backhoes, dump trucks, excavators, etc.) prior to entering National Forest System Lands. Inspect, remove, and properly dispose of weed seed and plant parts found by construction crews on their clothing and equipment on a daily basis.
4. Use only weed-free straw and mulch for all projects conducted or authorized by the Forest Service, on National Forest System Lands. If State certified straw and/or mulch is not available, use sources certified to be weed free using the North American Weed Free Forage Program standards or a similar certification process.
5. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists.
6. Use native plant materials as the first choice for re-vegetation, where timely natural regeneration of the native plant community is not likely to occur.

9. Literature Cited

Agee, J.K. 2000. Disturbance ecology of North American boreal forests and associated northern/mixed subalpine forests. Pages 39-82 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.

Akins, J. 2017. Conservation status of the Cascade red fox. Mount Rainier Science Brief. Mount Rainier National Park. Available at: https://www.nps.gov/articles/cascade-fox.htm. Accessed: 12 October 2017.

Aubry, K.A. 1984. The recent history and present distribution of the red fox in Washington. Northwest Science, 58(1):69-79.

Becker, S.A., T. Roussin, W. Jones, E. Krausz, S. Walker, S. Simek, D. Martorello, and A. Aoude. 2016. Washington Gray *Wolf Conservation and Management 2015 Annual Report.* Pages WA-1 to WA-24 in U.S. Fish and Wildlife Service Rocky Mountain Wolf Program 2015 Annual Report. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601.

Behnke, Robert J. 2002. Trout and Salmon of North America. The Free Press, New York.

Brown, T.K. 2002. Creating and Maintaining Wildlife, Insect, and Fish Habitat Structures in Dead Wood. *In* Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle Technical Coordinators. USDA Forest Service Gen. Tech. Rep. PSW-GTR-181. 2002. pp. 883-892.

Buchanan, J. B. 1991. Spotted owl nest site characteristics in mixed conifer forests of the eastern Cascade Mountains, Washington. M.S. Thesis, University of Washington, Seattle, WA. 76 pp.

Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1993. Characteristics of spotted owl nest trees in the Wenatchee National Forest. Journal of Raptor Research, 27(1):1-7.

Buchanan, J. B. 2016. Periodic status review for the Northern Spotted Owl in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 22 + iv pp.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NMFS- NWFSC-27. Available: http://www.nwfsc.noaa.gov/publications/techmemos/tm27/steelhead.pdf

Cassier, E.F., D.J. Freddy, and E.D. Ables. 1992. Elk responses to disturbance by cross country skiers in Yellowstone National Park. Wildlife Society Bulletin. 20(4): 375–381.

Ciuti S. J.M. Northrup, T.B. Munhly, S. Simi, M. Musiani, J.A. Pitt, and M.S. Boyce. 2012. Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear. PLoS ONE 7(11): e50611. doi:10.1371/journal.pone.0050611

Creel, S., J.E. Fox, A. Hardy, J. Sands, B. Garrott, and R.O. Peterson. 2002. Snowmobile activity and glucocorticoid stress responses in wolves and elk. Conservation Biology. 16(3): 809–814

Davis, R. J., B. Hollen, J. Hobson, JE Gower, and D. Keenum. 2016.Northwest Forest Plan—the first 20 years (1994–2013): status and trends of northern spotted owl populations and habitats. Gen. Tech. Rep. PNWGTR-929. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 54 p.

Elliot-Fisk, D.L. 1988. The boreal forest in Barbour, M.G. and W.D. Billings (eds.) North American terrestrial vegetation. Cambridge Univ. Press, Cambridge.

Ferguson, M.A.D. and L.B. Keith, L.B. 1982. Influence of Nordic skiing on distribution of moose and elk in Elk Island National Park, Alberta. Canadian Field-Naturalist. 96(1): 69–78.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research, 35(2): 141-150.

Forsman, E.D., Anthony, R.G., Dugger, K.M., Glenn, E.M., Franklin, A.B., White, G.C., Schwarz, C.J., Burnham, K.P., Anderson, D.R., Nichols, J.D., Hines, J.E., Lint, J.B., Davis, R.J., Ackers, S.H., Andrews, L.S., Biswell, B.L., Carlson, P.C., Diller, L.V., Gremel, S.A., Herter, D.R., Higley, J.M., Horn, R.B., Reid, J.A., Rockweit, J., Schaberl, J., Snetsinger, T.J., Sovern, S.G. 2011. Population demography of northern spotted owls. Studies in Avian Biology 40. Berkeley, CA: University of California Press. 106 p.

Forsman, E.D., Sovern, M. Taylor, and S.G. Biswell. 2015. Home range and habitat selection by northern spotted owls on the eastern slope of the Cascade Mountains, Washington. J. Raptor Res. 49(2):109-128.

Forest Practices Board (FPB). 2002. Forest Practices Board Manual Section 13 Determining Fish Use for the Purpose of Typing Water.

Frame, P.F., H.D. Cluff, and D.S. Hik. 2007. Response of wolves to experimental disturbance at homesites. Journal of Wildlife Management 71(2):316-320.

Fritts, S.H. 1992. Wolf recovery in the state of Washington. International Wolf (Winter):19-20.

Gaines, W.L., G.K. Neale, and R.H. Naney. 1995. Response of coyotes and gray wolves to simulated howling in Northcentral Washington. Northwest Science, 69(3):217-222.

Gaines, W.L., P. Singleton, and A.L. Gold. 2000. Conservation of rare carnivores in the North Cascades Ecosystem, western North America. Natural Areas Journal, 20:366-375.

Gaines, W.L, P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. General Technical Report, PNW-GTR-586. Portland, OR: Pacific Northwest Research Station, US Forest Service (USFS). 79 pp. Available online at http://www.fs.fed.us/pnw/pubs/gtr586.pdf (October 19, 2006).

Gaines, W.L., B.C. Wales, L.H. Suring, J.S. Begley, K. Mellen-McLean and S. Mohoric. 2017. Terrestrial species viability assessments for National Forests in northeastern Washington. General Technical Report PNW-GTR-907. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 324 pp.

Halfpenny, J.C., R.W. Thompson, S.C. Morse, T. Holden and P. Rezendes. 1995. Snow tracking. Chapter 5, Pg. 91-124 in Zielinski, W.J.; Kucera, T.E., technical editors. American marten, fisher, lynx, and wolverine: survey methods for their detection. Gen. Tech. Rep. PSW-GTR-157. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 163 p.

Hallock, L.A. and McAllister, K.R. 2005. Western Toad. Washington Herp Atlas. http://wdfw.wa.gov/conservation/herp_atlas/. Accessed 12 November 2017.

Hayes, S.G. D.J. Leptich, and P. Zager. 2002. Proximate factors affecting male elk hunting mortality in northern Idaho. Journal of Wildlife Management. 66(2):491–499.

Hayes, G. and G.J. Wiles. 2013. Washington bat conservation plan. Washington Department of Fish and Wildlife, Olympia, Washington. 138+viii pp.

Hays, D.W. and E.A. Rodrick. 2004. Flammulated owl. Pages 24-1 – 24-4 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Hodges, K.E. 2000. Ecology of snowshoe hares in southern boreal and montane forests. Pages 163-206 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.Hruby, T. (2014). Washington State Wetland Rating System for Eastern Washington: 2014 Update. (Publication #14-06-030). Olympia, WA: Washington Department of Ecology.

Interagency Grizzly Bear Committee (IGBC). 1998. Grizzly bear/motorized access management. Interagency Grizzly Bear Committee Taskforce Report. 7 pp.

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Johnson, B.K., J.W. Kern, M.J. Wisdom, S.L. Findholt and J.G. Kie. 2000. Resource selection and spatial separation of mule deer and elk during spring. Journal of Wildlife Management. 64(3): 685–697.

Kerwin, J. 1999. Salmonid Habitat Limiting Factors Report for the Puyallup River Basin. Washington Conservation Commission.

Koehler, G.M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. Canadian Journal of Zoology 68(5):845-851.

Koehler, G.M., B.T. Maletzke, J.A. von Kienast, K.B. Aubry, R.B. Wielgus, and R.H. Naney. 2008. Habitat fragmentation and the persistence of lynx populations in Washington State. Journal of Wildlife Management, 72(7):1518-1524.Laufer, J.R. and P.T. Jenkins. 1989. *Historical and present status of the gray wolf in the Cascades Mountains of Washington*. Northwest Environmental Journal, 5:313-327.

Lehmkuhl, J.F., K.D. Kistler, and J.S. Begley. 2006a. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy. 87(2):371-379.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006b. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. Amphibians of Washington and Oregon.

Lewis, J.C. and J.M. Azerrad. 2004. Pileated woodpecker. Pages 29-1 – 29-9 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Livezey, K.E and T.L. Fleming. 2007. Effects of barred owls on spotted owls: the need for more than incidental detections and correlational analysis. Journal of Raptor Research 41(4):319-325.

Maletzke, B.T. 2004. Winter habitat selection of lynx (Lynx canadensis) in northern Washington. Masters of Science, Natural Resource Sciences. Washington State University. December 2004. 39pp.McCord and Cardoza 1982

McDaniel, G. W., K. S. McKelvey, J. R. Squires, and L. F. Ruggiero. 2000. Efficacy of lures and hair snares to detect lynx. Wildlife Society Bulletin 28:119–123.

McKelvey, K.S., Y.K. Ortega, G.M. Koehler, K.B. Aubry, and D. Brittell. 2000. Canada lynx habitat and topographic use patterns in north central Washington: a re-analysis. Pages 307-336 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.

Mech, L.D., S.H. Fritts, G.L. Radde, and W.J. Paul. 1988. Wolf distribution and road density in Minnesota. Wildlife Society Bulletin, 16(1): 85-87.

Mech, L.D., T.J. Meier, and J.W. Burch. 1991. Denali Park wolf studies: implications for Yellowstone. Transactions of the North American Wildlife and Natural Resources Conference, 56:86-90.

Millspaugh, J.J., R.J. Woods, K.E. Hunt, K.J. Raedeke, G.C. Brundige, B.E. Washburn and S.K. Wasser. 2001. Fecal glucocorticoid assays and the physiological stress response in elk. Wildlife Society Bulletin. 29(3): 899–907.

Mladenoff, D.J., T.A. Sickley, R.G.Haight, and A.P. Wydeven. 1995. A regional landscape analysis and prediction of favorable gray wolf habitat in the northern Great Lakes region. Conservation Biology, 9(2):279-294. Available online at http://www.blackwell-synergy.com/toc/cbi/9/2 (October 3, 2006).

National Oceanic and Atmospheric Administration (NOAA Fisheries). 2017a. Species Under the Endangered Species Act (ESA). NOAA Fisheries Office of Protected Resources. Available at: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish

National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017b. Endangered Species Act Critical Habitat. West Coast Region. Available at: http://www.westcoast.fisheries.noaa.gov/maps_data/endangered_species_act_critical_habitat.html

Natural Resources Conservation Science (NRCS). 2005. Mule deer (*Odocoileus hemionus*). Fish and Wildlife Habitat Management leaflet. Available at : https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010100.pdf

Natural Resources Conservation Science (NRCS). 2017. QUAKING ASPEN *Populus tremuloides* Plant Guide. Contributed by: USDA NRCS National Plant Data Center & the Biota of North America Program. Available at*:* https://plants.usda.gov/plantguide/pdf/cs_potr5.pdf

Naylor, L. M., M.J. Wisdom, and R. G. Anthony. 2009. Behavioral Responses of North American Elk to Recreational Activity. J. of Wildlife Management, 73: 328–338. doi:10.2193/2008-102

Phillips, G.E. A.W. Alldredge. 2000. Reproductive success of elk following disturbance by humans during calving season. Journal of Wildlife Management. 64(2): 521–530.

Richards, Jo Ellen. 1989. Spotted owl food habits and prey availability on the east slope of the Washington Cascades. M.S. Thesis, Colorado State University. 44p.

Rocchio, J. and R. Crawford. 2015. Ecological Systems of Washington State: A Guide to Identification. October 19, 2015. Washington Department of Natural Resources, Natural Heritage Program 1111 Washington St. SE, Olympia, WA 98504-7014. 384pp.

Schroeder, M. 2006. Blue grouse divided by two equals Dusky and Sooty Grouse. Washington Birder: 14(3): 3pp. Washington Department of Fish and Wildlife, Bridgeport, WA

Schultz, R.D.; Bailey, J.A. 1978. Responses of national park elk to human activity. Journal of Wildlife Management. 42(1): 91–100.

Slough, B.G. 1999. Characteristics of Canada lynx, Lynx canadensis, maternal dens and denning habitat. Canadian Field Naturalist, 113:605-608.

Sovern, S. G., E. D. Forsman, K. M. Dugger, and M. Taylor. 2011. Habitat use by Northern Spotted Owls during natal dispersal. Journal of Wildlife Management.

Squires, J.R., and T. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. In: Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S McKelvey, and J.R. Squire, eds. Ecology and Conservation of lynx in the United States. University Press of Colorado, Boulder, CO.

Steelquist, R. 1992. Field Guide to the Pacific Salmon. Sasquatch Books, Seattle, Washington.

Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

Thiel, R.P. 1985. Relationship between road density and wolf habitat suitability in Wisconsin. American Midland Naturalist, 113:404-407.

Trust for Public Land (TPL). 2008. Stemilt-Squilchuck Community Vision. September 2008. Prepared by The Trust for Public Land in partnership with The Stemilt Partnership, Chelan County. Written by Kitty Rasmussen. Accessed at: http://cloud.tpl.org/pubs/convis_wa_stemilt_1report.pdf

Upper Columbia Regional Technical Team (RTT). 2003. A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region. Discussion Draft.

U.S. Department of Agriculture (USDA) and US Department of the Interior (USDI). 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl; Standards and Guidelines for management of habitat of late-successional and old-growth related species within the range of the northern spotted owl (Northwest Forest Plan). USDA Forest Service and USDI Bureau of Land Management. Portland, OR. April 1994. Available online at http://www.reo.gov/general/aboutnwfp.htm.

U.S. Environmental Protection Agency (EPA). 2003. EPA Region 10 guidance for Pacific Northwest state and tribal temperature water quality standards. Region 10 Office of Water. EPA 910-B-03-002. April.

U.S. Environmental Protection Agency (EPA). 2004. Wetlands overview. EPA 843-F-04-011a. Office of Water. December 2004. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/500025PY.PDF?Dockey=500025PY.PDF

U.S. Environmental Protection Agency (EPA). 2017. Level III and IV Ecoregions of the Continental United States. Available at: ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/wa/wa_eco.pdf

U.S. Fish and Wildlife Service (USFWS). 1967. Endangered and Threatened Wildlife; Determination of Endangered Status for Gray Wolf (*Canis lupus)* in the conterminous States, except MN and where listed as an experimental population; Final Rule. *Federal Register* 32:4001. March 11, 1967.

U.S. Fish and Wildlife Service (USFWS). 1975. Endangered and Threatened Wildlife; Amendment Listing the Grizzly Bear *(Ursus arctos horribilus)* of the 48 Conterminous States as a Threatened Species; Final Rule. *Federal Register* 40(145):31734-31736. July 28, 1975.

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl; Final Rule. *Federal Register* 55(123):26114-26194. June 26, 1990.

U.S. Fish and Wildlife Service (USFWS). 1997. North Cascades Ecosystem recovery plan chapter—supplement to the grizzly bear recovery plan. Missoula, Montana, USA.

U.S. Fish and Wildlife Service (USFWS). 1998. Endangered and Threatened Wildlife and Plants: Findings on Petitions to Change the Status of Grizzly Bear Populations in the North Cascades Area of Washington and the Cabinet-Yaak Area of Montana and Idaho from Threatened to Endangered; Notice of 12-month petition finding. *Federal Register* 63(107):30453-30455. June 4, 1998.

U.S. Fish and Wildlife Service (USFWS). 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx (*Lynx canadensis)* and Related Rule; Final Rule. *Federal Register* 65(58):16051-16086. March 24, 2000.

U.S. Fish and Wildlife Service (USFWS). 2003. Endangered and threatened wildlife and plants; final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; Final and Proposed Rules. *Federal Register* 68(62):15803-15875. April 1, 2003.

U.S. Fish and Wildlife Service (USFWS). 2005. RECOVERY OUTLINE: Contiguous United States Distinct Population Segment of the Canada Lynx. September 14, 2005. 21 pp.

U.S. Fish and Wildlife Service (USFWS). 2006. Species Profile for Bull Trout. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E065.

U.S. Fish and Wildlife Service (USFWS). 2007. Grizzly Bear Recovery: North Cascades Ecosystem. [Online] http://www.fws.gov/mountain-prairie/species/mammals/grizzly/cascadesindex.html (Accessed Feb 2013).

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. Available at: http://www.fws.gov/migratorybirds/.

U.S. Fish and Wildlife Service (USFWS). 2011. *Revised Final Recovery Plan for the Northern Spotted Owl - Strix occidentalis caurina.* US Fish and Wildlife Service (USFWS). Portland, Oregon. xvi + 258 pp. Available online at http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/.

U.S. Fish and Wildlife Service (USFWS). 2011. Grizzly bear (*Ursus arctos horribilus*): 5-year review: summary and evaluation. Grizzly Bear Recovery Office, Missoula, Montana. August 2011. 205 pp.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Regist*er 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12-04/pdf/2012-28714.pdf

U.S. Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. US Fish and Wildlife Service (USFWS). Federal Register 79(177):54782-54846. September 12, 2014. https://www.gpo.gov/fdsys/pkg/FR-2014-09-12/pdf/2014-21013.pdf

U.S. Fish and Wildlife Service (USFWS). 2014b. Final Critical Habitat for Bull Trout Upper Columbia River Basins Unit: 10. Available at: https://www.fws.gov/pacific/bulltrout/finalcrithab/index.cfm?unit=10

U.S. Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.

U.S. Forest Service (USFS). 1990. Wenatchee National Forest land and resource management plan. USDA Forest Service, Pacific Northwest Region, Wenatchee, WA.

U.S. Forest Service (USFS). 2000. Environmental assessment, Mission Ridge Ski Area Master Plan Improvements. Okanogan-Wenatchee National Forest.

U.S. Forest Service (USFS). 2012. The Okanogan-Wenatchee National Forest Restoration Strategy. November 2012. 45 pp. Available online at https://ems-team.usda.gov/sites/fs-r06-owffrs/EMDS%20Practitioners/RestorationStrategyDoc2012.pdf

von Kienast, J.A. 2003. Winter habitat selection and food habits of lynx on the Okanogan Plateau, Washington. Thesis, University of Washington, Seattle, USA. Washington Department of Fish and Wildlife (WDFW). 1998. Washington State Salmonid Stock Inventory: Bull Trout/Dolly Varden.

Washington Conservation Commission (WCC). 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages)., Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2006. WRIA 40 Diversion Screening and Fish Passage Inventory Report.

Washington Department of Fish and Wildlife (WDFW). 2013. Threatened and Endangered Wildlife in Washington: 2012 Annual Report. Listing and Recovery Section, Wildlife Program, Washington Department of Fish and Wildlife, Olympia. 251 pp.

Washington Department of Fish and Wildlife (WDFW). 2014. Game management plan July 2015 – June 2021. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA. 159 pp.

Washington Department of Fish and Wildlife (WDFW). 2016. Washington State Mule Deer Management Plan, Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 144 p.

Washington Department of Fish and Wildlife (WDFW). 2016b. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.

Washington Department of Fisheries (WDF), Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI): summary report.

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. (WADOE) March 2006. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1). Washington State Department of Ecology Publication #06-06-011a. Olympia, WA.

Watson, J. and M. Whalen. 2004. Golden eagle. Pages 8-1 – 8-7 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Wiles, Gary J., H.L. Allen, G.E. Hayes. 2011. Wolf Conservation and management plan for Washington. Washington Department of Fish and Wildlife. Olympia, Washington. 292 pages. Available online at http://wdfw.wa.gov/publications/00001/wdfw00001.pdf.

Wydoski, R.S., and R.R. Whitney. 2003. Inland Fishes of Washington. University of Washington Press, Seattle.

APPENDIX A

Wetland Delineation Report

Mission Ridge

WETLAND DELINEATION REPORT

Dennis Beich, Ecosystems North West,
Suzanne Tomassi, Avia Environmental

September 2017

(Formatting of original report was modified to fit within this resource report. No content was modified.)

Contents

I. INTRODUCTION 55

II. METHODS 55

III. PROPERTY DESCRIPTION 55

IV. FINDINGS 56

DOCUMENT SEARCH 56

FIELD INVESTIGATION 57

V. REGULATORY IMPLICATIONS 60

LOCAL REGULATIONS 60

STATE AND FEDERAL REGULATIONS 61

Introduction

Ecosystems North West was contracted by Washington Conservation Science (WCS) to conduct wetland determination and delineation on three specific site within a property owned by Mission Ridge in Section 19 of Township 21N, Range 20E in Chelan County. The subject property and adjacent Mission Ridge Ski and Board Resort are proposed and current special use permit areas, respectively.

Base information for this report was obtained from WCS; publically available aerial photographs; and planning, zoning, and critical areas information databases from local, State, federal, and non-governmental websites.

This investigation was conducted to determine whether three specific locations qualify as regulatory wetlands as defined in Chelan County Code (CCC) Chapter 14.10, and to delineate any wetland areas identified in these locations.

Portions of this work were subcontracted to Avia Environmental.

Methods

A documentation search was conducted and included County inventories, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database, State and federal threatened and endangered species lists, the National Wetland Inventory (NWI), and the Washington Department of Natural Resources (WDNR) Natural Heritage Program database.

Three small areas of the property were investigated in detail during a September 6, 2017 field visit by Dennis Beich, PWS. Methodology used for wetland determination was that of the Washington State Department of *Ecology's Wetland Identification and Delineation Manual* (Manual) and *Western Mountains, Valleys, and Coast Regional Supplement*. Soil, hydrology, and vegetation were examined throughout the property to determine whether they fit criteria set forth in the Manual. Data were recorded at four of these points (Appendix A). Wetland boundaries were marked with pink pin flags.

Wetlands were rated using the Washington State Wetland Rating System for Eastern Washington: 2014 Update and buffers determined per CCC 11.80.

Property Description

The area of investigation is generally sloping with many depressions, including the wetland areas described herein. Average slope is approximately 2 t0 10 percent. Non-wetlands in the area are a mosaic of mid-age Ponderosa pine forest with areas of meadow and emergent vegetation. These areas are described in more detail in Section IV.

The USDA Soil Survey for the area indicates the possible presence of Loneridge very stony loam, Stemilt silt loam, and rock outcrop in the area (see Appendix B for details and soils map).

Findings

DOCUMENT SEARCH

Threated and endangered species for which records exist in the study area vicinity are as follows:

- Northern spotted owl (*Strix occidentalis*)
- Gray wolf (*Canis lupus*)
- Grizzly bear (*Ursus arctos*)
- Lynx (*Lynx canadensis*)
- Fisher (*Pekania pennanti*)

Northern spotted owl is the only one of these species noted within approximately two miles of the study site. Other mammal species are unlikely to occur on the site, as it is located at the far extents of their ranges. WDFW PHS species noted in the wider vicinity are:

- Elk (*Cervus elaphus*)
- Mule deer (*Odocoileus hemionus*)
- Northern goshawk (*Accipiter gentilis*)
- Western cutthroat (*Oncorhynchus clarki lewisi*)
- Rainbow trout (*Oncorhynchus mykiss*) (resident)

See Appendix C for the full PHS report.

The NWI online database does not depict any wetlands on the study area. Chelan County uses NWI in lieu of a County-specific inventory.

WDNR's website does not indicate the presence of Natural Heritage sites on the study area.

FIELD INVESTIGATION

Two small emergent wetlands were discovered on the study site. These are referred to herein as Wetland A and Wetland B, and located approximately as depicted in Figure 1. As well, a small aspen (*Populus tremuloides*) stand was investigated to determine whether it met wetland criteria.

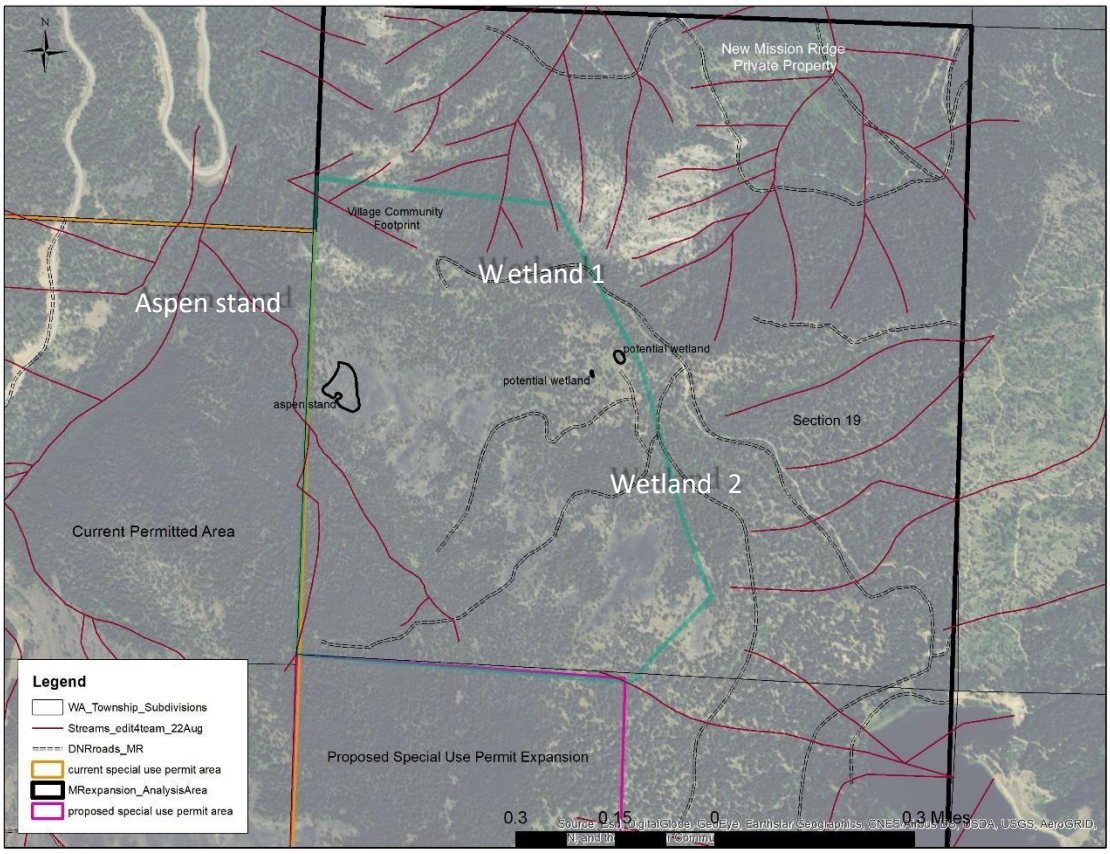


Figure 1. Approximate locations of wetlands and aspen stand in the study area.

Wetland 1

Wetland 1 is a small depression with emergent vegetation (Photo 1). Vegetation in Wetland 1 is dominated by common spikerush (*Eleocharis palustris*) and an unidentified sedge (*Carex* sp.), with analogue sedge (*C. simulata*) and meadow foxtail (*Alopecurus pratensis*) also common. Two soil strata were observed: black (10YR 2/1) loamy clay (0-7 inches) and grayish brown (2.5Y 5/2) clay (7-13 inches).

No redoximorphic features were observed. Wetland hydrology is supported primarily by groundwater, and no outlet is present. Although no ponding was present during the site visit, field indicators for seasonal ponding exceeding ½ of the wetland area were observed. Few habitat features are present and the wetland has low structural and compositional diversity. Please see Appendix D for details of wetland function and potential.

The buffer of Wetland 1 is typical mid-age Ponderosa pine dominated eastside forest with and understory of Wood's rose, pine grass (Calamagrostis rubescens), fescue grasses (*Festuca* sp.), and legumes (Fabaceae-Leguminosae).

Wetland 1 rates as Category III with water quality, hydrologic, and habitat function scores of 5, 6, and 7, respectively.



Photo 1. Wetland 1

Wetland 2

A second small depression, Wetland 2, was identified roughly 350 feet WSW of Wetland 1 (Photo 2). Approximately twice the size of Wetland 1, Wetland 2 is dominated by sedges (*Carex* sp.), blue joint grass (*Calamagrostis canadensis*), and cinquefoil (*Popentilla* sp.). Soils consist of black (10YR 2/1) clay loam (0-4 inches), brown (10YR 3/2) clay loam (4-7 inches), and dark gray (2.5Y 4/1) clay loam (7-12 inches) with oxidized roots in the soil matrix with 10 inches of the surface.

Wetland hydrology is indicated by both the oxidized rhizospheres along living roots and the presence of drift deposits.

The buffer of Wetland 1 is Ponderosa forest with subalpine fir (Abies lasiocarpa) and an understory of pine grass, fescue grasses, and strawberry (*Fragasia vesca*).

Wetland 2 is also Category III and score similarly to Wetland 1, although water quality and hydrology scores are each lower by one point. Habitat features in the wetland include loose rock and standing snags. Total score for Wetland 2 is 16.



Photo 2. Wetland 2

Aspen Stand

An area of quaking aspen was investigated as a possible wetland. Although the species' facultative status is FACU, it has been assigned special status when it is found within wetlands. The area investigated is in upland habitat located on a talus slope with no exposed soil and several layers of rock. The rock layers were at least 16 inches deep in test pits dug in an unsuccessful attempt to find soil substrate. No wetland hydrologic indicators were present at the time of the site visit. Dominant vegetation is quaking aspen, juniper (*Juniperus communis*) (UPL), and bitter brush (*Purshia tridentata*) (UPL), each constituting approximately 20% coverage. The remaining area is bare rock.

Regulatory Implications

LOCAL REGULATIONS

Chelan County regulates wetlands through CCC 11.80, Wetland Areas Overlay District. Wetland buffers are determined based on the wetland category associated with the wetland. Buffer widths also vary depending on the intensity of planned land use. Some exemptions apply to standards regulations, including some passive, educational, maintenance, and noxious species control uses (CCC 11.80.020).

As Category III wetlands, Wetlands 1 and 2 require standard buffers of 75 and 150 feet for low- and high-impact adjacent activities, respectively (CCC 11.80.060(6)). Regulatory buffers are required to be maintained in their natural condition. Buffer widths may be modified only when approved by the County and pursuant to the conditions in CCC 80.11.070. Under this code provision, the applicant but demonstrate:

"(1) That width averaging will not degrade the wetland structure, function and values; and

(2) The total area contained within the wetland buffer after averaging is no less than that contained within the wetland buffer, outlined by the requirements of this chapter, prior to averaging. The revised wetland buffer width shall not be less than seventy-five percent of the wetland buffer widths outlined within this chapter, or be less than twenty-five feet, whichever is greater; and

(3) Failure to adjust the buffer would result in a hardship to the property owner; and

(4) The need for buffer averaging is not due to the landowner's own actions; and

(5) That low-intensity land uses would be located adjacent to areas where buffer width is reduced, and that such low-intensity land uses are guaranteed in perpetuity by covenant, deed restriction, easement, or other legally binding mechanism; and

(6) A wetland report pursuant to Section 11.80.100, if required by the administrative authority, supporting the newly delineated wetland buffer, has been prepared and submitted."

The County administrator may increase the required buffer if it is determined that a wider buffer is needed to protect a wetland (CCC 80.11.090). Buffer widths may be varied by the County on lots, tracts, and parcels legally created prior to January 5, 1999, provided the applicant can demonstrate that standard requirements significantly interferes with reasonable use of the property, the need for variance is not the result of the applicants own actions, the shoreline environmental (if applicable) will not be impacted, the project is compatible with the Chelan County Comprehensive Plan and Shoreline Master Program, and the public will not be negatively impacted (CCC 11.80.090).

Buffer reduction may be no greater than 50% of the standard, and may not be less than 25 feet for Category II, III, and IV wetlands and 150 feet for Category I wetlands. The County administrator may require a mitigation plan to be implemented to avoid or compensate for any buffer impacts.

STATE AND FEDERAL REGULATIONS

Wetlands are also regulated by the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act. Any filling of Waters of the State, including wetlands (except isolated wetlands), would likely require notification and permits from the Corps. Wetlands 1 and 2 would likely be considered isolated by the Corps, as no hydrologic connection to other aquatic areas are evident. Federally permitted actions that could affect endangered species may also require consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Please note that the findings of this report are subject to the verification and agreement of local, State and/or federal regulatory authorities.

Appendix A. – Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-1

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus ponderosa* 2.	30	yes	UPL
3.			
4.			
50% = ___, 20% =	30	= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1. *Rosa woodsii*	5	yes	FACU
2.			
3.			
4.			
5.			
50% = ___, 20% =	5	= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Calamagrostis rubescens*	50	yes	UPL
2. *Fescue sp*	30	yes	UPL
3. *Legume sp*	5	no	
4.			
5.			
6.			
7.			
8.			
50% = ___, 20% =	85	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ☐ ☒

Remarks:

SOIL Sampling Point: TH-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100						LOAMY CLAY

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Histic Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) Reduced Vertic
- ☐ 2 cm Muck (A10) Red Parent
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks: some rocks present

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) **(Nonriverine)**
- ☐ Sediment Deposits (B2) **(Nonriverine)**
- ☐ Drift Deposits (B3) **(Nonriverine)**
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) **(Riverine)**
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) **(Riverine)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-2

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☒ No ☐**
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% =		= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% =		= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Carex sp*	30	yes	FACW
2. *Eleocharis palustris*	50	yes	OBL
3. *Carex simulata*	10	yes	OBL
4. *Alopecurus pratensis*	10	yes	FACW
5.			
6.			
7.			
8.			
50% = ___, 20% =	100	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

US Army Corps of Engineers Arid West – Version 2.0 Project Site: Mission Ridge

SOIL Sampling Point: TH-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100						LOAMY CLAY
7-13	2.5Y 5/2	70	7.5YR 5/6	30	C	M		CLAY LOAM

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)

Indicators for Problematic Hydric Soils[3]:

- ☐ Sandy Redox (S5) 1 cm Muck (A9)
- ☐ Stripped Matrix (S6) 2 cm Muck (A10)
- ☐ Loamy Mucky Mineral (F1) Reduced Vertic
- ☐ Loamy Gleyed Matrix (F2) Red Parent
- ☐ Depleted Matrix (F3) Other (Explain in

- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) **(Nonriverine)**
- ☐ Sediment Deposits (B2) **(Nonriverine)**
- ☒ Drift Deposits (B3) **(Nonriverine)**
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)

- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) **(Riverine)**
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) **(Riverine)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-3

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Abies lasiocarpa* 2.	20	yes	UPL
3.			
4.			
50% = ___, 20% =	20	= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% =		= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Calamagrostis rubescens*	80	yes	UPL
2. *Fescue sp*	10	yes	UPL
3. *Fragasia vesca*	10	yes	UPL
4.			
5.			
6.			
7.			
8.			
50% = ___, 20% =	90	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ☐ ☒

Remarks:

SOIL Sampling Point: TH-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					LOAM	
6-12	10YR 4/3	100					LOAM	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Histic Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Material (F21) Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**) Redox Dark Surface (F6)
- ☐ Depleted Below Dark Surface (A11) Depleted Dark Surface (F7)
- ☐ Thick Dark Surface (A12) Redox Depressions (F8)
- ☐ Sandy Mucky Mineral (S1) Vernal Pools (F9)
- ☐ Sandy Gleyed Matrix (S4)

Indicators for Problematic Hydric Soils[3]:

- ☐ Sandy Redox (S5) 1 cm Muck (A9)
- ☐ Stripped Matrix (S6) 2 cm Muck (A10)
- ☐ Loamy Mucky Mineral (F1) Reduced Vertic
- ☐ Loamy Gleyed Matrix (F2) Red Parent
- ☐ Depleted Matrix (F3) Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
☐ Surface Water (A1)	☐ Salt Crust (B11)	☐ Water Marks (B1) **(Riverine)**
☐ High Water Table (A2)	☐ Biotic Crust (B12)	☐ Sediment Deposits (B2) **(Riverine)**
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)	☐ Drift Deposits (B3) **(Riverine)**
☐ Water Marks (B1) **(Nonriverine)**	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)
☐ Sediment Deposits (B2) **(Nonriverine)**	☐ Oxidized Rhizospheres along Living Roots (C3)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3) **(Nonriverine)**	☐ Presence of Reduced Iron (C4)	☐ Crayfish Burrows (C8)
☐ Surface Soil Cracks (B6)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Thin Muck Surface (C7)	☐ Shallow Aquitard (D3)
☐ Water-Stained Leaves (B9)	☐ Other (Explain in Remarks)	☐ FAC-Neutral Test (D5)

Field Observations:

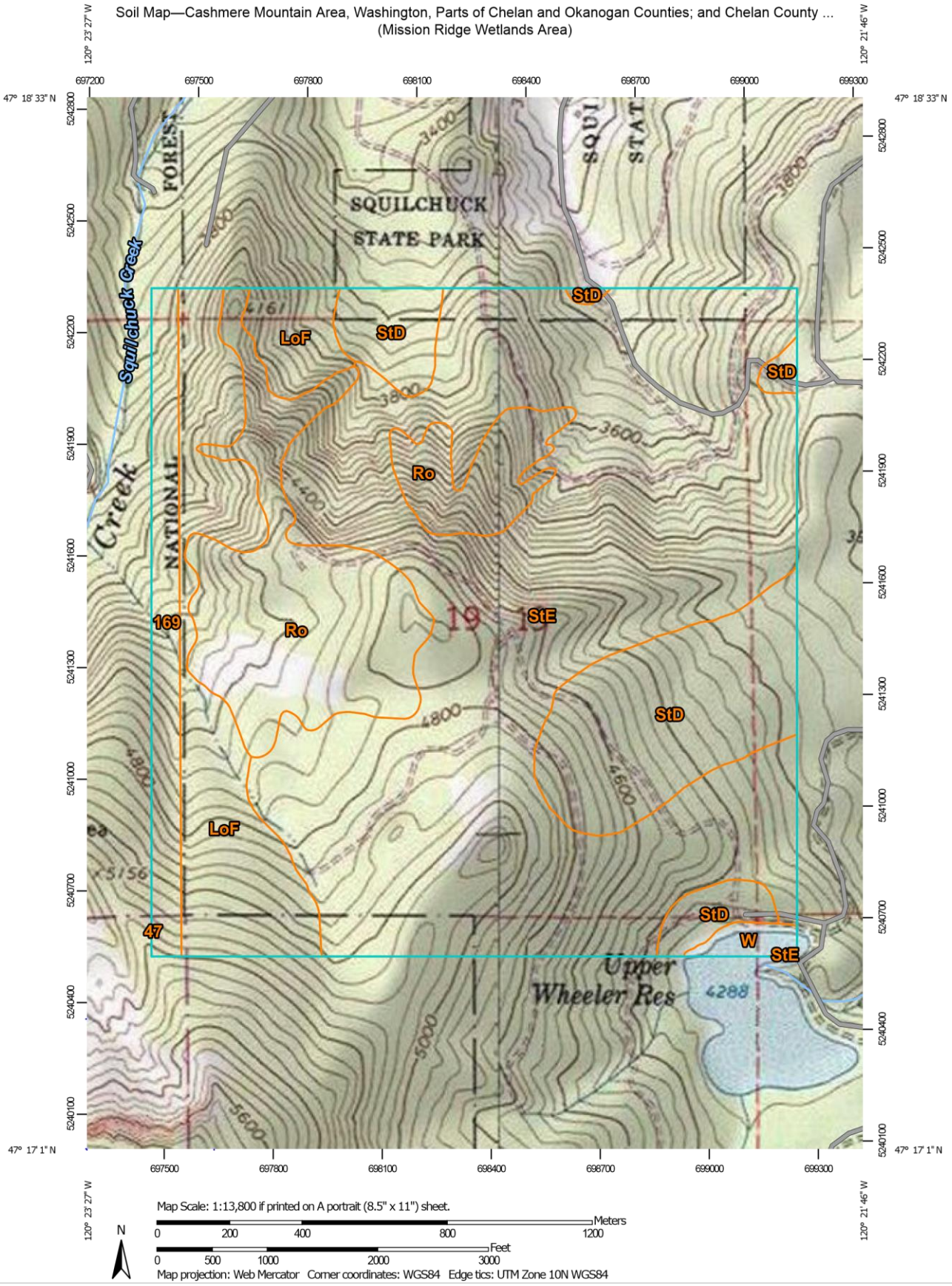
Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B. Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Topographic Map
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cashmere Mountain Area, Washington, Parts of Chelan and Okanogan Counties
Survey Area Data: Version 15, Sep 8, 2016

Soil Survey Area: Chelan County Area, Washington (Parts of Chelan and Kittitas Counties)
Survey Area Data: Version 12, Sep 8, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 24, 2012—Sep 21, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
47	Blewett-Rock outcrop complex, 30 to 60 percent slopes	0.1	0.0%
169	Loneridge very stony loam, 30 to 60 percent slopes	34.7	4.4%
Subtotals for Soil Survey Area		**34.7**	**4.4%**
Totals for Area of Interest		**791.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LoF	Loneridge very stony loam, 25 to 65 percent slopes	93.9	11.9%
Ro	Rock outcrop	115.3	14.6%
StD	Stemilt silt loam, 0 to 25 percent slopes	104.4	13.2%
StE	Stemilt silt loam, 25 to 45 percent slopes	437.4	55.3%
W	Water	5.4	0.7%
Subtotals for Soil Survey Area		**756.5**	**95.6%**
Totals for Area of Interest		**791.2**	**100.0%**

Appendix C. PHS Vicinity report and map

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic
REPORT DATE: 10/07/2017 5.47

Query ID: P171007174703

Common Name / Scientific Name / Notes	Site Name / Source Dataset / Source Record / Source Date	Priority Area / Occurrence Type / More Information (URL) / Mgmt Recommendations	Accuracy	Federal Status / State Status / PHS Listing Status	Sensitive Data / Resolution	Source Entity / Geometry Type
Columbia spotted frog Rana luteiventris	WS_OccurPoint 18285 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Columbia spotted frog Rana luteiventris	WS_OccurPoint 18280 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Elk Cervus elaphus	NONEUM BASIN CALVING PHSREGION 901504	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM MIGRATION PHSREGION 901510	Migration Migration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM ELK CALVING PHSREGION 901501	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Lake	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Lake	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Mule deer Odocoileus hemionus	MISSION CREEK DEER PHSREGION 901318	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons

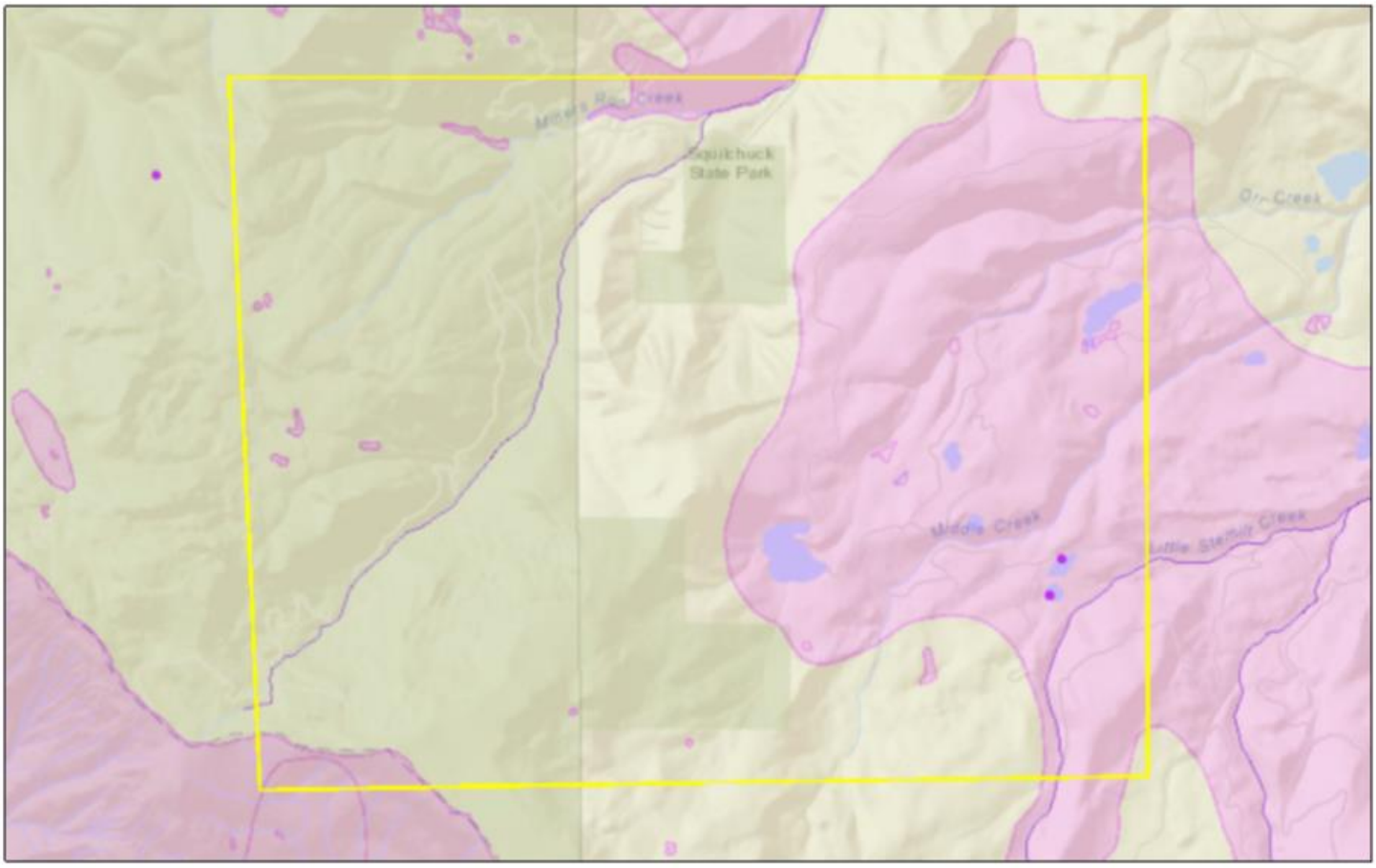
Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102022 May 21, 1998	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102001 June 13, 1992	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 92889 May 16, 2001	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105435 June 05, 1996	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 100673 May 12, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105701 May 27, 1998	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Rainbow Trout Oncorhynchus mykiss	Squilchuck Creek SWIFD 3531	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Western toad Anaxyrus boreas	WS_OccurPoint 18278 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Western toad Anaxyrus boreas	WS_OccurPoint 18283 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Westslope Cutthroat Oncorhynchus clarki lewisi	Little Stemilt Creek SWIFD 3572	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm http://wdfw.wa.gov/publications/pub.php?	NA	N/A N/A PHS LISTED	N AS MAPPED	 Lines
Wetlands	STEFFEN POND PHSREGION 901534	Aquatic Habitat N/A http://www.ecy.wa.	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to vraition caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

WDFW Test Map



October 7, 2017

PHS Report Clip Area
PT
LN

POLY
AS MAPPED
SECTION

QTR-TWP
TOWNSHIP

1:59,509

0 0.5 1 2 mi
0 0.75 1.5 3 km

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

THIS PAGE LEFT BLANK INTENTIONALLY

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): ____Mission Ridge 1_____ Date of site visit: ____9-6-17_

Rated by_____Dennis Beich, PWS____ Trained by Ecology? _x_ Yes ___ No Date of training __2014

HGM Class used for rating___Depressional_____ Wetland has multiple HGM classes?____Y ___x_N

NOTE: **Form is not complete without the figures requested** (*figures can be combined*). Source of base aerial photo/map_____Google maps_____

OVERALL WETLAND CATEGORY _III_ (based on functions___ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 22-27
_____**Category II** – Total score = 19-21
____X__**Category III** – Total score = 16-18
_____**Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	(H) M L	(H) M L	H (M) L	
Landscape Potential	H M (L)	H M (L)	(H) M L	
Value	H M (L)	H (M) L	H (M) L	**TOTAL**
Score Based on Ratings	5	6	7	18

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	**II III**
Alkali	**I**
Wetland of High Conservation Value	**I**
Bog and Calcareous Fens	**I**
Old Growth or Mature Forest – slow growing	**I**
Aspen Forest	**I**
Old Growth or Mature Forest – fast growing	**II**
Floodplain forest	**II**

None of the above	

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	N/A
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	N/A
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	1
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	N/A
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	N/A

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size ___At least 30% of the open water area is deeper than 10 ft (3 m)

(NO) – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks; ___The water leaves the wetland **without being impounded**.

(NO) - go to 3 YES – The wetland class is **Slope**
NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?
___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
___ The overbank flooding occurs at least once every 10 years.

(NO) - go to 4 YES – The wetland class is **Riverine**
NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 5 (YES) – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT

AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number 1

DEPRESSIONAL WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality		Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?		
1.1. Characteristics of surface water outflows from the wetland:		
Wetland has no surface water outlet	points = 5 (circled)	5
Wetland has an intermittently flowing outlet	points = 3	
Wetland has a highly constricted permanently flowing outlet	points = 3	
Wetland has a permanently flowing, unconstricted, surface outlet	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions of soils)*	YES = 3 NO = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes)		
Wetland has persistent, ungrazed, vegetation for > 2/3 of area	points = 5 (circled)	
Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area	points = 3	5
Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area	points = 1	
Wetland has persistent, ungrazed vegetation < 1/10 of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.*		
Area seasonally ponded is > ½ total area of wetland	points = 3 (circled)	3
Area seasonally ponded is ¼ - ½ total area of wetland	points = 1	
Area seasonally ponded is < ¼ total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	13

Rating of Site Potential If score is: **__x__ 12- 16 = H ___ 6- 11 = M ___ 0- 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1- D 2.3? Source_____	Yes = 1 No = 0	0
Total for D 2	Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___3 or 4 = H ___1 or 2 = M __x__ 0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]? Yes = 1 No = 0		0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)? Yes = 2 No = 0		0
Total for D 3	Add the points in the boxes above	0

Rating of Value If score is: **___2-4 = H ___1 = M ___x 0 = L** *Record the rating on the first page*

Wetland name or number 1

DEPRESSIONAL WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and erosion.

	Points (only 1 score per box)
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland:	8
Wetland has no surface water outlet — points = 8	
Wetland has an intermittently flowing outlet — points = 4	
Wetland has a highly constricted permanently flowing outlet — points = 4	
Wetland has a permanently flowing unconstricted surface outlet — points = 0	
(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).*	
Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 8	8
Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 6	
The wetland is a headwater wetland — points = 4	
Seasonal ponding: 1 ft - < 2 ft — points = 4	
Seasonal ponding: 6 in - < 1 ft — points = 2	
Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0	
Total for D 4 — Add the points in the boxes above	16

Rating of Site Potential If score is: **x 12-16 = H** **6-11 = M** **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in a land use that generates runoff? Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses? Yes = 1 No = 0	0
Total for D 5 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: **3 = H** **1 or 2 = M** **x 0 = L** *Record the rating on the first page*

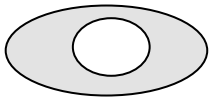
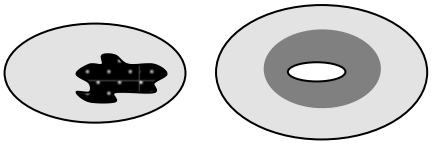
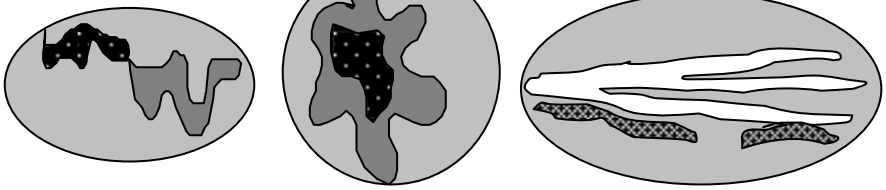
D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The wetland is in a landscape that has flooding problems.	1
Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.*	
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND	
Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2	
Surface flooding problems are in a sub-basin farther down-gradient — points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0	
There are no problems with flooding downstream of the wetland points = 0	
D 6.2. Has the site has been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 — Add the points in the boxes above	1

Rating of Value If score is: **2-4 = H** **x 1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number 1

These questions apply to wetlands of all HGM classes. (only 1 score per box) **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ____Aquatic bed _x_ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover __x_Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover ____Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ____Scrub-shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	1
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? ***A****nswer YES for Lake Fringe wetlands*. Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No*. Yes = 3 No = 0	3
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. D*ifferent patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species __7__ Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0	1

Wetland name or number 1

H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points  Riparian braided channels with 2 classes All three diagrams in this row are **High** = 3 points	Figure__ 1

H 1.6. Special habitat features *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ____Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ____Cattails or bulrushes are present within the wetland. ____Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ____Emergent or shrub vegetation in areas that are permanently inundated/ponded. ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity __X_ Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	1
Total for H 1 Add the points in the boxes above	7

Rating of Site Potential If score is:___**15-18 = H** __**x**__**7-14 = M** ___**0-6 = L** *Record the rating on the first page*

Wetland name or number 1

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat _____ **+** [(% moderate and low intensity land uses)/2] ____ **=**_____% > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat _____ **+** [(% moderate and low intensity land uses)/2] ____ **=**_____% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use points = (- 2) Does not meet criterion above points = 0	0
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 Add the points in the boxes above	6

Rating of Landscape Potential If score is: **__x__ 4-9 = H ___1-3 = M ___< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: **___2 = H __x_1 = M ___0 = L** *Record the rating on the first page*

Wetland name or number 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Vernal pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool*. ☐ The soil in the wetland is shallow [< 1 ft (30 cm)deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. Yes **–** Go to **SC 1.1** No = **Not a vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? Yes **–** Go to **SC 1.2** No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? Yes = **Category II** No = **Category III**	**Cat. II** **Cat. III**
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ¾ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. Yes = **Category I** No= **Not an alkali wetland**	**Cat. I**
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 3.2** No – Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 3.4** No = **Not a WHCV**	**Cat. I**

SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? Yes = **Category I** No =**Not a WHCV**	

SC 4.0 Bogs and Calcareous Fens Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? *Use the key below to identify if the wetland is a bog or calcareous fen.* ***If you answer yes you will still need to rate the wetland based on its functions.*** SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils*. Yes – Go to **SC 4.3** No – Go to **SC 4.2** SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 4.3** No = **Is not a bog for rating** SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5? Yes = **Category I bog** No – Go to **SC 4.4 NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog. SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy? Yes = **Category I bog** No – Go to **SC 4.5** SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks? Yes = **Is a Calcareous Fen for purpose of rating** No – Go to **SC 4.6** SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met: ☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems ☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland Yes = **Is a Category I calcareous fen** No = **Is not a calcareous fen**	**Cat. I** **Cat. I**

SC 5.0. Forested Wetlands Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H 1.1*) ☐ The wetland is within the 100 year floodplain of a river or stream ☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species ☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see definitions in question H3.1)* Yes – Go to **SC 5.1** No = **Not a forested wetland with special characteristics**	

Wetland name or number 1

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)? Yes = **Category I** No – Go to **SC 5.2**	**Cat. I**
SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species? Yes = **Category I** No – Go to **SC 5.3**	**Cat. I**
SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)? Yes = **Category II** No – Go to **SC 5.4**	**Cat. II**
SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream? Yes = **Category II** No = **Not a forested wetland with special characteristics**	**Cat. II**
Category of wetland based on Special Characteristics *Choose the highest rating if wetland falls into several categories* If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number_____

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Old-growth/Mature forests:** Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in oldgrowth; 80-200 years old west and 80-160 years old east of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

☐ **Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

- **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

- **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

This page left blank intentionally

Wetland name or number 2

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Mission Ridge 2 Date of site visit: 9-6-17

Rated by Dennis Beich, PWS Trained by Ecology? x Yes No Date of training 2014

HGM Class used for rating Depressional *Wetland has multiple HGM classes?* Y x N

NOTE: **Form is not complete without the figures requested** (*figures can be combined*). Source of base aerial photo/map Google maps

OVERALL WETLAND CATEGORY III (based on functions or special characteristics)

3. Category of wetland based on FUNCTIONS

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

_____**Category I** – Total score = 22-27

_____**Category II** – Total score = 19-21

X **Category III** – Total score = 16-18

_____**Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	(H) M L	H (M) L	
Landscape Potential	H M (L)	H M (L)	(H) M L	
Value	H M (L)	H M (L)	H (M) L	**TOTAL**
Score Based on Ratings	4	5	7	16

4. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	**II** **III**
Alkali	**I**
Wetland of High Conservation Value	**I**
Bog and Calcareous Fens	**I**
Old Growth or Mature Forest – slow growing	**I**
Aspen Forest	**I**
Old Growth or Mature Forest – fast growing	**II**
Floodplain forest	**II**
None of the above	

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	N/A
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	N/A
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	1
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	N/A
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	N/A

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	

1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

6. Does the entire unit **meet both** of the following criteria?
   ____The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   ____At least 30% of the open water area is deeper than 10 ft (3 m)

   (NO) – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

7. Does the entire wetland unit **meet all** of the following criteria?
   ____The wetland is on a slope (*slope can be very gradual*),
   ____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks; The water leaves the wetland **without being impounded**.

   (NO) - go to 3 YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

8. Does the entire wetland unit **meet all** of the following criteria?
   ____The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   ____The overbank flooding occurs at least once every 10 years.

   (NO) - go to 4 YES – The wetland class is **Riverine**

NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

9. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 5 (YES) – The wetland class is **Depressional**

10. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have more* than 2 HGM classes *within a wetland boundary, classify the wetland as Depressional for the rating.

Wetland name or number 2

DEPRESSIONAL WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

	Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has no surface water outlet — points = (5) Wetland has an intermittently flowing outlet — points = 3 Wetland has a highly constricted permanently flowing outlet — points = 3 Wetland has a permanently flowing, unconstricted, surface outlet — points = 1	5
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions of soils)* YES = 3 NO = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes) Wetland has persistent, ungrazed, vegetation for > 2/3 of area — points = (5) Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area — points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area — points = 1 Wetland has persistent, ungrazed vegetation < 1/10 of area — points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.* Area seasonally ponded is > ½ total area of wetland — points = 3 Area seasonally ponded is ¼ - ½ total area of wetland — points = (1) Area seasonally ponded is < ¼ total area of wetland — points = 0	1
Total for D 1 — Add the points in the boxes above	11

Rating of Site Potential If score is: **__x__ 12- 16 = H _____ 6- 11 = M _____ 0- 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1- D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___ 3 or 4 = H _____ 1 or 2 = M __x__ 0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)? Yes = 2 No = 0	0
Total for D 3 — Add the points in the boxes above	0

Rating of Value If score is: **___ 2-4 = H _____ 1 = M _____ x 0 = L** *Record the rating on the first page*

Wetland name or number 2

DEPRESSIONAL WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and erosion.

Points (only 1 score per box)

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland: **8**

- Wetland has no surface water outlet — points = 8 (circled)
- Wetland has an intermittently flowing outlet — points = 4
- Wetland has a highly constricted permanently flowing outlet — points = 4
- Wetland has a permanently flowing unconstricted surface outlet — points = 0

(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).* **4**

Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding points = 8 Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent pondingpoints = 6 The wetland is a headwater wetland — points = 4

- Seasonal ponding: 1 ft - < 2 ft — points = 4 (circled)
- Seasonal ponding: 6 in - < 1 ft — points = 2
- Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0

Total for D 4	Add the points in the boxes above	12

Rating of Site Potential If score is: **__x_ 12-16 = H_____6-11 = M_____0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in a land use that generates runoff?	Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?	Yes = 1 No = 0	0
Total for D 5	Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___3 = H_____1 or 2 = M ___x_0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The wetland is in a landscape that has flooding problems. **0**

Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND

- Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2
- Surface flooding problems are in a sub-basin farther down-gradient — points = 1 (circled)

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why*_____points = 0

There are no problems with flooding downstream of the wetland points = 0

D 6.2. Has the site has been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0 — **0**

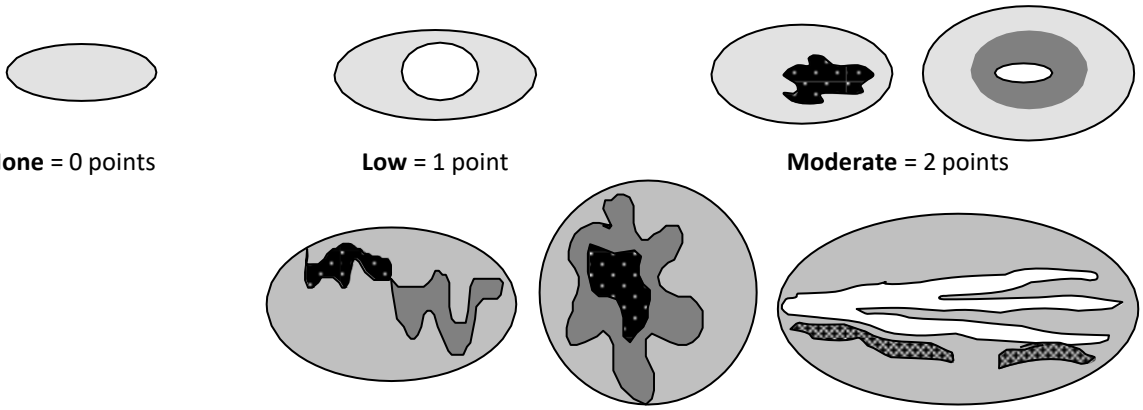
Total for D 6	Add the points in the boxes above	0

Rating of Value If score is: **___2-4 = H __x_1 = M_____0 = L** *Record the rating on the first page*

Wetland name or number 2

These questions apply to wetlands of all HGM classes. (only 1 score per box) **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ____Aquatic bed _x_ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover __x_Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover ____Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ____Scrub-shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	1
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? ***A****nswer YES for Lake Fringe wetlands*. Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No*. Yes = 3 No = 0	3
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. D*ifferent patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species __7 Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0	1

Wetland name or number 2

H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points Riparian braided channels with 2 classes All three diagrams in this row are **High** = 3 points	Figure___ 1

H 1.6. Special habitat features *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ____Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ____Cattails or bulrushes are present within the wetland. _X_Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ____Emergent or shrub vegetation in areas that are permanently inundated/ponded. ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity _X Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	3
Total for H 1 Add the points in the boxes above	9

Rating of Site Potential If score is:___**15-18 = H** __**x**__**7-14 = M**_____**0-6 = L** *Record the rating on the first page*

Wetland name or number 2

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat_____**+** [(% moderate and low intensity land uses)/2]_____**=**_____% > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat_____**+** [(% moderate and low intensity land uses)/2]_____**=**_____% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use points = (- 2) Does not meet criterion above points = 0	0
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 Add the points in the boxes above	6

Rating of Landscape Potential If score is: **x 4-9 = H 1-3 = M < 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* ☒ Site meets ANY of the following criteria: points = 2 It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: **2 = H x 1 = M 0 = L** *Record the rating on the first page*

Wetland name or number 2

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Vernal pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool*. The soil in the wetland is shallow [< 1 ft (30 cm)deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. Yes **–** Go to **SC 1.1** No = **Not a vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes **–** Go to **SC 1.2** No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? Yes = **Category II** No = **Category III**	**Cat. II** **Cat. III**
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? The wetland has a conductivity > 3.0 mS/cm. The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland More than ¾ of the plant cover consists of species listed on Table 4 A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. Yes = **Category I** No= **Not an alkali wetland**	**Cat. I**
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 3.2** No – Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 3.4** No = **Not a WHCV**	**Cat. I**

SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? Yes = **Category I** No =**Not a WHCV**	

SC 4.0 Bogs and Calcareous Fens Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? *Use the key below to identify if the wetland is a bog or calcareous fen.* ***If you answer yes you will still need to rate the wetland based on its functions.*** SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils*. Yes – Go to **SC 4.3** No – Go to **SC 4.2** SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 4.3** No = **Is not a bog for rating** SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5? Yes = **Category I bog** No – Go to **SC 4.4 NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog. SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy? Yes = **Category I bog** No – Go to **SC 4.5** SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks? Yes = **Is a Calcareous Fen for purpose of rating** No – Go to **SC 4.6** SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met: ☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems ☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland Yes = **Is a Category I calcareous fen** No = **Is not a calcareous fen**	**Cat. I** **Cat. I**

SC 5.0. Forested Wetlands Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H 1.1*) ☐ The wetland is within the 100 year floodplain of a river or stream ☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species ☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see definitions in question H3.1)* Yes – Go to **SC 5.1** No = **Not a forested wetland with special characteristics**	

Wetland name or number 2

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)? Yes = **Category I** No – Go to **SC 5.2**	**Cat. I**
SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species? Yes = **Category I** No – Go to **SC 5.3**	**Cat. I**
SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)? Yes = **Category II** No – Go to **SC 5.4**	**Cat. II**
SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream? Yes = **Category II** No = **Not a forested wetland with special characteristics**	**Cat. II**
Category of wetland based on Special Characteristics *Choose the highest rating if wetland falls into several categories* If you answered No for all types, enter "Not Applicable" on Summary Form	

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

 Aspen Stands: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

 Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

 Old-growth/Mature forests: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in oldgrowth; 80-200 years old west and 80-160 years old east of the Cascade crest.

 Oregon White Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

 Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

 Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

 Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

 Cliffs: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

 Talus: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

 Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

 Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

- **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

- **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

THIS PAGE LEFT BLANK INTENTIONALLY

APPENDIX B

Chelan County Natural Resources Stream Typing for Parcel Number 212019000000 Report

Chelan County Natural Resource Department
411 Washington Street, Suite 201, Wenatchee, WA 98801 Phone (509) 667-6640 Fax (509) 667-6527

August 17, 2017

Stream Typing for Parcel Number 212019000000

On August 16, 2017 a site visit was made to Chelan County parcel #**212019000000**, at the request of Josh Jorgensen, on behalf of Tamarack Saddle LLC. The parcel is the site of a potential future development and expansion of Mission Ridge Ski Area. The stream type request was part of an effort to understand natural resource considerations and potential permitting requirements before submitting designs and permit applications to the County. The stream typing was only done within the conceptual expansion area within parcel 212019000000 (see Figures 1 and 2, maps of parcel and conceptual expansion area). According to the Washington Department of Natural Resources (DNR) FPARS mapping tool, many stream segments are present within the conceptual expansion area. The streams located in the conceptual expansion area are all listed as

"N" streams, or non-fish bearing (with the exception of one "U", or unknown stream). Each stream within the expansion area was typed and recorded.

For the purposes of this report, the conceptual expansion area was divided into two sections, sections A and B. Within these sections, streams showing on the DNR FPARs layer were numbered as a tracking system for reporting. The numbers and letters shown in Figure 2 correspond to the streams discussed in this report. Photos for each stream typed are inserted in the report with the determination.

Section A: Section A showed 8 streams according to the FPARs map; 7 "N' and 1 "U". The results of the stream typing in Section A are as follows.

Stream 1: Stream 1 is shown on the FPARs map in an area of complex terrain, with depressions that suggest the presence of water. Short sections of channelized terrain were noted, but these sections typically end in berms or ridges that water could not pass over. An old road grade follows the general path of the largest of these depressions, with no drainage structures present in the road grade (culverts, ditches, waterbars, etc). The road is still intact, indicating that water does not flow in the path of the depression often. Vegetation in these depressions and short sections of channel-like topography is upland-type vegetation (kinnikinnick, pipsissewa, oceanspray, vine maple). Though it is likely that water collects in these depressions during wet seasons or snow melt-off, **this stream does not qualify as a stream** due to lack of a continuous, defined and measurable channel, riparian vegetation, and surface connection with a larger stream.



Photo 1. A typical section of channel-like depression, terminating in a berm.



Photo 2. Another section of channel-like depression, showing lack of riparian vegetation and defined, measureable channel. The complex topography in this area results in many of these channel-like features which likely collect water during snowmelt, but do not qualify as a stream.

Stream 2: According to FPARs map, this stream begins on a steep side hill, just below the road on the northern edge of the expansion area. Upon inspection, there were no indicators of any type of stream in this area. The area is uniformly forested with thick dog-hair stands, with virtually no understory vegetation. No topographic features, defined channels, or riparian vegetation exist in this area. The stream shown on the map is likely a modeled extension of a topographical feature lower on the hillslope that appears as a gully or draw. **This stream does not qualify as a stream.**



Photo 3. The vicinity of stream 2, no evidence of a stream.

Stream 3: See notes for stream 2; this stream has no indicators of being a stream, for all of the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 4. The vicinity of stream 3, no evidence of a stream.

Stream 4: See notes for stream 2; this stream has no indicators of being a stream, for all of the reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 5. The vicinity of stream 4. The vegetation is growing at the edge of the road, but there is a distinct lack of understory vegetation on the forest floor, and no indicators of riparian vegetation or a defined channel of any kind.

Stream 5: See notes for stream 2; this stream has no indicators of being a stream, for the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 6. The vicinity of stream 5. There is no evidence of a defined measureable channel or riparian vegetation in this area.

Stream 6: See notes for stream 2; this stream has no indicators of being a stream, for the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 7. The vicinity of stream 6. There are no indicators of presence of a stream in this area.

Note: Streams 2-6 were assessed by traversing across the hillslope about 150 below the road shown on the area map. This assessment provided adequate evidence that there are no streams located north of the road in the expansion area.



Photos 8. This photo shows the typical terrain in this area; steep hillside dropping off very steeply into sandstone cliff/gully formations above the housing community of Forest Ridge. There were no indications of streams on this section.

Stream 7: Stream 7 is shown on the FPARs map to enter the expansion area at the beginning of its path, and cross the road on the eastern edge of the expansion area. The road was searched for any evidence of water conveyance under the road or water passage over the road. No evidence of water conveyance was found. The sides of the road were also examined for evidence of a channel and/or riparian vegetation intersecting the road, and neither were found. The area of the stream shown on the map was searched, and no evidence of a measurable defined channel or riparian vegetation was found. **This stream does not qualify as a stream.**



Photo 9. The road along the eastern edge of the expansion area, in the vicinity of where stream 7 is shown on the map. There is no evidence of water conveyance under, over, or alongside the road in the form of ditches, culverts, or waterbars; nor is there any other evidence of a stream in the area.

Stream 8: Stream 8 is mapped as a "U", or Unknown stream on the FPARs map. The vicinity of this stream was investigated thoroughly, and no evidence of a measurable defined channel or any riparian vegetation was found. The topography of the area does not have an obvious water conveyance route, and is rolling and complex. **This stream does not qualify as a stream.**

Section B: Section B shows 6 streams according to the FPARs map, all of which are labeled as "N" streams. The results of the stream typing of the 6 streams in Section B are as follows.

Stream 1: Stream 1 does not actually enter the parcel identified for this stream typing, and is located on US Forest Service land. Stream 2, as discussed below, was typed as an Np stream, and any associated setback for Stream 2 would overlap and extend beyond any setback from Stream 1 that may extend into the expansion area, negating the need to type this stream for the purposes of this report.

Stream 2: Stream 2 was found to have a wetted, defined channel, with associated riparian vegetation, that begins just outside the southwest corner of the parcel. While stream characteristics were not in evidence above where the wetted channel begins just outside of the parcel boundary (making the actual stream slightly shorter than what is shown on the FPARs map, see Figure 3), the stream inside the parcel and within the expansion area was found to have flowing water, a defined channel, and riparian vegetation. The stream

appears to begin as a spring just below a steep hillside, and continues down on the path labeled as Stream 2 on the attached FPARs map. **This stream does qualify as an Np (non fish-bearing perineal) stream.**



Photo 10. Looking downslope to the start of Stream 2, which appears to begin from a spring on a steep hillside just outside of the parcel. Riparian vegetation is evident from this angle.



Photo 11. Flowing water appears below the steep hillside pictured above. The hillside above contains riparian vegetation, but the flowing water and defined channel appear about 50 feet lower than the start of the riparian vegetation.

Stream 3: Stream 3 does exhibit characteristics of an Np stream, but the stream as evidenced by a wetted channel and riparian vegetation begins below (downstream, north) of the road grade in the southwest corner of the parcel shown on the FPARs map. Just below the road grade, a depression occurs and riparian vegetation is evident. About 100 feet below the road grade, groundwater collects at the surface in a few small ponds; the water then travels in an easterly direction to meet with Stream 4. This easterly direction varies from what is shown on the FPARs map; rather than traveling north before merging with Stream 4, the wetted channel travels north east and merges with stream 4 higher up than what is shown on the FPARs map. See Figure 3 for mapping detail. **This stream does qualify as an Np stream.**



Photo 12. Water collects in a few small ponds before continuing its flow down and into a defined wetted channel. The stream below the intersection of Streams 3 and 4 is labeled as Stream 3, and meets the qualifications of being an Np stream. Stream 3 above the intersection with Stream 4 is also an Np stream, but only up to the road grade.



Photo13. Stream 2 continues to flow below the small ponds in a northeasterly direction before intersecting with Stream 4.

Stream 4: Stream 4 was observed as a short section of defined, measurable channel with riparian vegetation but no water, present from just outside the boundary of the expansion area to the intersection with Stream 3. The channel was observed to be of variable width with sections of about 3 feet at the widest, and have riparian vegetation present. The channel tapers out and disappears just north of the southern parcel boundary. The characteristics of this stream, including a defined measurable channel, riparian vegetation, a surface connection with a larger stream, but no water present indicate that **this stream qualifies as a Ns (non fish-bearing seasonal) stream.**



Photo 14. The measurable channel of Stream 4 is about 3 feet at its widest. As seen in this photo, the channel did not have running water at the time of this stream typing.



Photo 15. Riparian vegetation growing in the channel. While these species, including elderberry, bead lily, and mosses are not considered entirely riparian dependent species, vegetation in the channel differs significantly from the surrounding forest, indicating presence of more moisture in the channel. This fact, combined with the presence of the channel, indicates this is at least a seasonal, non-fish bearing stream.

Stream 5: Stream 5 shows on the FPARs map as a short stream section that quickly joins a larger stream. Upon inspection, no visible channel or riparian vegetation was located in this area. The area is covered by a talus field, which supports an aspen stand. The aspen stand is unusual as it grows directly from the talus, indicating presence of water below the rock. However, as there is no evidence of surface water or any kind of channel here, **this stream does not qualify as a stream**. The aspen stand will be examined by a wetlands biologist, as aspen qualifies as a wetland species.



Photo 16. The vicinity of Stream 5, showing the talus field with a small aspen community. There is no channel or any other riparian vegetation present in this area, negating the presence of a stream. However, the area will be assessed by a wetland biologist due to the presence of the aspen.

Stream 6: Stream 6 is shown on the FPARs map to begin in low angle terrain near the center of the parcel. Upon inspection, there is no evidence of a channel or riparian vegetation in the central area of the parcel. About halfway between where the stream is shown to begin on the FPARs map, and the confluence with Stream 2, the benchy terrain begins to exhibit short sections of channel-like features. However, these features do not connect with each other (nor are they in line), and do not contain riparian vegetation. Most of the depressions contain upland species such as kinnikinnick, pipsissewa, pine grass, and ponderosa pine, with the lower section containing bitterbrush. These terrain features are similar to those of Stream 1 in Section A, and tend to appear as dishes or depressions that often end in berms that water could not travel over.

The FPARs map shows the stream taking a sharp left bend before joining Stream 2, but this is impossible as water would have to travel side-hill to accomplish this bend. Rather, there is a larger depression leading directly downslope that does hold a semi-defined channel and some vegetation that could be considered riparian (elderberry), but this depression also ends in a large berm with no evidence of water passing over or under it, before reaching Stream 2. The complex terrain in this area makes the determination of a stream typing difficult, but due to the lack of a defined, measurable, contiguous channel, presence of obvious riparian vegetation, and surface connection with a larger stream, it is determined that **this stream does not qualify as a stream.** The terrain features here likely collect water during snow melt, but they are most likely present because of the geology and complexity of the terrain rather than water conveyance.



Photo 17. The vicinity of the central area of the parcel, where Stream 6 is shown to begin on the FPARs map. There is no indication of any channel or riparian vegetation in this area.



Photo. Lower down, after following the path of Stream 6 as shown on the FPARs map, terrain features such as the one pictured above begin to appear. These terrain features are disconnected and do not hold riparian vegetation or measurable, defined channels.



Photo 18. Another terrain feature with a channel-like section, but with no riparian vegetation and not connected to a channel feature below.



Photo 19. The area near where Stream 6 is shown to take a sharp left bend on the FPARs map. This type of bend is impossible here, as the stream would have to travel side-hill. There is also no evidence of riparian vegetation here, but rather distinctly upland species such as bitterbrush.

This stream typing was undertaken with the help of Andrea Lyons, a consultant with WA Conservation Science Institute, who is assisting Tamarack Saddle LLC with preparation of a resource management plan for the conceptual expansion of Mission Ridge Ski Area. Andrea's familiarity with the conceptual expansion area was of great help in locating and typing the streams shown on the FPARs map. All stream type determinations were made solely by me and were based on visual inspections of the vicinities of all streams shown on the FPARs map. If there are any questions please contact me @ 509-630-5303 or erin.mckay@co.chelan.wa.

Sincerely,

Erin McKay, Chelan County Natural Resource Specialist

Figure 1.

Chelan County GIS Parcel Search

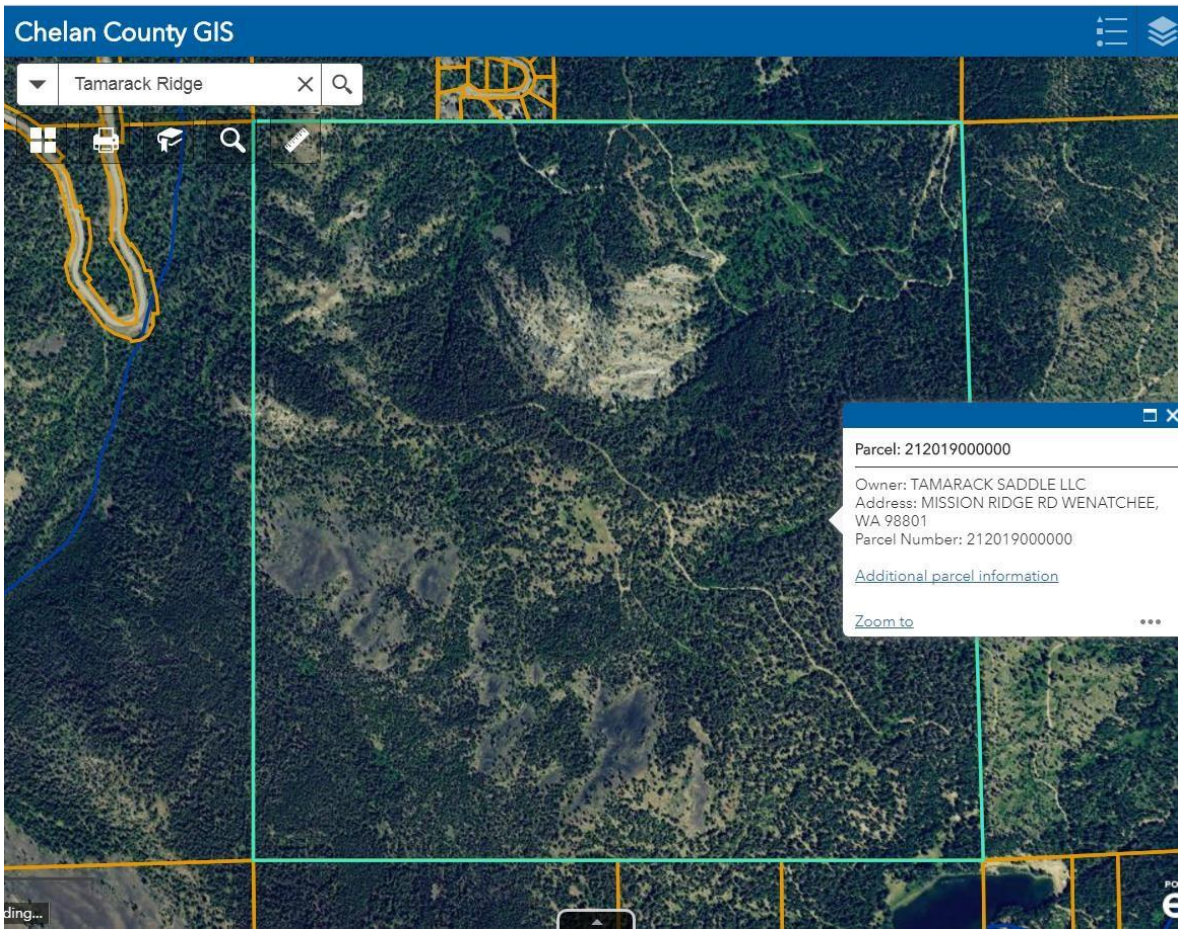


Figure 2.

FPARs map with Sections A and B drawn and labeled, and with each stream numbered as a tracking system for reporting.

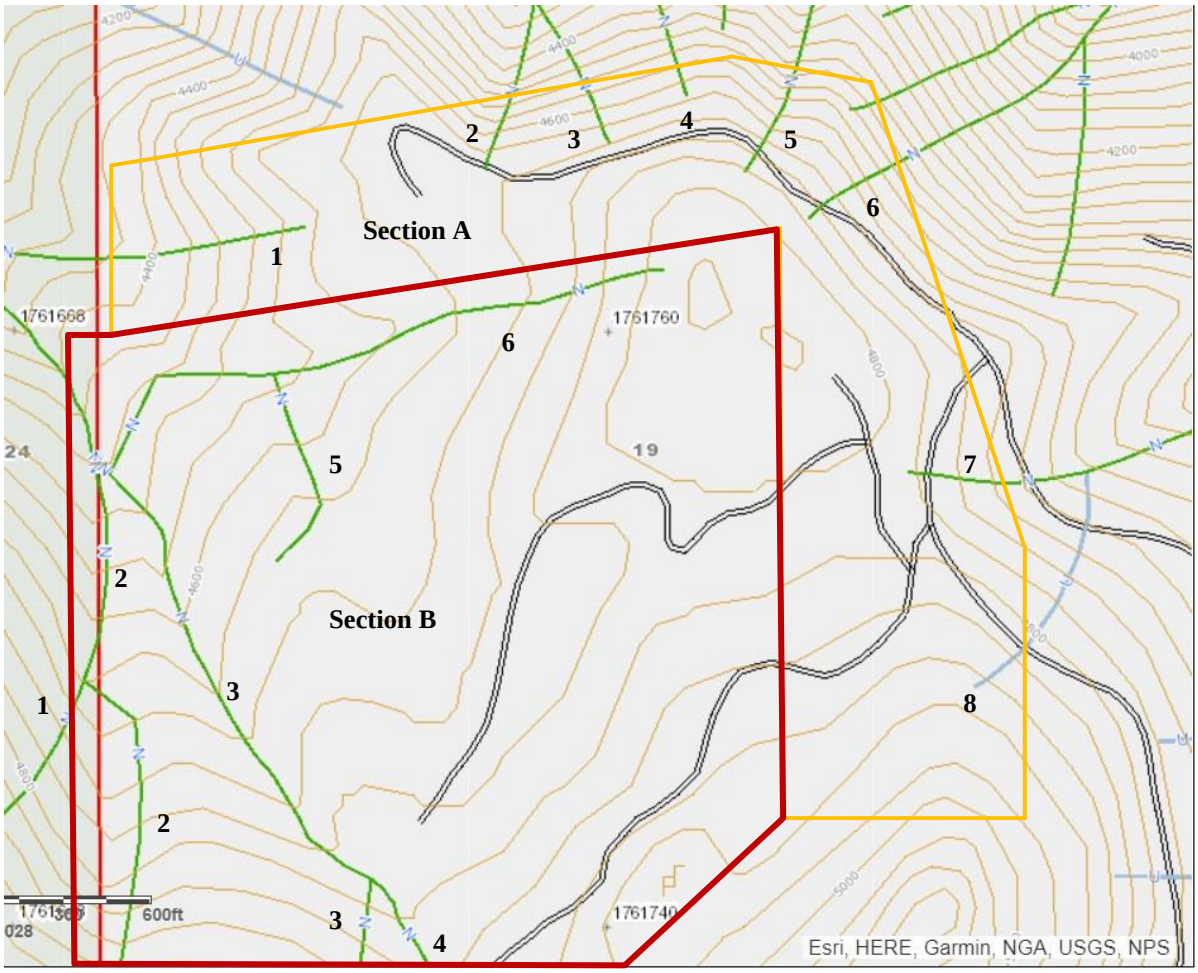
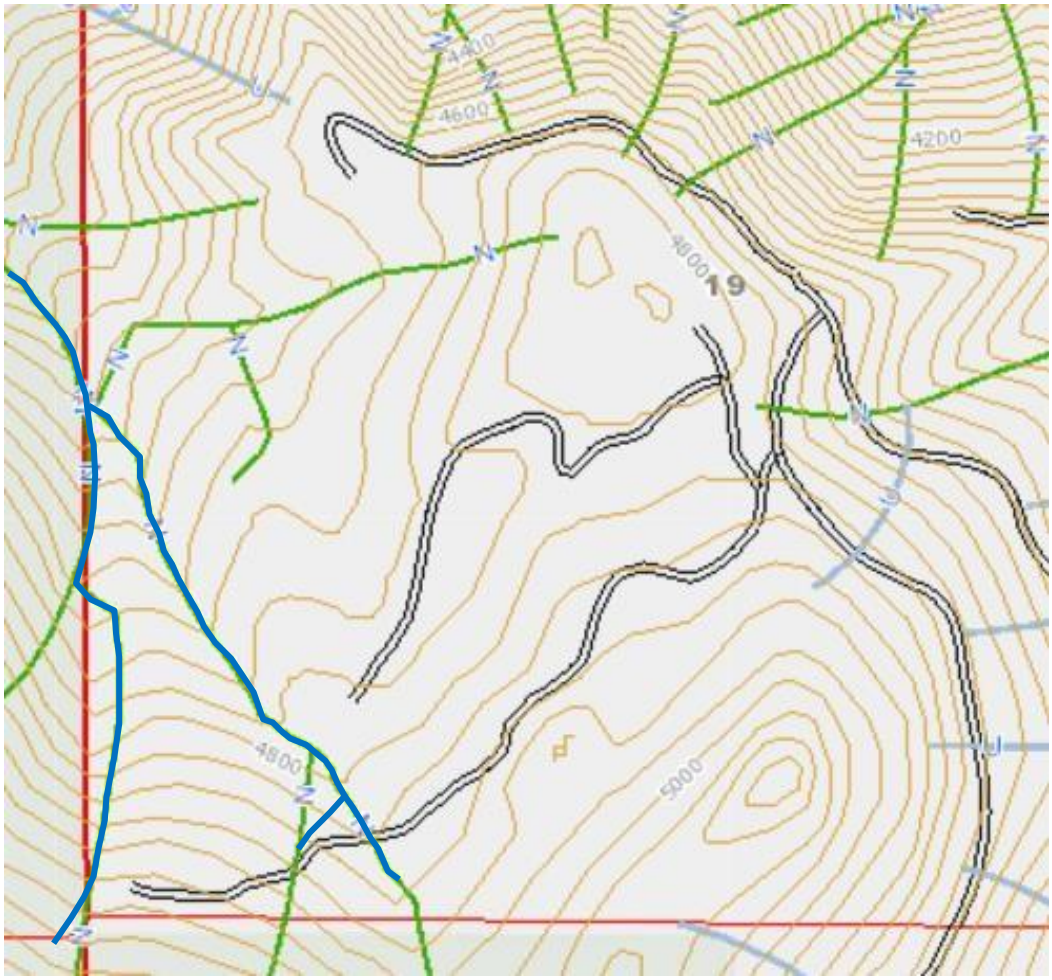


Figure 3.

Streams determined to actually qualify as streams, shown in dark blue. Only Streams 2 (Np), 3 (Np), and 4 (Ns), were found to qualify as streams. Corrections to FPARs streams are shown here as well.



FPARs mapping tool, Washington Department of Natural Resources. 2017.

resource management plan for the conceptual expansion of Mission Ridge Ski Area. Andrea's familiarity with the conceptual expansion area was of great help in locating and typing the streams shown on the FPARs map. All stream type determinations were made solely by me and were based on visual inspections of the vicinities of all streams shown on the FPARs map. If there are any questions please contact me @ 509-630-5303 or erin.mckay@co.chelan.wa.

Sincerely,
Erin McKay, Chelan County Natural Resource Specialist

Figure 1.
Chelan County GIS Parcel Search



APPENDIX C

Priority Habitat and Species Report and Map for the Mission Ridge Expansion Project Area.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic Query ID: P170327105804

REPORT DATE: 03/27/2017 10.58

Common Name / Scientific Name / Notes	Site Name / Source Dataset / Source Record / Source Date	Priority Area / Occurrence Type / More Information (URL) / Mgmt Recommendations	Accuracy	Federal Status / State Status / PHS Listing Status	Sensitive Data / Resolution	Source Entity / Geometry Type
Elk Cervus elaphus	NONEUM BASIN CALVING PHSREGION 901504	Breeding Area Parturition http://wdfw.wa.gov/publication s/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM ELK CALVING PHSREGION 901501	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM MIGRATION PHSREGION 901510	Migration Migration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Mule deer Odocoileus hemionus	MISSION CREEK DEER PHSREGION 901318	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Northern goshawk Accipiter gentilis	KING CANYON WS_OccurPoint 52590 August 19, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 92889 May 16, 2001	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 100673 May 12, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102001 June 13, 1992	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102022 May 21, 1998	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105435 June 05, 1996	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105701 May 27, 1998	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publication s/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

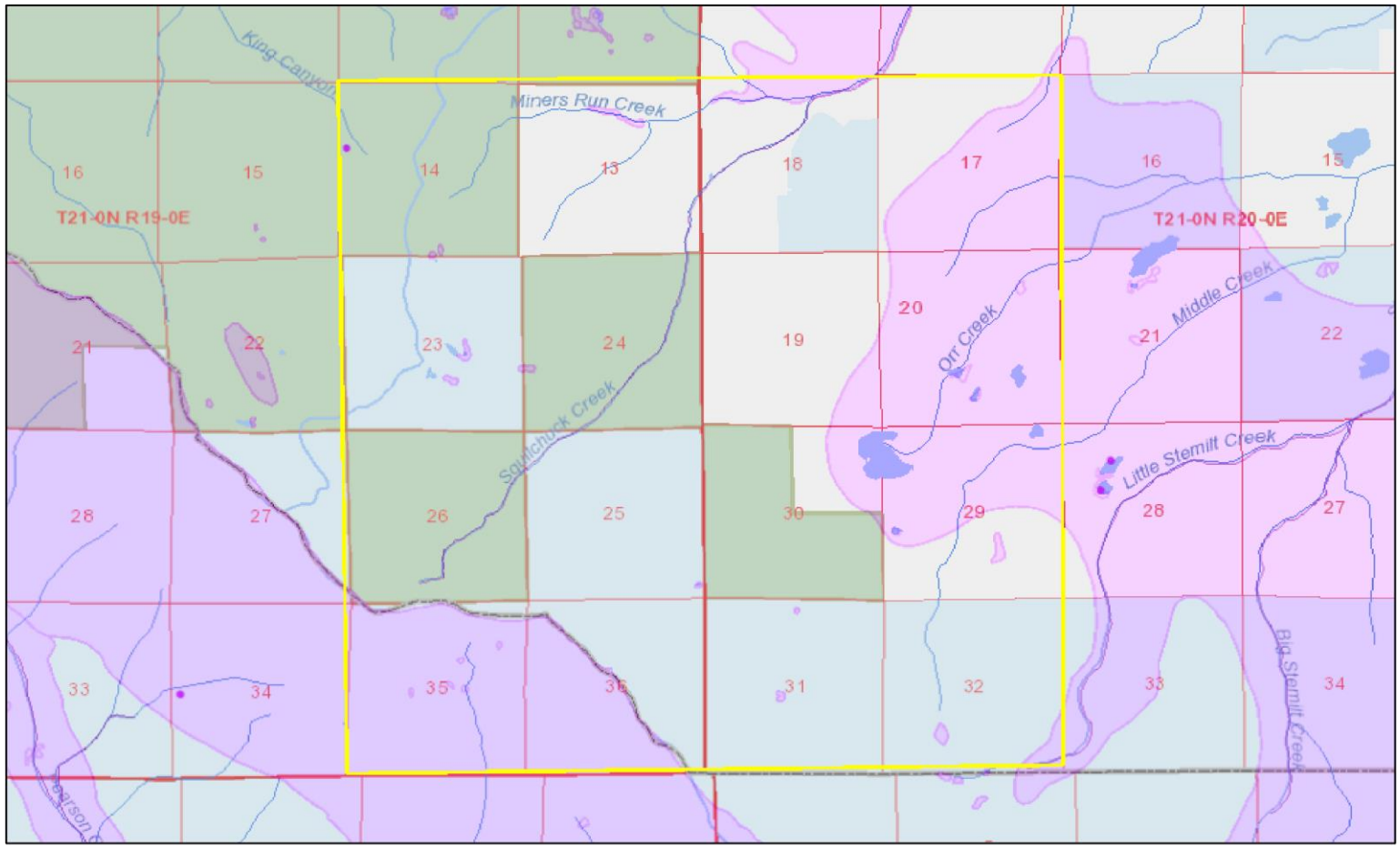
Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Rainbow Trout Oncorhynchus mykiss	Squilchuck Creek SWIFD 3531	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/divers	NA :y/soc/soc.htm	N/A N/A PHS LISTED	N AS MAPPED	Lines
Westslope Cutthroat Oncorhynchus clarki lewisi	Little Stemilt Creek SWIFD 3572	Occurrence/Migration Occurrence, http://wdfw.wa.gov/v:y/soc/soc.htm http://wdfw.wa.gov/publications,	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Westslope Cutthroat Oncorhynchus clarki lewisi	SWIFD 3650	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm http://wdfw.wa.gov/publications/pub.php?	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to vraition caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type

WDFW Test Map



APPENDIX G

Plants and Animals Reports

2020 Mission Ridge Aquatics, Wildlife, and Botany Resources Report (Washington Conservation Science Institute)

Washington Conservation Science Institute
PO Box 494, Cashmere, WA 98815

January 6, 2020

RE: Mission Ridge Expansion Project
Supplement to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report – Updated December 2019

To Whom it May Concern:

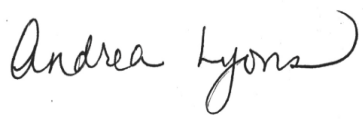
In March 2018, we conducted a Supplemental Assessment of potential impacts to fish, wildlife and plant resources as part of SEPA compliance for the Mission Ridge Expansion Project. Since the time the supplemental report was completed, the proposed project and site plans have been updated with substantial additional detail.

In summary, although refinements to the project proposal and available data provided for more site specific and rigorous analysis, the conclusions were similar to those in the March 2018 report. Some quantitative values related to site design and layout have changed, but the overall conclusions remain the same.

With appropriate mitigation measures as discussed in the Supplemental Assessment, we would expect no significant long-term impacts from construction or operation activities. As such, we would not expect population level effects to any fish, wildlife, or plant species.

Further field surveying and analysis as part of the NEPA Environmental Assessment process has yielded more detailed data regarding northern spotted owl and elk habitat. Those analyses are provided with this submittal for your reference (Attachment 1).

Sincerely,



Andrea Lyons
Director, Terrestrial Ecology Program
PHONE: 509-630-0673
EMAIL:andrea@waconservationscience.com

ATTACHMENT:1

Attachment 1. Updated analyses relative to northern spotted owl and Rocky Mountain elk in the Mission Ridge Expansion Project Area. The following information builds upon the information provided in the Supplemental Report dated March 2018.

NORTHERN SPOTTED OWL AND CRITICAL HABITAT

Environmental Baseline

The northern spotted owl is federally listed as a Threatened species (USFWS 1990). A recovery plan was completed in 2011 (USFWS 2011) and revised critical habitat was designated in 2012 (USFWS 2012). In 1994, the Northwest Forest Plan amended the Okanogan-Wenatchee Land and Resource Management Plan. One of the primary components of the Northwest Forest Plan was the designation of a system of reserves to provide for the conservation and recovery of wildlife species, such as the northern spotted owl, that are associated with late-successional forests (USDA and USDI 1994). The assessment area for the Mission Ridge Expansion project does not include any designated critical habitat for the northern spotted owl, nor does it include any of the federal reserves that were designated under the Northwest Forest Plan. Outside of reserves or critical habitat, the management of spotted owls focuses on the protection of suitable habitat around spotted owl activity centers.

Forest conditions that provide for nest/roosting functions for northern spotted owls in the eastern Cascades are generally characterized as having a relatively high degree of structural complexity (see Gaines et al. 2015 for a recent summary). These forest conditions generally include a high canopy closure (e.g., >70%) and multiple canopy layers (e.g., multiple age or size classes of trees). These forests are generally composed of grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) forested plant associations in dry and mesic forests, and western hemlock (*Tsuga heterophylla*) in moist forest associations (Buchanan et al. 1995, Herter et al. 2002, Irwin et al. 2000, Loehle et al. 2011). The presence of large snags and coarse downed wood is quite variable in spotted owl nesting habitat, but mistletoe appears to be regularly associated with nesting habitat (Buchanan et al. 1995, Loehle et al. 2011, Marshal et al. 2003). Nesting, Roosting, Foraging (NRF) habitat, also referred to as "suitable" habitat, was mapped using high resolution stereo imagery to establish the initial map for the assessment area. This map was evaluated by field surveys and using LiDAR imagery to develop a final "suitable" spotted owl habitat map used in this assessment (Fig. 8).

Forest conditions that provide for spotted owl foraging function is thought to be the most variable of habitats used by territorial spotted owls, and may be most closely tied to forest conditions associated with primary prey species (Irwin et al. 2007, USFWS 2011). The primary prey species for northern spotted owls in the eastern Cascades include northern flying squirrels (*Glaucomys sabrinus*) and bushy-tailed woodrats (*Neotoma cinerea*)(Forsman et al. 2001, 2004; Lehmkuhl et al. 2006a,b). Foraging habitat includes nesting/roosting habitat but also includes forests that are less structurally complex and would not support successful nesting.

Spotted owls begin nesting in early March and extends until juveniles disperse from the nesting area in August and September. Monitoring of spotted owl nests in the eastern Cascades has shown that spotted owl young are generally mobile enough to move away from disturbance by the end of July. Dispersal habitat is used by spotted owls to move between patches of nesting/roosting, and foraging habitats. Dispersal habitat is composed of single or multi-layered forests with moderate sized trees, and canopy closure >40%. There is no dispersal habitat located within the project area and there are 15,430 acres of dispersal habitat within the assessment area.

Surveys for northern spotted owls were conducted throughout the assessment area from the late 1980s through 2006, and again during 2018. A single spotted owl was located within the assessment area in 1996 and a resident single spotted owl within the assessment area in 1998. No spotted owl nesting has been documented within the project area. There is no suitable spotted owl habitat within the project area. There are approximately 1,754 acres of spotted owl habitat within the assessment area and 243 acres occurs on federal lands.

The effects of the Mission Ridge Expansion project will be assessed on spotted owls and their habitats using the following indicators: potential for disturbance during nesting and changes to amount of suitable (nesting, roosting, foraging) and dispersal habitat.

Effect Analysis

Direct and Indirect Effects

There is no suitable spotted owl habitat within the project area. However, there are approximately 6 acres of suitable spotted owl habitat outside the project area but within a ¼ mile of construction activities (these include use of the existing road by construction equipment and construction of the main access road) that may produce noise above ambient levels during the nesting period. Past and recent surveys have not resulted in the location of nesting spotted owls. Additionally, the existing Mission Ridge Road bisects the suitable habitat to the northwest of the Project Area. The fragmented nature of the existing habitat within the assessment area and the location on the extreme eastern edge of the spotted owl range makes it unlikely that a pair or resident territorial spotted owl may be present. The potential for noise from construction activities to disturb spotted owl nesting in very small, however, if a nest is located during surveys, timing restrictions would be implemented.

Interrelated and Interdependent Actions

There is no NRF or dispersal habitat on private lands.

Cumulative Effects

There are 1,754 acres of suitable spotted owl habitat within the assessment area. Approximately 243 acres of this habitat occurs on federal lands, with the remaining habitat on private land (587 acres), WDFW land (435 acres), WDNR land (263 acres) and Chelan County land (226 acres). None of these lands are in a land allocation that would emphasize spotted owl habitat. There are ongoing projects, not associated with the Mission Ridge Ski Expansion, on Chelan County land and WDNR lands for forest thinning and fuel reduction treatments that could reduce spotted owl habitat by 489 acres. This would result in cumulative effects to about 28% of the spotted owl habitat in the assessment area, all on the periphery of the range, and outside critical habitat.

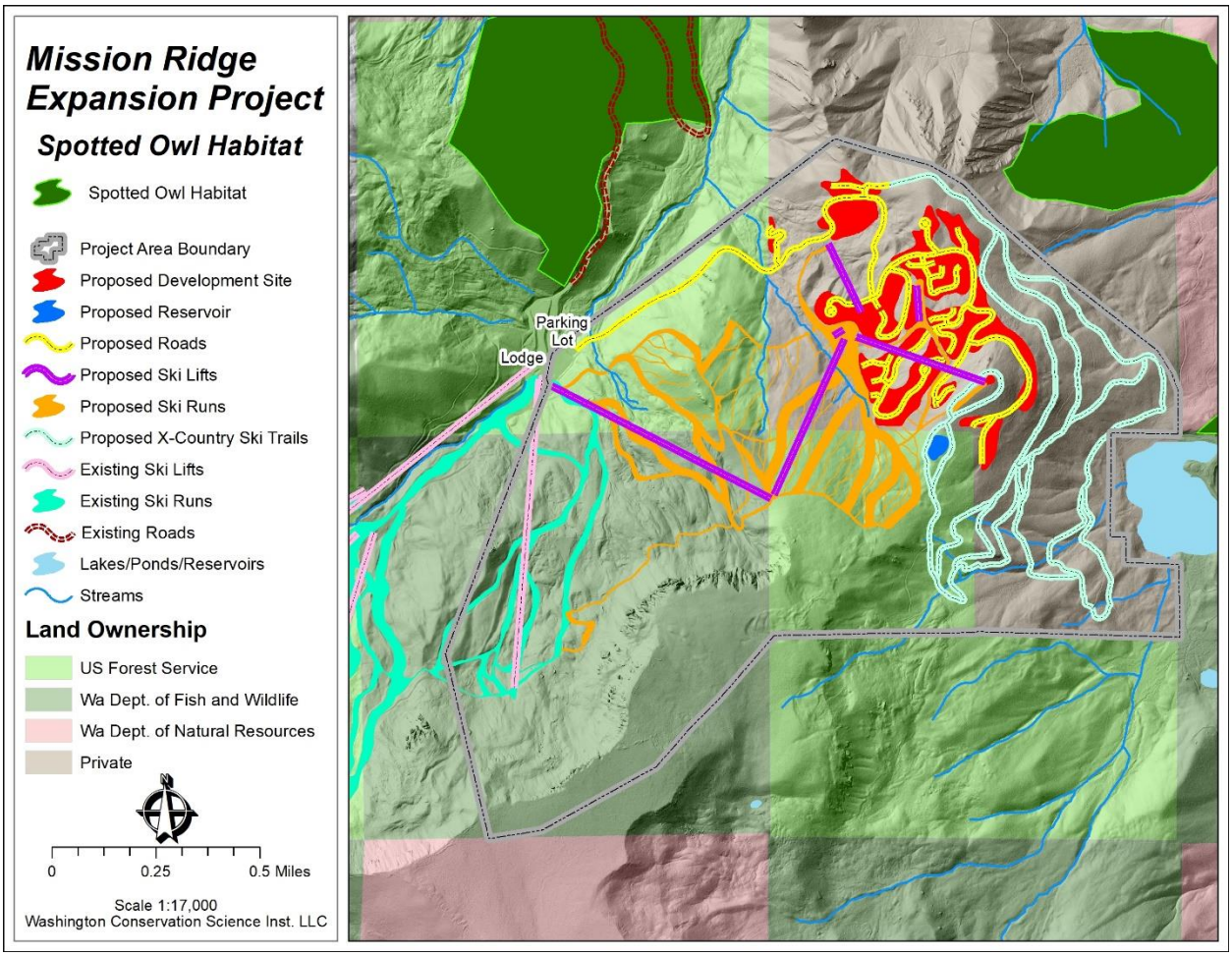


Figure 8. Map showing the suitable (NRF) and dispersal spotted owl habitat within the Mission Ridge Ski Expansion project area.

Determination

Based on the direct, indirect, and cumulative effects, the Mission Ridge Ski Expansion "may affect, but is not likely to adversely affect" spotted owls and their habitat. The reasons for this determination include: The activities associated with the Mission Ridge Ski Expansion on do not occur in an area designated to emphasize spotted owl recovery, on either federal or state lands. The project occurs on the eastern edge of the range of the spotted owl. The project would not degrade or downgrade any suitable spotted owl habitat, dispersal habitat, or potential habitat, either within the project area or in the assessment area. There is a limited potential for disturbance to occur to nesting habitat, however, this potential is low and, surveys and timing restrictions would be implemented.

There is no designated critical habitat for the northern spotted owl in the project area or in the assessment area. Therefore, a determination of "no effect" to spotted owl critical habitat has been made.

REFERENCES

Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1995. Within-stand nest site selection by spotted owls in the eastern Washington Cascades. Journal of Wildlife Management, 59(2):301-310. Available online at http://www.jstor.org/stable/3808943.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research, 35(2): 141-150.

Forsman, E.D.; Anthony, R.G.; Meslow, E.C.; Zabel, C.J. 2004. Diets and foraging behavior of northern spotted owls in Oregon. Journal of Raptor Research. 38(3): 214–230.

Gaines, W.L., P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-586.

Gaines, W.L., J.S. Begley, D. Churchill, and R.J. Harrod. 2019. Stemilt-Squilchuck landscape evaluation: final report. Chelan County Natural Resources Department. Wenatchee, WA.

Herter, D.R., L. Hicks, H.C. Stabins, J.J. Millspaugh, A.J. Stabins, and L.D. Melampy. 2002. Roost site characteristics of Northern Spotted Owls in the nonbreeding season in Central Washington. Forest Science 48:437–444.

Irwin, L.L., D.F. Rock and G.P. Miller. 2000. Stand structures used by northern spotted owls in managed forests. Journal of Raptor Research. 34(3): 175–186.

Lehmkuhl, J.F., K.D. Kistler, and J.S. Begley. 2006a. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy. 87(2):371-379.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006b. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Loehle, C.; Irwin, L.; Beebe, J.; Fleming, T. 2011. Factors influencing the distribution of northern spotted owls in the eastern Cascades, Washington. Northwestern Naturalist. 92: 19–36.

Marshall, K.; Mamone, M.; Barclay, R. 2003. A survey of Douglas-fir dwarf mistletoe brooms used for nests by northern spotted owls on the Applegate Ranger District and Ashland Resource Area in southwest Oregon. Western Journal of Applied Forestry. 18(2): 115–117.

U.S. Department of Agriculture Forest Service (USDA) and U.S. Department of the Interior (USDI). 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl; Standards and Guidelines for management of habitat of late-successional and old-growth related species within the range of the northern spotted owl (Northwest Forest Plan). USDA Forest Service and USDI Bureau of Land Management. Portland, OR. April 1994. Available online at http://www.reo.gov/general/aboutnwfp.htm.

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl; Final Rule. *Federal Register* 55(123):26114-26194. June 26, 1990.

U.S. Fish and Wildlife Service (USFWS). 2011. *Revised Final Recovery Plan for the Northern Spotted Owl - Strix occidentalis caurina.* US Fish and Wildlife Service (USFWS). Portland, Oregon. xvi + 258 pp. Available online at http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Regist*er 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12-04/pdf/2012-28714.pdf

DESCRIPTION OF THE ELK HABITAT QUALITY ASSESSMENT

Introduction

Elk were identified as a Species of Management Interest by the Stemilt Partnership (TPL 2007). Therefore, elk were evaluated as one of several wildlife species in the Stemilt-Squilchuck Landscape Evaluation. The process used to evaluate elk habitat is documented in this appendix.

Some Key Assumptions

- The elk habitat assessment completed as a portion of the Stemilt-Squilchuck Landscape Evaluation provides and ***interim*** assessment of elk habitat quality until ongoing research on elk become available. There are two ongoing efforts of particular importance: the eastern Washington and Oregon elk habitat model that is likely to be adopted by the Forest Service, and the Colockum Elk Study being analyzed by the Washington Department of Fish and Wildlife.
- The elk habitat assessment relies on recent research showing the importance of late-summer/early-fall elk foraging habitat and elk habitat security on elk productivity and survival. This assumption is supported a considerable body of research (Cook et al. 2001, 2004, 2018, McCorquodale 2015) and is the scientific basis for other elk modeling efforts (Cook et al. 2018, Rowland et al. 2018, Wisdom et al. 2018). There are other important elk life history aspects (e.g., calving, winter elk ecology) that are not assessed in the landscape evaluation and would need to be addressed in other research.
- Some aspects of the elk assessment would benefit from additional field evaluation, specifically, the forage quality and quantity components.

Key Components of the Elk Habitat Assessment

There are four interacting components of the elk habitat assessment. These follow closely components described in Rowland et al. (2018) but rely on data available for the Stemilt-Squilchuck subwatersheds from the landscape evaluation. The four components described in more detail below include: nutrition, cover, habitat security, and terrain.

Nutrition

The primary goal of this component of the assessment is to identify the vegetation types that have the greatest potential to meet or exceed the minimum nutritional requirements for an elk cow/calf pair (Cook et al. 2018). Data on forage productivity and elk use from Lehmkuhl et al. (2013) were used to classify vegetation types derived from the landscape evaluation into forage quality categories (Table B-1). These categories are used to assess which vegetation types had the greatest potential to provide the best forage quality and quantity. The vegetation data from the landscape evaluation that were used included cover type, potential vegetation type, structure class, and canopy closure.

Table B-1. The vegetation types derived from the landscape evaluation and the forage quality categories.

Vegetation Type	Forage Category
Herb – Dry Forest PVG	Moderate
Herb – Mesic Forest PVG	High
Herb – Cold Forest PVG	High
Shrub – Dry Forest PVG	Moderate
Shrub – Mesic Forest PVG	High
Shrub – Cold Forest PVG	High
Stand Initiation – Dry Forest PVG	Moderate

Stand Initiation – Mesic Forest PVG	High
Stand Initiation – Cold Forest PVG	High
Stem Exclusion Open Canopy – Dry Forest PVG	Moderate
Stem Exclusion Open Canopy – Mesic Forest PVG	Moderate
Stem Exclusion Open Canopy – Cold Forest PVG	High
Stem Exclusion Closed Canopy – Dry Forest PVG	Low
Stem Exclusion Closed Canopy – Mesic Forest PVG	Low
Stem Exclusion Closed Canopy – Cold Forest PVG	Low
Young Forest Multi-Story >40%CC – Dry Forest PVG	Low
Young Forest Multi-Story >40%CC – Mesic Forest PVG	Low
Young Forest Multi-Story >40%CC – Cold Forest PVG	Low
Young Forest Multi-Story <40%CC – Dry Forest PVG	Low
Young Forest Multi-Story <40%CC – Mesic Forest PVG	Moderate
Young Forest Multi-Story <40%CC – Cold Forest PVG	Moderate
Old Forest Single Story – Dry Forest PVG	Moderate
Old Forest Single Story – Mesic Forest PVG	Moderate
Old Forest Multi Story – Dry Forest PVG	Low
Old Forest Multi Story – Mesic Forest PVG	Low
Old Forest Multi Story – Cold Forest PVG	Moderate
Hardwood	Moderate
Dry Shrub - nonforest	Moderate
Dry Grassland – non forest	Moderate
Agriculture/Cropland	Zero
Non-vegetated/Rock/Water	Zero

Distance-to-Cover

Traditional views of the importance of cover to large ungulates, such as elk, have changed over time as a result of intensive research (Cook et al. 2005). Previously, cover was emphasized as an important component of habitat for elk with little attention paid to forage quality and quantity. Cover was traditionally thought to effect elk productivity and survival by mediating the effects of weather, creating warmer areas with less snow cover in the winter, and cooler, shaded areas in the summer. However, a considerable body of research has cast doubt on the relationship between cover and elk productivity and survival (see Cook et al. 2005 for a summary). Cover is still often shown to be an important variable in models of elk habitat but is usually expressed as a distance-to-cover measure (Rowland et al. 2018). The distance-to-cover metric better expresses the role cover plays in providing area for elk to hide in an seek security in close proximity to non-cover foraging areas. We defined cover as areas with medium to large trees with at least 70% canopy cover and used three distance bands from cover in our habitat quality assessment: >200 meters from cover, 101-200 meters from cover, and <100 meters from cover.

Habitat Security

Habitat security is defined as areas that have a relatively low level of human activities (Hillis et al. 1991). Secure habitats provide places where elk can escape harassment from humans, thus reducing their energy expenditures and increasing their survival. Several studies have shown that elk use areas near human activities less than areas farther from human activities (Gaines et al. 2003, Montgomery et al. 2012, Proffitt et al. 2013, McCorquodale 2013, Ranglack et al. 2017, Thurfjell et al. 2017). We used data provided by the WDFW (W. Moore, pers. comm.) to identify secure and not secure areas. Roads and their status (open vs closed) were attributed in our GIS and then distance buffers (Gaines et al. 2003) were applied to open roads. The size of the buffer along each side of a road was constrained by the adjacent topography so that buffers did not extend over ridges, causing an under representation of secure habitats. The entire planning area was classified as either secure if the area was located outside a buffer or non-secure if located within a buffer.

Terrain Steepness

Elk tend to use gentle terrain more that steep terrain (Rowland et al. 2018). We used digital terrain data to classify the planning area into gentle (<30 degrees), moderate (30-60 degrees), and steep (>60 degrees) slope steepness classes.

Habitat Quality Index

The variables described above were used to score each 30 x 30 m pixel in the planning area from 0-10 to identify areas of low to high habitat quality. The ranking of each of the variables is shown in Table A-2 with areas of the highest potential nutritional value, in close proximity to cover, in secure habitats, and on gentle terrain having the highest habitat quality (Index = 11). Conversely, areas with zero nutrition values, >200 meters from cover, in non-secure areas, and on steep slopes having the lowest habitat quality (Index = 0).

Table B-2. The variables and the variable weighting used to index elk habitat quality.

Variable	Weighting
Nutrition Classes	
Zero	0
Low	1
Moderate	2
High	4
Distance-to-Cover	
>200 m from cover	0
101-200 m from cover	1
<100 m from cover	2
Habitat Security	
Not-Secure	0
Secure	2
Terrain Steepness	
Steep	0
Moderate	1
Gentle	2

Results

The application of the elk habitat quality index showed that 19,370 acres (50%) of the assessment area is in a low habitat quality condition, 17,030 acres (44%) in a moderate habitat quality condition, and 2,575 acres (6%) in a high habitat quality condition (Fig. B-1). Most of the high-quality habitat is currently located in the Stemilt subwatershed portion of the assessment area. The habitat quality could be enhanced by reducing the impacts of roads to create additional security habitat and by creating more openings in mesic and moist forest types to create better forage conditions.

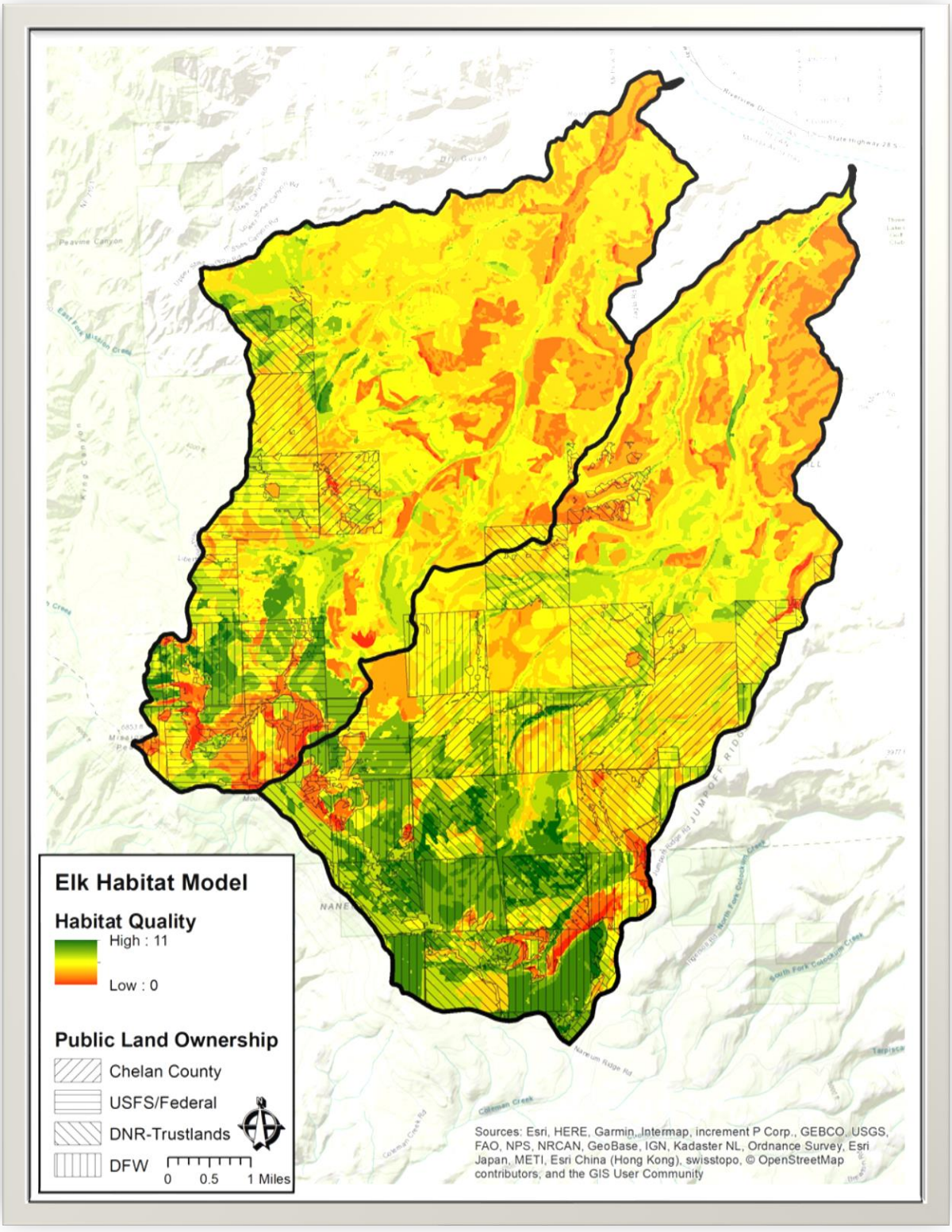


Fig. B-1. Elk habitat quality index score for the Stemilt-Squilchuck landscape evaluation area.

REFERENCES

Cook, J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. DelCurto, L.D. Bryant, and L.L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monograph 155: 1-61.

Cook, J.G., L.L. Irwin, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 2005. Thermal cover needs of large ungulates: A review of hypothesis tests. Pages 185-196 in Wisdom, M.J. Tech. Ed. The Starkey Project: A synthesis of long-term studies of elk and mule deer. Alliance Communications Group, Lawrence, Kansas.

Cook, J.G., R.C. Cook, R.W. Davis [and others]. 2018. Development and evaluation of a landscape nutrition model for elk in western Oregon and Washington. Wildlife Monograph 199: 13-30.

Cook, R.C., D.L. Murry, J.G. Cook, P. Zager, and M.J. Gratson. 2001. Nutritional influences on breeding dynamics in elk. Canadian Journal of Zoology 71: 2291-2296.

Gaines, W.L., P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee national forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-586.

Hillis, J., M. Thompson, J. Canfield, L. Lyon, C. Marcum, P. Dolan, and D. McCleerey. 1991. Defining elk security: the Hillis paradigm. Pages 38-43 in Proceedings of a symposium on elk vulnerability. Montana State University, Bozeman, MT.

Lehmkuhl, J.F., A.L. Lyons, E. Bracken, J. Leingang, W.L. Gaines, E.K. Dodson, and P.H. Singleton. 2013. Forage composition, productivity, and utilization in the eastern Washington Cascade Range. Northwest Science 87(4): 267-291.

Montgomery, R.A., G.J. Roloff, and J.J. Millspaugh. 2012. Variation in elk response to roads by season, sex, and road type. Journal of Wildlife Management 77(2): https://doi.org/10.1002/jwmg.462.

Proffitt, K.M., J.A. Gude, K.L. Hamlin, and M.A. Messer. 2013. Effects of hunter access and habitat security on elk habitat selection in landscapes with a public and private land matrix. Journal of Wildlife Management. https://doi.org/10.1002/jwmg.491.

Ranglack, D.H., K.M. Proffitt, J.E. Canfield, J.A. Gude, J. Rotella, and R.A. Garrot. 2017. Security areas for elk during archery and rifle hunting seasons. Journal of Wildlife Management 81(5): 778-791.

Rowland, M.M., R.M. Nielson, M.J. Wisdom [and others]. 2018. Linking nutrition with landscape features in a regional habitat-use model for elk in western Oregon and Washington. Wildlife Monograph 199: 31-49.

Thurfjell, J., S. Ciuti, and M.S. Boyce. 2017. Learning from mistakes of others: How female elk (Cervus elaphus) adjust behavior with age to avoid hunters. PLoS ONE 12(6): e0178082. https://doi.org/10.1371/journal.pone.0178082.

Trust for Public Lands (TPL). 2007. The Stemilt Partnership: Stemilt-Squilchuck Community Vision. Trust for Public Lands, Seattle, WA.

Wisdom, M.J., M.M. Rowland, R.M. Nielson [and others]. 2018. Modeling to evaluate elk habitat: contemporary approaches for western Oregon and Washington. Wildlife Monographs 199: 8-12.

Mission Ridge Expansion Project

Supplement to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report

Final Report – March 2018

Prepared for:

Mission Ridge Mtn Inc.
7500 Mission Ridge Rd,
Wenatchee, WA 98801

PREPARED BY:
WASHINGTON CONSERVATION SCIENCE INSTITUTE
PO BOX 494
CASHMERE, WA 98815

Table of Contents:

1. Executive Summary……4
2. Introduction 5
3. Project Summary..... 5
4. Methods and Approach.....5
   4.1. Identification of Assessment Area..... 6
   4.2. Review of Existing Information 6
   4.3. Information and Coordination.....6
5. Affected Environment ……..…….. 7
   5.1. Location and General habitat characteristics..... 7
6. Species and Habitat Assessments…….…….. 8
7. Fisheries and Aquatic Resources ……..…….. 11
8. Wildlife Species and Habitat ……..…… 20
9. Plant Species and Habitat ……..…….. 41
10. Literature Cited. ……44
11. Appendix A. Wetland Delineation Report…… 52
12. Appendix B. Chelan County Natural Resources Stream Typing for Parcel Number 212019000000 Report ……...……..…….... 110
13. Appendix C. Priority Habitat and Species Report and Map for the Mission Ridge Expansion Project Area ……..……..……..... 131

Tables

Table 1. Aquatic Federal Endangered, Threatened, and Species of Concern in the Upper Columbia River

Table 2. Aquatic State Candidate and Sensitive Species in the Upper Columbia River

Table 3. Summary of Findings for Federal and State Listed Aquatic Species

Table 4. Wildlife species that potentially occur in vicinity of Mission Ridge Proposed Expansion Project

Table 5. Summary of Findings for Federal and State Listed Wildlife Species

Table 6. Road changes proposed within the Mission Ridge Proposed Expansion Project

Table 7. Spotted owl habitat within the Mission Ridge Proposed Expansion Project

Table 8. Plant species that potentially occur in the vicinity of the Mission Ridge Project Area

Figures

Figure 1. Landownership, Land management Allocation and Assessment Areas within the Mission Ridge Proposed Expansion Project

Figure 2. Mission Ridge Proposed Expansion Project Area and Assessment Area in WRIA 40

Figure 3. Stream Type Classifications, Riparian Buffers, and Stream Gradients within Project Area

Figure 4. Location of grizzly bear management units, lynx analysis units and roads in the vicinity of the Mission Ridge Proposed Expansion Project

Figure 5. Northern spotted owl suitable habitat within the vicinity of the Mission Ridge Proposed Expansion Project

Figure 6. Proximity of Mission Ridge Expansion Project relative to Rocky Mountain elk and mule deer winter range and calving areas as mapped by the Okanogan-Wenatchee National Forest and WDFW Priority Habitat and Species

Figure 7. Potential summer habitat for Rocky Mountain elk in the vicinity of the Mission Ridge Proposed Expansion Project

EXECUTIVE SUMMARY

The Supplemental Resources Report provides a synthesis of information and data collected within the proposed Mission Ridge expansion area with regard to fish, wildlife and plant species and habitat. It is intended to serve as a Supplemental Assessment to the State Environmental Policy Act (SEPA) Checklist developed for the proposed Project. The purpose of the Supplemental Assessment is to evaluate proposed construction and operation of the Mission Ridge Expansion with respect to species and critical habitats that are protected under the Endangered Species Act (ESA) of 1973 (as amended) or Washington state law, or receive special consideration under federal and state regulations, such as Priority Habitat Species. The Supplemental Assessment is intended to provide state and county regulatory agencies with information to assess potential impacts to fish, wildlife and plant resources to comply with SEPA. Where necessary, the Supplemental Resources Report also includes conditions designed to mitigate impacts to a level of non-significance. Accordingly, these measures would be incorporated into the County's SEPA determination, as well as the permits and approvals necessary to implement the Project as enforceable conditions of development. Our assessment of potential impacts to aquatics, wildlife and plant resources and incorporation of mitigation measures into the project design adhered to all guidance found in Chelan County Code Chapter 11.78 - FISH AND WILDLIFE HABITAT CONSERVATION AREAS OVERLAY DISTRICT (FWOD) and Chapter 11.80 WETLAND AREAS OVERLAY DISTRICT (WOD).

The proposed project area and surrounding lands provide habitat for a wide variety of native wildlife species common to mixed-conifer, high elevation forests. Two non-fishbearing, perennial streams and associated riparian habitat are located within the immediate project area. No aquatic species listed as endangered or threatened are known to occur in the project area or immediate vicinity. Terrestrial species listed as endangered or threatened have some potential to occur in the project area or immediate vicinity, but none were observed during field visits. Two small Class III wetlands were identified and delineated within the project area. The proposed project includes construction of roads, multiple-use buildings, ski runs, ski lifts and associated infrastructure. Implementation of the proposed expansion project may impact some aquatic and terrestrial resources through disturbance and habitat removal and may slightly reduce suitability for some native wildlife species. These impacts may be offset by implementation of ski runs and open space within the site design. No stream crossings or ground disturbance will occur in fish bearing streams. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers. With appropriate mitigation measures we would expect no significant long-term impacts from construction or operation activities. As such, we would not expect population level effects.

1. Introduction

This Aquatics, Wildlife and Botany Resources Report (Resources Report) provides a synthesis of information and data collected relative to the proposed Mission Ridge Expansion Project (the proposed Project) with regard to fish, wildlife and plant species and habitat. It is intended to serve as a Supplement to the SEPA Checklist developed for the proposed Project. The purpose of this assessment is to discuss potential effects of the proposed project on species that are protected under the Endangered Species Act (ESA) of 1973 (as amended) or Washington state law, or receive special consideration under federal and state regulations. This assessment is intended to provide state and county regulatory agencies with information to assess potential impacts to fish, wildlife and plant resources in order to comply with State Environmental Policy Act (SEPA). This assessment is not intended to fulfill section 7 (c) of the ESA nor meet the requirements of Forest Service Manual direction (FSM 2670) including compliance with Code of Federal Regulations (CFR) 50-402.12. The Okanogan-Wenatchee National Forest (OWNF) will conduct a comprehensive environmental assessment to meet the standards set forth in the National Environmental Policy Act (NEPA), 40 CFR §1500-1508, Forest Service policy (identified in FSH 1909.15) for actions proposed on Federal Lands as well as indirect and cumulative impacts of actions on private lands associated with this project.

2. Project Summary

A complete project description can be found in the Application narrative and details are not repeated here. To summarize, Mission Ridge Resort Inc. is proposing to expand the Mission Ridge Ski Area. Two major components of the expansion include the following: 1) Expand operations in Okanogan-Wenatchee National Forest Sections 24 and 25 and the privately held Sections 19 and 30; and 2) Expand the Special Use Permit Area and permitted operations into the northeast corner of Okanogan-Wenatchee National Forest Section 30. The full proposed project occurs on land under multiple ownerships, including: private, US Forest Service – Okanogan-Wenatchee National Forest (Wenatchee River Ranger District) and Washington Department of Fish and Wildlife. Figure 1 and Figure 2 provide an overview of the location of the proposed Project.

The information presented in this Resources Report is an approximation of the proposed Project activities. Any substantial changes to the following proposed activities will result in additional review. The activities considered here that may potentially impact aquatics, wildlife and/or botany resources include:

- Approximately 4.8 miles of new road.
- Stream crossings.
- Vegetation removal and ground disturbance for construction of building lots, buildings, roads, trails. The private land parcels encompass 773 acres with proposed construction (resulting in ground disturbance) occurring on approximately 160 of those acres. Construction is proposed to occur on approximately 72 acres of public lands. The total area of ground disturbance is approximately 232 acres.
- Operational activity during construction and final operation

3. Methods and Approach

The preparation of this Resources Report included conducting two points of investigation to assess the existing environmental conditions of and the potential impacts of the proposed project to aquatic and terrestrial species and habitats. The two points of investigation included the following: 1) a review of existing information; and 2) field site visits of the potential project footprint of the Mission Ridge Proposed Expansion. Available information was reviewed to determine presence of wetlands, streams, and potential fish, wildlife and plant habitat. A separate Wetland Report summarizes the existing conditions of wetlands and wetland species found in the Project Area (Appendix A).

3.1 Identification of Assessment Area

For the purposes of this assessment we have defined a Project Area, which encompasses all areas of proposed construction and ground disturbance or habitat modification and includes a 100 foot buffer (for analysis purposes).The Project Area includes US Forest Service land within Section 24 (T21NR19E) and Section 30 (T21NR20E), Washington Department of Fish and Wildlife land (Administered by US Forest Service) within Section 25 (T21NR19E), and Private Land within Sections 19 and 30 (T21NR20E). The Project Area encompasses approximately 1,058 acres and will be used to assess direct and indirect effects. The Project Site defines those portions of the Project Area that will likely experience actual ground disturbance or vegetation modification and encompasses approximately 232 acres (Figure 1). The Project Site will be used to assess direct effects of ground or vegetation disturbance.

The overall Assessment Area is the Squilchuck and Stemilt Subwatersheds, within WRIA 40 (Figure 2). The Assessment Area is the area to be affected directly or indirectly by the private party action and not merely the immediate area involved in the action. The Assessment Area provides a basis for describing existing conditions and potential impacts at a scale and within a context appropriate for aquatic species and mobile species such as spotted owls and wide-ranging carnivores. The Squilchuck and Stemilt Subwatersheds encompass approximately 28 square miles (mi^2) and 33 mi^2, respectively.

3.2 Review of Existing Information

We consulted a combination of available species lists and spatial databases to identify species and habitats of concern that are known to occur or have the potential to occur in the study area vicinity. A description is provided for each resource in the following sections. We narrowed down available data to a list of those species and habitats that occur or potentially occur in the vicinity of the proposed Project. Species that are currently on or under consideration for the ESA or state endangered, threatened, or species of concern lists are identified. Additional information on those fish, wildlife and plant species and typical habitat they use is provided below.

3.3 Information and Coordination

The proposed Project is located on multiple ownerships and jurisdictions. As such we have begun coordination with each of the following agencies and entities:

- Washington Department of Fish and Wildlife - biologists were contacted on 18 August 2017 for information about species and habitat concerns relative to the Project Area. Obtained data relative to sensitive species.
- Chelan County Natural Resources - Stream Typing
- Washington State Department of Ecology – input on wetland and riparian habitats.
- Washington State Department of Natural Resources – input on riparian habitat, spotted owl habitat, vegetation management.
- US Forest Service – The Okanogan-Wenatchee National Forest will be conducting a National Environmental Policy Act (NEPA) analysis for actions on federal lands. We are coordinating with the Wenatchee River Ranger District on this process.
- US Fish and Wildlife Service (Wenatchee Field Office) - potential impacts to listed species.
- Confederated Tribes of the Colville Nation – cultural and environmental concerns
- Confederated Tribes and Bands of the Yakama Nation - cultural and environmental concerns

4. Affected Environment

4.1 Location and General Habitat Characteristics

The proposed Project is adjacent to the existing Mission Ridge Ski Area and adjoins the northeast border of the existing ski area boundary. Part of the proposed Project is located on land administered by the Wenatchee River Ranger District, Okanogan-Wenatchee National Forest, while the private parcel is under the jurisdiction of Chelan County, Washington. The proposed Project encompasses: Sections 19, and 30, Township 21N, Range 20E, W.M. and Sections 24, and 25, Township 21N, Range 19E, W.M.

Habitat and topography in the Project Area are similar to the existing ski area with a mix of alpine meadows, primarily subalpine forest (with some small areas of Douglas-fir and ponderosa pine), basalt rock outcrops and talus. The proposed Project is located within the East Cascades Slopes and Foothills Ecoregion. Elevation of the proposed Project Area ranges from 3,100 feet at the junction with the existing Mission Ridge Base Area to 6,700 feet along the highest ridges in the greater Assessment Area. Aspect varies across the Project Area. The terrain is steep, with slopes varying from 0 to 178 percent, and the majority of the slopes less than 60 percent.

Part of the proposed Project is located within the ponderosa pine (*Pinus ponderosa)* cover type (historical database) within the East Cascades Ecoregion (Washington Natural Heritage database, version July 2017). The Eastern Cascades Ecoregion is described as (EPA, 2017):

> "The Eastern Cascade Slopes and Foothills ecoregion is in the rainshadow of the Cascade Range. It has a more continental climate than ecoregions to the west, with greater temperature extremes and less precipitation. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher ecoregions to the west where hemlock and fir forests are common, and the lower, drier ecoregions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry, continental climate and frequent fire. Historically, creeping ground fires consumed accumulated fuel and devastating crown fires were less common in dry forests. Volcanic cones and buttes are common in much of the region. A few areas of cropland and pastureland occur in the lake basins or larger river valleys."

Ecological Systems provide a mid-scale ecological classification for uplands and wetlands. Ecological Systems represent recurring groups of terrestrial plant communities that are found in similar climatic and physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding, share similar substrates, and/or environmental gradients (Rocchio and Crawford, 2015).

Ecological System Classes within the Project Area include: Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland, with a very small area of Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland and Northern Rocky Mountain Ponderosa Pine Woodland and Savanna.

Vegetation is primarily closed-canopy single-story stands dominated by Douglas-fir (*Pseudotsuga menziesii*) with a mixed conifer component consisting of grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*) and larch (*Larix occidentalis*). The area is a mix of very dense stands with little understory vegetation to more open canopy. Understory vegetation is primarily comprised of upland type vegetation such as pine grass (*Calamagrostis rubescens*), serviceberry (*Amelanchier alnifolia*), twinflower (*Linnaea borealis*), kinnikinnick (*Arctostaphylos uva-ursi*), pipsissewa (*Chimaphila umbellata*), oceanspray (*Holodiscus discolor*), and vine maple (*Acer circinatum*). Bitterbrush (*Purshia tridentata*) and yarrow (*Achillea millefolium*) can be found in the drier parts of the Project Area.

Riparian areas near streams consist of vegetation types such as elderberry (*Sambucus* spp.), bead lily (*Clintonia borealis*), sedges (*Carex* spp.) and mosses. A small, scattered aspen (*Populus tremuloides*) stand is located on the private parcel. A large (greater than 20 inches diameter at breast height (DBH)) tree and snag component is lacking. Much of the Project Area is even-aged resulting from harvest activities in the mid-20th century. More than 250 acres are open, rolling, talus fields with little vegetation.

The proposed Project Area is generally dry with numerous ephemeral hydrologic drainage paths that terminate in perennial creeks on the west side of Section 19. Two small emergent wetlands were identified on the northeast corner of the Project Area (see attached Wetland report, Appendix A). The majority of the soil types within the Project Area consist of Stemilt silt loam series, rubble and rock outcrops, loneridge very stony loam series and naxing very stony loam series.

Lands under US Forest Service jurisdiction are managed to provide developed recreation (RE-1) opportunities per the Wenatchee Land Management Plan (USFS, 1990) and as Administratively Withdrawn or within Riparian Reserves per the Northwest Forest Plan (USDA and USDI, 1994). The proposed Project Area adjoins lands managed by Washington State Department of Natural Resources to the east. The Project Area is located within water resource inventory area (WRIA) 40 and the Squilchuck and Stemilt Sub-watersheds (HUC12).

5. Species and Habitat Assessments

In the following sections we provide resource specific information to describe the existing habitat condition and species occurring or potentially occurring in the vicinity of the proposed Project and evaluate potential impacts to species of special status. A summary of proposed conservation measures, designed to avoid, minimize or mitigate impacts with the intent to prevent any adverse impacts, is also provided for each resource.

Based on our assessments, the Mission Ridge Proposed Expansion Project will have no adverse impacts to special status aquatic, wildlife or plant populations or habitats. The project is consistent with all local, state and federal regulatory guidance. The project is designed to limit impacts and conserve resources when possible and incorporates mitigation and conservation measures to achieve these objectives. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential effects to discountable levels.

Figure 1. Landownership and Land Management Allocation relative to Project Site and Project Area within the Mission Ridge Proposed Expansion Project

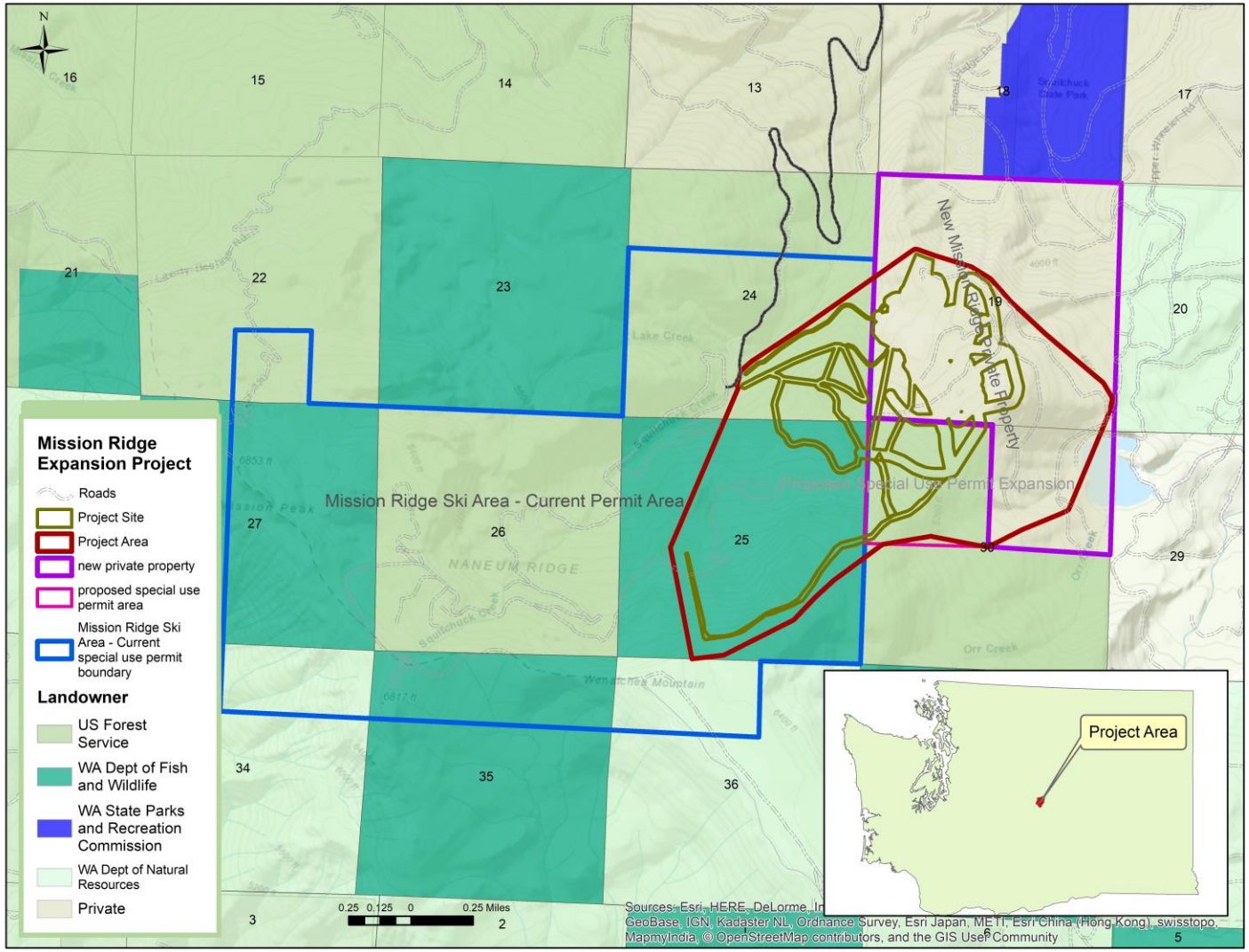
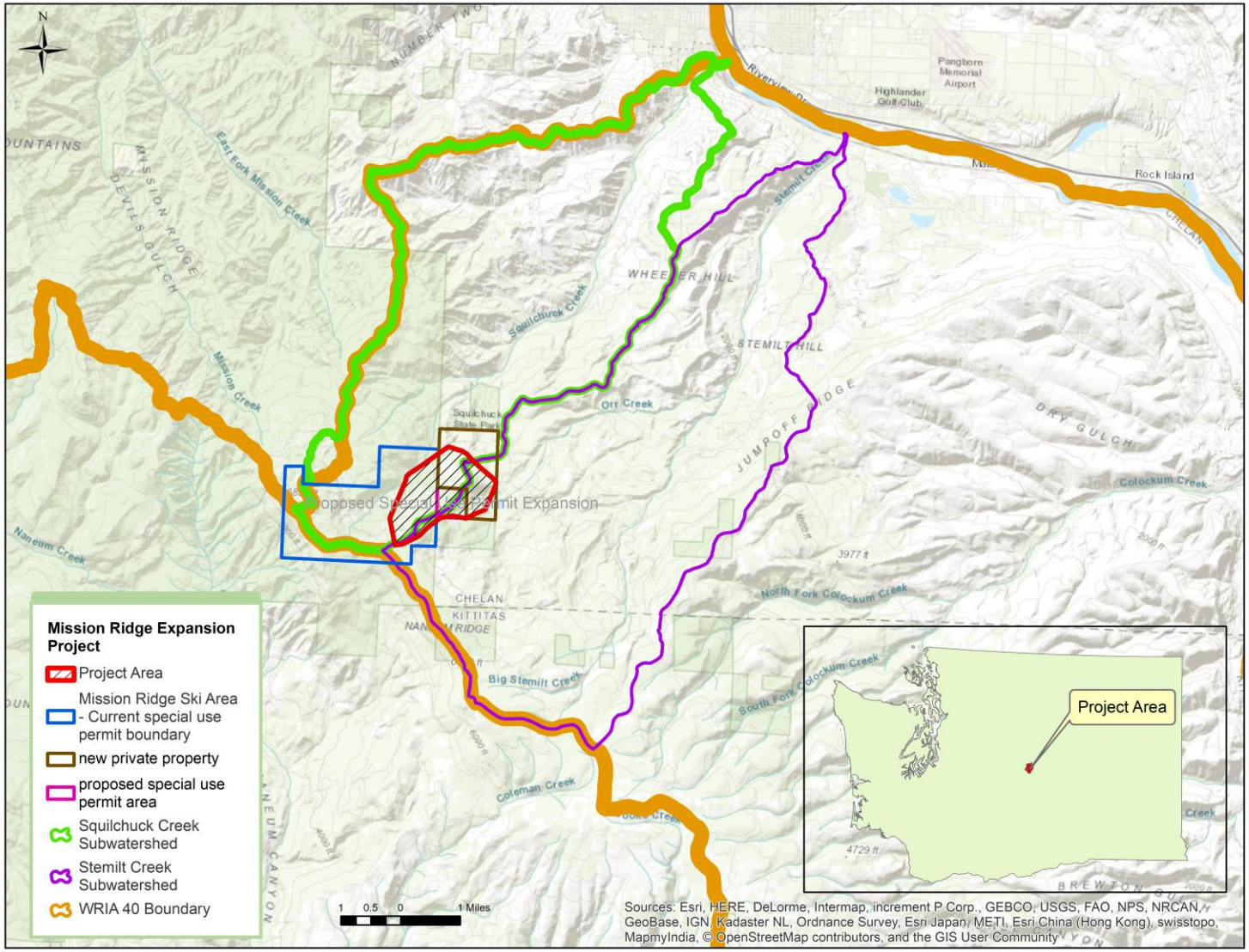


Figure 2. Mission Ridge Proposed Expansion Project Area and Assessment Area in WRIA 40



6. Fisheries and Aquatic Resources

This Resources Report provides a summary of aquatic resources, including federal and state listed fish species and associated habitats, that may be found in the Squilchuck Creek Watershed, the Mission Ridge Proposed Expansion Project Area and larger Assessment Area (Figure 1 and Figure 2).

Review of Existing Information

The preparation of this Resources Report included review of several existing documents, sources of habitat and environmental information and review of various agencies' GIS data and maps. A summary of the review of existing information is provided throughout this Resources Report.

The following provides an example of the types of sources that were included in the review:

- Chelan County Natural Resource Department. 2017. Stream Typing for Parcel Number 212019000000 Report.
- Forest Practices Board. 2002. Forest Practices Board Manual Section 13 Determining Fish Use for the Purpose of Typing Water.
- National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017. Species Under the Endangered Species Act (ESA). NMFS Office of Protected Resources. Available at: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish.
- National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017. Endangered Species Act Critical Habitat. West Coast Region. Available at: http://www.westcoast.fisheries.noaa.gov/maps_data/endangered_species_act_critical_habitat.html.
- United States Fish and Wildlife Service (USFWS). 2014b. Final Critical Habitat for Bull Trout Upper Columbia River Basins Unit: 10. Available at: https://www.fws.gov/pacific/bulltrout/finalcrithab/index.cfm?unit=10.
- United States Fish and Wildlife Service (USFWS). 2017. National Wetland Inventory (NWI) Wetlands Map. Available at: http://www.fws.gov/wetlands/Data/Mapper.html.
- United States Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.
- Upper Columbia Regional Technical Team (RTT). 2003. A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region. Discussion Draft.
- Washington Conservation Commission (WCC). 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages)., Olympia, WA.
- Washington Department of Fish and Wildlife (WDFW). 2017. SalmonScape Mapping System. Available at: http://apps.wdfw.wa.gov/salmonscape/.
- Washington Department of Fish and Wildlife (WDFW). 2006. WRIA 40 Diversion Screening and Fish Passage Inventory Report.
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington State Department of Natural Resources (WDNR). 2017. Washington Natural Heritage Program GIS data set. Available at: http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html.

Site Visits

Several site reconnaissance visits have been conducted to become familiar with and characterize the Project Area and Assessment Area. Two of the site visits, conducted in August 2017, focused on preliminary assessment and documentation of aquatic habitat including streams, riparian buffers, and

wetlands. The first site reconnaissance was conducted on August 3, 2017. During this field visit streams, riparian areas, and wetlands were identified in the Project Area and their locations were documented to create a GIS layer to develop baseline habitat maps. A preliminary assessment of existing conditions was also conducted for these areas.

The first field reconnaissance provided information and maps for the second site visit conducted on August 16, 2017. During the second site visit, the Chelan County Natural Resource Department conducted a stream typing determination for streams in the private land portion of the Project Area.

The intent of the stream typing effort was to locate, and type streams identified as present in the Project Area on the Washington Department of Natural Resources (WDNR) Forest Practices Application Review System (FPARS) mapping tool. Results of the Chelan County stream typing effort and determinations are summarized in the Salmonid and Fish Use in Squilchuck Creek Watershed section of this Resources Report. The complete Chelan County Natural Resource Department 2017 Stream Typing for Parcel Number 212019000000 Report is in Appendix B.

Salmonid and Fish Use in the Columbia River

The Columbia River and its tributaries supports numerous anadromous salmonid species including Chinook, chum, coho, pink, and sockeye salmon; coastal cutthroat, steelhead, and bull trout; as well as resident and migratory lamprey. Other fish include but are not limited to sturgeon, rainbow trout, American shad, smelt and mountain whitefish. The Columbia River also provides rearing, foraging, spawning and adult habitat for numerous resident fish, shellfish, plants, and wildlife species unique to the Pacific Northwest.

The Upper Columbia River provides migration, rearing, foraging, overwintering, and spawning habitat for Chinook and sockeye salmon, steelhead trout, bull trout, lamprey, and mountain whitefish. Coho salmon are considered extirpated from the Upper Columbia River but in recent years the Yakama Nation has started a program to reintroduce them to the system (WCC, 2001). Native and hatchery produced anadromous species of salmon and trout are found in the Upper Columbia River throughout every month of the year.

Several wild salmonid species found in the Upper Columbia River and Chelan County are federally listed as endangered, threatened, or species of concern by the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS). The listed species, their evolutionary significant unit, and their critical habitat and federal status are provided in Table 1 (NOAA Fisheries, 2017a; USFWS, 2017). Table 2 provides Washington Department of Fish and Wildlife (WDFW) listing status for state candidate and sensitive fish species.

Table 1: Aquatic Federal Endangered, Threatened, and Species of Concern in the Upper Columbia River

Common Name	Scientific Name	Evolutionary Significant Unit	Critical Habitat	Regulatory Agency Status
Chinook salmon	*Oncorhynchus tshawytscha*	Upper Columbia River Spring Run	Yes	NOAA / Endangered
Bull trout	*Salvelinus confluentus*	Washington	Yes	USFWS / Threatened
Steelhead trout	*Oncorhynchus mykiss*	Upper Columbia River	Yes	NOAA / Threatened
Pacific lamprey	*Lampetra tridentata*	Washington	No	USFWS / Species of Concern
Pygmy whitefish	*Prosopium coulteri*	Washington	No	USFWS / Species of Concern

Table 2: Aquatic State Candidate and Sensitive Species in the Upper Columbia River

Common Name	Scientific Name	Evolutionary Significant Unit	Regulatory Agency Status
Chinook salmon	*Oncorhynchus tshawytscha*	Upper Columbia River Spring Run	WDFW / Candidate
Bull trout	*Salvelinus confluentus*	Washington	WDFW / Candidate
Steelhead trout	*Oncorhynchus mykiss*	Upper Columbia River	WDFW / Candidate
Leopard dace	*Rhinichthys falcatus*	Washington	WDFW / Candidate
Mountain sucker	*Catostomus platyrhynchus*	Washington	WDFW / Candidate
Pygmy whitefish	*Prosopium coulteri*	Washington	WDFW / Sensitive
Umatilla dace	*Rhinichthys umatilla*	Washington	WDFW / Candidate

Salmonid and Fish Use in the Squilchuck Creek Watershed

The Project Area and larger Assessment Area are within the Squilchuck and Stemilt Watersheds, which are part of the Alkali-Squilchuck Watershed Resource Inventory Area (WRIA) 40. This northern portion of WRIA 40 is south of the City of Wenatchee, in Chelan County, Washington (Figure 2). All three streams drain directly to the Columbia River, at river mile 464.0, 461.9, and 450.0, respectively. The majority of the Project Area encompasses a portion of the Squilchuck Creek Watershed and a very small portion of the Stemilt Creek Watershed. Ground disturbance and habitat modification is only proposed to occur within the Squilchuck Creek Watershed. Therefore, the Squilchuck Creek Watershed will be the focus of this section of Resources Report. Riparian areas and streams, in both the Squilchuck Creek and Stemilt Creek Watersheds, will have established riparian buffers to protect aquatic resources. Stream crossings and ground disturbance will avoid all fish bearing streams.

From its headwaters, Squilchuck Creek flows just over 1.5 miles through federal lands, including the Mission Ridge Ski Area, and continues to flow for approximately nine miles thru private and state lands to its confluence with the Columbia River. Squilchuck Creek flows from Mission Ridge Ski Area through mountainous forested areas, shrub-steppe areas, orchards and other agricultural, residential, and small industrial areas, and the larger developed City of Wenatchee. Major highways, roads, and railways exist in the watershed.

According to the Salmon, Steelhead and Bull Trout Limiting Factors Report for WRIA 40 (WCC, 2001), Squilchuck Creek is characterized as a naturally low surface water producer with arid geology. While the mouth of Squilchuck Creek at its confluence with the Columbia River is expected to support rearing of Chinook salmon and steelhead trout, the upper extent of Squilchuck Creek habitat is limited to anadromous salmonids by natural fish passage barriers, steep gradients, stream channel size, and insufficient flows. Other habitat limiting factors in Squilchuck Creek include roads, floodplain and riparian buffer conversion to agriculture and residential development, water diversion for irrigation, reduced large wood recruitment and instream habitat complexity, flood control practices such as berms disconnecting floodplain habitat from the stream channel and stream channelization. Compacted fines and gravel and high turbidity found throughout the nine miles of the system further limit habitat.

The WDNR FPARS mapping tool lists 14 streams in the Project Area. Thirteen of the streams are classified as non-fish bearing (N) and one is listed as unknown (U). The Chelan County stream typing effort resulted in the following stream type determinations:

- Ten of the 14 listed streams were determined to not qualify as streams
- Two of the 14 listed streams were determined to qualify as non-fish bearing perennial streams (Np)
- One of the 14 listed steams was determined to qualify as a non-fish bearing seasonal stream (Ns)

- One of the 14 listed streams, Squilchuck Creek, was determined to be on federal land and was not typed. Squilchuck Creek is classified on the WDNR FPARS as a fish bearing stream.

Figure 3 provides an overview of the Project Area showing the location of streams, updated stream type classifications, stream gradients, and riparian buffers. The majority of the streams within the Project Area are considered steep, with gradients greater than 20 percent which is considered a threshold for fish use (FPB, 2002; Washington Administrative Code, WAC-222-031).

In addition to the natural limiting factors described above, Squilchuck Creek has numerous human constructed fish passage barriers throughout the system, particularly in the lower elevations of the watershed. Aside from culverts and water diversions, the major barriers preventing access to spawning and rearing habitat include the Burlington Railroad culvert at RM 0.1, a partial fish passage barrier, and the Wenatchee Avenue culvert at river mile 0.3, a full fish passage barrier to Chinook salmon (WCC, 2001). Approximately 1.2 miles above the mouth, a natural barrier exists that limits migration for adult Chinook and coho salmon (WDFW, 2006). In high water events, steelhead trout may be able to migrate past these barriers, but seasonal low flows and severely degraded habitat limits their productivity (WCC, 2001).

The Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region classifies the Squilchuck Creek Watershed as a Category 4 watershed due to fish passage barriers and intermittent stream flows that limit the distribution of anadromous salmonids, and likely isolate populations of inland trout. Category 4 watersheds contain both functional and non-functional habitats that historically supported populations of one or more federally listed species. Exotic species may now be dominant in one or more subwatersheds and native species are typically not present in sustainable numbers (RTT, 2003).

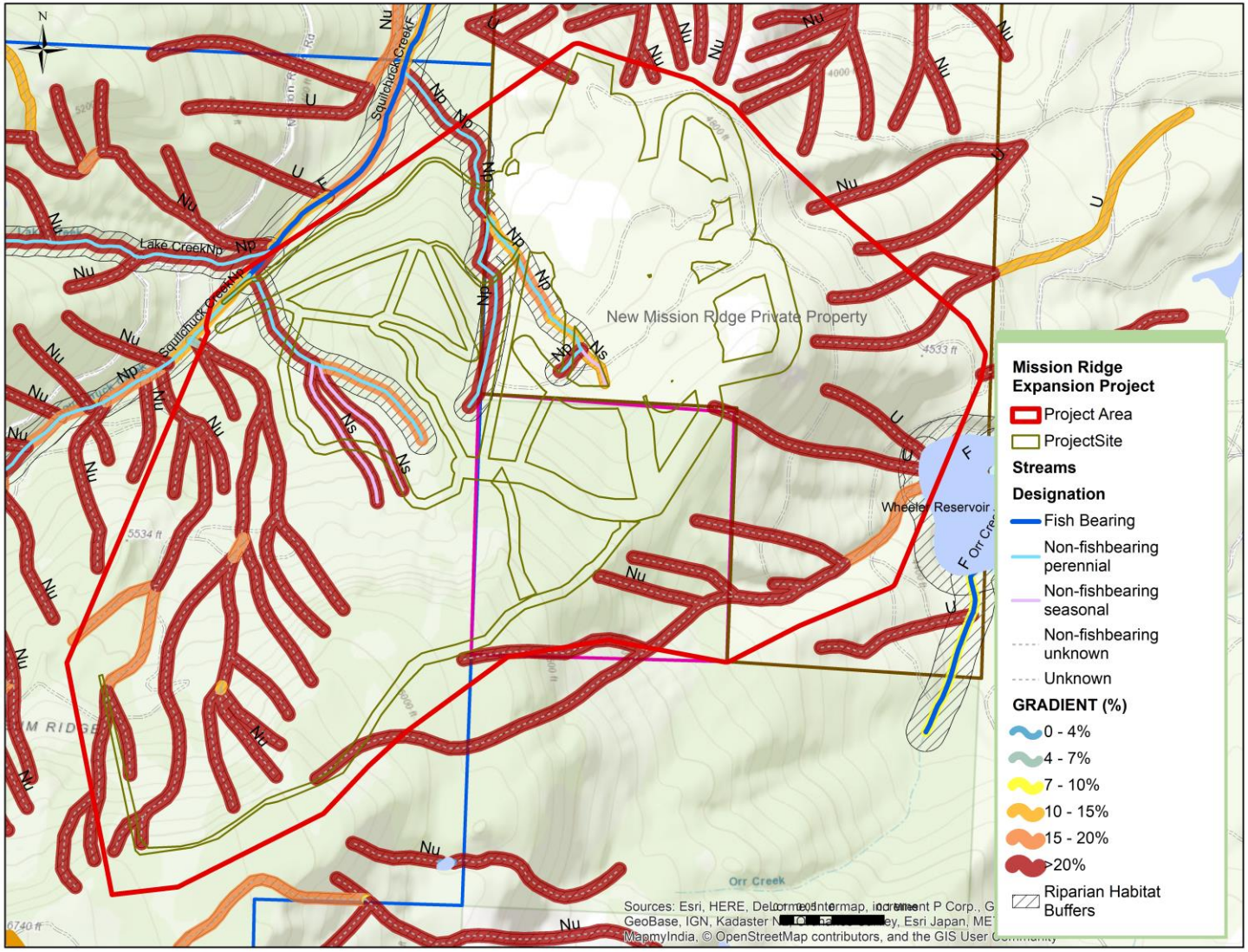
Native salmonid species expected to use Squilchuck Creek include Chinook and coho salmon and steelhead trout, primarily for rearing in the lower elevations below fish passage barriers and at the confluence of the Columbia River. Because of the natural limiting factors, bull trout are not expected to be found in Squilchuck Creek. Resident rainbow trout and west slope cutthroat trout are expected to be found throughout the system but as mentioned above are expected to be isolated populations with limited productivity (RTT, 2003).

The following provides a brief description of federally listed endangered and threatened salmonid species that use the lower portions of Squilchuck Creek. A brief description of mountain sucker, a state listed fish species of concern, and that may have the potential to be in the upper portions of Squilchuck Creek, is also provided. Table 3 provides a summary of effects determinations for the federal and state listed fish species discussed below. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Chinook Salmon (*Oncorhynchus tshawytscha*) - Endangered

Chinook salmon have a historic range extending from the Ventura River in California to Point Hope, Alaska, in North America and from Hokkaido, Japan, to the Anadyr River in Russia. Chinook salmon require varied habitats during different phases of their life cycle. Spawning habitat typically consists of riffles and the tailouts of pools with clean silt-free substrate dominated by gravel in the mainstem of rivers and large tributaries (WDF et al., 1993). Chinook salmon are most frequently observed spawning in water with a daily average temperature ranging from 4 to 14°Celsius (C). Rearing of juvenile Chinook salmon usually occurs in water with temperatures ranging from 10 to 17°C (EPA, 2003). Chinook salmon spend three months to two years of their lives rearing in fresh water before migrating to the ocean, where they spend six months to seven years maturing.

Figure 3. Stream Type Classifications, Riparian Buffers, and Stream Gradients within Project Area.



Juvenile Chinook salmon require estuarine and nearshore marine habitat for migration, foraging, refuge, and osmoregulation processes. Juveniles spend from several days to months in estuarine habitat before migrating into marine waters (Kerwin, 1999). Juveniles rely on shallow nearshore habitats such as eelgrass meadows, intertidal flats, tidal marshes, and subtidal channels near estuaries (Steelquist, 1992). Once juvenile Chinook are large enough to eat small fish and have grown larger than their prey, they move away from the shore into deeper marine waters.

Chinook salmon are opportunistic feeders. Juveniles prey on a wide variety of food such as benthic, epibenthic, and pelagic crustaceans, as well as insects, fish larva, and juvenile fish. Adult salmon feed on fish such as surf smelt, longfin smelt, Pacific sandlance, and herring while in the estuarine and marine environment.

Squilchuck Creek is expected to support rearing of Chinook salmon in the lower portions at its confluence with the Columbia River. The upper extent of Squilchuck Creek habitat is naturally limited to anadromous salmonids by steep gradients, stream channel size, and insufficient flows. Aside from numerous fish passage barriers in the system, a full passage fish barrier to Chinook salmon exists at RM 0.3. and approximately 1.2 miles above the mouth, a natural barrier exists that limits migration for adult Chinook salmon.

Direct and Indirect Effects

Implementation of the proposed Project is expected to have no effect to Chinook salmon due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and existence of full fish passage barriers. To protect designated critical habitat, NOAA Fisheries has identified three physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of Chinook salmon. The freshwater PCEs are related to spawning, rearing, and migration. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (NOAA Fisheries, 2017b).

Bull Trout (*Salvelinus confluentus*) - Threatened

The historical distribution of bull trout extends from northern California to Alaska. In Washington, bull trout are found throughout coastal and inland streams and lakes (WDFW, 1998). Bull trout have a complex life history, with two primary life-history types: a resident form and a migratory form. Bull trout that are considered migratory may be stream-dwelling (fluvial), lake-dwelling (adfluvial), or ocean- or estuarine-dwelling (anadromous) (Behnke, 2002; USFWS, 2006). Individuals of each form may be represented in a single population, although migratory populations may dominate where migration corridors and subadult rearing habitats are in good condition (USFWS, 2006).

As opportunistic feeders, juvenile anadromous bull trout migrate to estuaries in the summer months, when salmon fry and smolts become plentiful. Adult anadromous bull trout migrate between fresh, estuarine, and saltwater environments, depending on food availability. Most inland populations of bull trout are either fluvial or adfluvial, migrating from larger rivers and lakes to spawn in smaller tributary streams from August through October (Wydoski and Whitney, 2003). Bull trout spawn in streams with clean gravel substrates and cold (less than 9°C) water temperatures (Behnke, 2002; USFWS, 2006). Spawn timing is relatively short, occurring from late October through early November. Redds are dug by females in water 8 to 24 inches in depth in substrate gravel 0.2 to 2 inches in diameter (Wydoski and Whitney, 2003); emergence generally occurs in the spring. Bull trout are opportunistic feeders, consuming fish in the water column and insects on the bottom (WDFW, 1998).

While bull trout are in the Upper Columbia River, they are not expected to be found in Squilchuck Creek, the Assessement Area or the Project Area because of natural limiting factors (WCC, 2001).

Direct and Indirect Effects

Implementation of the proposed Project is expected to have no effect to bull trout due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and other natural limiting factors. To protect designated critical habitat, the USFWS has identified nine physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of bull trout. The PCEs are related to water quality; migration habitat; food availability; instream habitat; water temperature; substrate characteristics; stream flow; water quantity; and nonnative species. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (USFWS 2014b).

Steelhead Trout (*Oncorhynchus mykiss*) - Threatened

Steelhead are considered by many to have the greatest diversity of life history patterns of any Pacific salmonid species, including varying degrees of anadromy, differences in reproductive biology, and plasticity of life history between generations (Busby et al., 1996). Steelhead spend one to four years in freshwater and one to four years at sea; in Washington, a two year freshwater/two years at sea life history is most common (Steelquist, 1992). Because they can survive spawning, some can spawn a second or third time (Steelquist, 1992). Juvenile steelhead trout utilize estuaries as rearing and foraging habitat.

Steelhead are not expected to be found in the upper extent of Squilchuck Creek because of habitat that is naturally limited to anadromous salmonids by steep gradients, stream channel size, and insufficient flows. While steelhead trout may be able to migrate past the full and partial fish barriers in the lower portions of Squilchuck Creek during high flow events, seasonal low flows and severely degraded habitat are expected to limit their productivity.

Direct and Indirect Effects

Implementation of the proposed Project may affect, but is not likely to adversely affect steelhead trout due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and fish passage barriers that would preclude steelhead trout from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers. To protect designated critical habitat, NOAA Fisheries has identified three physical and biological requirements or primary constituent elements (PCEs) that are essential for the conservation of steelhead trout. The freshwater PCEs are related to spawning, rearing, and migration. The proposed project will not negatively impact the long-term quality of critical habitat because it does not exist in the Project Area or Assessment Area (NOAA Fisheries, 2017b).

Mountain Sucker (*Catostomus platyrhynchus)*

Mountain sucker are found in high elevation mountainous areas in western North America. In Washington, Mountain sucker are only found in the Columbia River basin, east of the Cascade mountain range, in the Columbia River and its tributaries including the Cowlitz, Yakima, Wenatchee, and Palouse River basins (Wydoski and Whitney, 2003). Mountain sucker inhabit small mountain streams, generally less than 40 feet wide with summer water temperatures ranging from 12 to 21°C. They are small fish reaching up to nine inches in length and can live up to nine years. Preferred substrates are comprised of sand, gravel, and boulders. They can also be found in large rivers and lakes and reservoirs. In early to mid-summer, mountain sucker generally spawn in riffles below pools. Mountain sucker feed primarily on algae and diatoms and invertebrate larvae. They may provide a food source for other fish species such as

trout and aquatic birds. In 1998, mountain sucker was listed as a state candidate species by WDFW because of lack of information on its distribution and status in Washington (Wydoski and Whitney, 2003).

Direct and Indirect Effects

The presence of mountain sucker in the upper extent of Squilchuck Creek is unknown. Implementation of the proposed Project may affect, but is not likely to adversely affect mountain sucker due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and potential fish passage barriers that would preclude mountain sucker from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.

Design Criteria and Mitigation Measures for Aquatic Resources

All work conducted below the ordinary high water mark will require obtaining appropriate permits such as a Hydraulic Project Approval. In general, to address potential impacts from the proposed expansion to aquatic resources and fish species, the following mitigation measures and design criteria will be developed and employed:

1. Riparian areas and streams in the Project Area will have established riparian buffers per Chelan County Code 11.78.090 and US Forest Service Northwest Forest Plan (USDA and USDI 1994). Fish bearing streams on federal lands will be protected by a 300-foot riparian buffer; fish bearing streams on private land will be protected by a 200-foot buffer; and non-fish bearing streams on private land will be protected by a 150-foot buffer.
2. Stream crossings and ground disturbance will avoid and not be conducted near any fish bearing streams.
3. Stream crossings or ground disturbance below the ordinary high water mark on non-fish bearing streams, will be conducted during in-water work windows, and all erosion and pollution control best management practices (BMPs) will be employed.
4. Sediment will be prevented from entering streams and wetlands through the use of BMPs.
5. Equipment and machinery will be maintained and stored in a manner to prevent spread of aquatic invasive species and to protect riparian buffered habitat from hazardous materials (ie. fuel and oil leaks).

Table 3. Summary of Findings for Federal and State Listed Aquatic Species**.**

Evolutionary Significant Unit Common Name	**Scientific Name**	**Life History Stages**	**Effects Determination***
Upper Columbia River Spring Chinook salmon	*Onchorhynchus tshawytscha*	Juvenile rearing-migration	No effect due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and full fish passage barriers.
Bull trout	*Salvelinus confluentus*	Adult-subadult migration	No effect due to the unlikeness of presence in the Project Area and Assessment Area because of lack of suitable habitat and other natural limiting factors.
Upper Columbia River Steelhead Trout	*Oncorhynchus mykiss*	Adult migration and juvenile rearing-migration	May affect but, is not likely to adversely affect due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and fish passage barriers that would preclude steelhead trout from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.
Mountain Sucker	*Catostomus platyrhynchus*	Adult migration and juvenile rearing-migration	May affect but, is not likely to adversely affect due to potential turbidities from construction in the local environment. These impacts will be diminished because no stream crossings or ground disturbance will occur in fish bearing streams. While potential turbidity reaching fish bearing streams is unlikely, impacts will be diminished because of species avoidance due to the seasonal low flows and potential fish passage barriers that would preclude mountain sucker from entering the Project Area and Assessment Area. Any work below the ordinary high water mark will be conducted during in-water work windows, and all erosion and pollution control BMPs will be employed. Effects will be further mitigated by established riparian buffers.

*In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

7. Wildlife Species and Habitat

This section of the Resources Report provides a summary of wildlife species, including federal and state listed species and associated habitats, that may be found in the Mission Ridge Proposed Expansion Project Area (Figure 1 and Figure 2).

Review of Existing Information

The preparation of this Resources Report included review of several existing documents, sources of habitat and environmental information, and review of various agencies' GIS data and maps. A summary of the review of existing information is provided throughout this Resources Report.

The following provides an example of the types of sources that were included in the review:

- United States Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2016. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2017. Management Recommendations For Washington's Priority Habitats and Species: various volumes. Available at: http://wdfw.wa.gov/conservation/phs/mgmt_recommendations/
- Washington State Department of Natural Resources (WDNR). 2017. Washington Natural Heritage Program GIS data set. Available at: http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html.
- United States Fish and Wildlife Service (USFWS). 2017. Species information and Recovery Plan, Northern Spotted Owl. Available at: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B08B
- United States Fish and Wildlife Service (USFWS). 2017. Critical Habitat - Northern Spotted Owl. Available at: https://ecos.fws.gov/ecp/report/table/critical-habitat.html
- Washington Department of Fish and Wildlife. 2017. Northern Spotted Owl data. Sensitive species data provided by WDFW.
- Washington Department of Natural Resources (WADNR). 2017. Spotted owl emphasis areas, GIS data set. Available at: https://www.dnr.wa.gov/programs-and-services/forest-practices/providing-gis-data-forest-practices-activities-throughout
- United States Forest Service Sensitive Species List (R6 ISSSSP). Available at: https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/

Site Visits

Walk-through reconnaissance field surveys were conducted in 2017 (June 2, July 27, Aug. 3, Aug. 16 and Oct. 2) to validate spatial data, document existing habitat conditions, identify fish, wildlife and plant habitats and determine presence of listed species and/or their prey base at the proposed expansion site and in surrounding areas. All streams and riparian areas were walked as part of the stream-typing assessment conducted by Chelan County Natural Resources (see Appendix B).

Table 4. presents those wildlife species or habitat that potentially occur in the vicinity of the proposed Project. Species that are currently on or under consideration for the ESA or state endangered, threatened, species of concern or sensitive species lists are identified. Additional information on those likely wildlife species and typical habitat use is provided below.

Table 4. Wildlife species that potentially occur in vicinity of Mission Ridge Proposed Expansion Project.

	Species/ Habitats*	***Scientific Name***	**State Status/ PHS Criteria**	**Priority Area (PHS)**	**Federal Status**
Amphibians	Columbia Spotted Frog	*Rana luteiventris*	Candidate. Species of Concern (due to regional decline)	Any occurrence	none
	Western Toad	*Anaxyrus boreas*	Candidate. Species of Concern (due to regional decline)	Any occurrence	none
Birds	Golden Eagle	*Aquila chrysaetos*	Candidate	Breeding Areas, Foraging Areas	none
	Northern Goshawk	*Accipiter gentilis*	Candidate	Breeding Areas, including alternate nest sites, post-fledging foraging areas	Species of Concern. USFS sensitive
	Dusky Grouse	*Dendragapus obscurus*	PHS - Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Regular Concentrations	none
	Sooty Grouse	*Dendragapus fuliginosus*	PHS - Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Regular Concentrations	none
	Flammulated Owl	*Otus flammeolus*	Candidate	Breeding Areas, Regular Occurrences	none
	Spotted Owl	*Strix occidentalis*	Endangered	Any occurrence	Threatened
	Pileated Woodpecker	*Dryocopus pileatus*	Candidate	Breeding Areas	none
	White-headed Woodpecker	*Picoides albolarvatus*	Candidate	Breeding Sites, Regular Occurrences	FS sensitive
Mammals	Townsend's Big-eared Bat	*Corynorhinus townsendii*	Candidate. PHS - Vulnerable Aggregations	Any occurrence.	Species of Concern. USFS sensitive
	Roosting Concentrations of: Big-brown Bat, Myotis bats, Pallid Bat		PHS - Vulnerable Aggregations.	Regular concentrations in naturally occurring breeding areas and other communal roosts	none
	Cascade Red Fox	*Vulpes vulpes cascadens*	Candidate	Any occurrence	none
	Gray Wolf	*Canis lupus*	Endangered	Regular occurrences	Endangered
	Grizzly Bear	*Ursus arctos*	Endangered	Any occurrences	Threatened

	Lynx	*Lynx canadensis*	Endangered	Any occurrence	Threatened
	Marten	*Martes americana*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Regular occurrences	none
	Wolverine	*Gulo gulo*	Candidate	Any occurrence	Candidate, proposed threatened
	Elk	*Cervus elaphus*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Calving Areas, Migration Corridors, Regular concentrations in winter and in foraging areas along coastal waters	none
	Rocky Mountain Mule Deer	*Odocoileus hemionus hemionus*	PHS-Species of Recreational, Commercial, and/or Tribal Importance	Breeding Areas, Migration Corridors, Regular Concentrations in Winter	none

*Species listed were obtained from USFWS Federally Listed species, USFS Sensitive Species and WDFW Priority species list for species in Washington and Chelan County.

The PHS interactive website indicated only spotted owl and elk as PHS species that occur in the Project Area. Freshwater emergent wetland habitats were identified on the PHS database more than one mile west of the Project Area. Wheeler Reservoir is identified as a wetland and is located adjacent to the southeast part of the Project Area (Appendix C). Of the species described in Table 4., only grouse were observed, although evidence of elk and mule deer (tracks, scat, wallow) were observed within the Project Site. No federal- or state-listed threatened or endangered species were observed during field visits. As described previously, two unmapped wetlands were identified in the Project Area during field visits.

Wildlife Species and Habitat

In this section, the habitat resources and wildlife identified within the vicinity of the proposed Project Area are described. This description includes identification of suitable habitat types, identification of wildlife species that are known to or potentially occur in the area, and identification of endangered, threatened, proposed, and candidate species for protection on state and federal species lists. We examined direct and indirect effects and identify measures that will be implemented to minimize or mitigate specific anticipated impacts.

Federally Listed Species

Four wildlife species that are currently protected under the ESA have potential to occur within the vicinity of the proposed Project. These species include: gray wolf, Canada lynx, northern spotted owl and grizzly bear. Effects determinations are summarized in Table 5, followed with detailed summaries for each of the four species in the following pages. In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Table 5. Summary of Findings for Federal and State Listed Wildlife Species.

Evolutionary Significant Unit Common Name	Scientific Name	Effects Determination*
Gray wolf	*Canis lupus*	May affect, but is not likely to adversely affect the gray wolf. Effects will be negligible because although habitat for both wolves and their prey exists in the Project Area, wolves have not been documented using the area, impacts to ungulate habitat would be minimal and increases in road density are minimal at the watershed scale. Any negative effects to wolves would be due to disturbance from noise and human presence during project implementation and subsequent increased human activity. This project would be consistent with recovery regulations; there would be no effect to known denning habitat or rendezvous sites.
Canada lynx	*Lynx canadensis*	May affect, but is not likely to adversely affect the Canada lynx. The Project Area is on the edge of the range of Canada lynx within designated peripheral habitat. Although habitat conditions may be suitable in patches, lynx are highly unlikely to use the Project Area due to the fragmented and isolated nature of the habitat.
Northern Spotted Owl	*Strix occidentalis*	May affect, but is not likely to adversely affect the northern spotted owl. This determination was made because approximately eight acres of potential suitable habitat may be degraded, and noise created above ambient conditions in suitable habitat could cause disturbance, although the likelihood of occupancy at this elevation on the fringe of spotted owl range is minimal.
Critical Habitat - Northern Spotted Owl (Designated)		Designated critical habitat for the northern spotted owl does not occur within the Project Area. Therefore, project implementation would have no effect on spotted owl critical habitat.
Grizzly bear	*Ursus arctos*	May affect but is not likely to adversely affect grizzly bear. The addition of 4.8 miles of road would have no effect on core habitat for grizzly bears because implementation would occur outside of a BMU. Although the Project Area is located outside of Grizzly Bear Management Units, and is on the fringe of grizzly bear range in the North Cascades, the site is near BMUs and may provide potential habitat. The project will result in an increase in human activity in the area. Because grizzly bears are wide-ranging, disturbance could occur during project activities from noise. The likelihood of this is extremely small though, including potential disturbance to denning habitat, because bears have not been reported near the Project Area in decades.

*In all cases if use by listed species is discovered at any time during the project, conservation measures would be implemented to reduce potential affects to discountable levels.

Gray Wolf (*Canis lupus*) – Endangered

The gray wolf in Washington is listed as an endangered species under the ESA (USFWS, 1967) west of U.S. Highway 97 (USFWS, 2003). Recovery regulations require consideration of potential impacts to known denning habitat or rendezvous sites (USFWS 2003). Wolves in Washington are also managed under the Wolf Conservation and Management Plan of Washington State (finalized in December 2011, Wiles et al., 2011).

Although gray wolves historically occurred in Washington, wolves were nearly extirpated by the 1940s through aggressive predator control (Laufer and Jenkins 1989; Gaines et al. 2000). Wolves have since been documented in Washington (Fritts 1992; Gaines et al., 1995) with at least 90 known wolves in 18 known packs (Becker et al. 2016). A new pack was detected west of Wenatchee in 2013 near the Project Area but has since disbanded and is no longer considered a pack by WDFW. Wolves have been reported in the vicinity of the Project Area and likely cross the area periodically.

Project effects that are generally considered relative to wolves include potential disturbance, effects to security habitat, and effects to prey base. Wolves generally den between April and June, then move pups to a series of rendezvous sites for the remainder of the summer. They are believed to be sensitive to disturbance during this time (Mech et al., 1991), particularly early in the denning period when pups are more vulnerable (Frame et al., 2007). Roads can influence security of habitat for wolves (Thiel, 1985; Mech et al., 1988; Mladenoff et al., 1995). Security habitat for wolves is defined as areas with open road and motorized trail densities less than one mile/square mile of habitat.

Deer and/or elk are common in the area and could provide a suitable prey base. Roads and human activity can also influence habitat effectiveness and reproductive capacity for ungulates. The fawning/calving period for mule deer is 15 May to 30 June; and for elk 15 May to 15 July (W. Meyers, pers. comm. 2002). Because deer and elk are considered a priority species please see page 31 for further discussion.

Direct and Indirect Effects

Roads were analyzed within the Squilchuck and Stemilt Watersheds to determine their potential effects on gray wolves (Gaines et al., 2003). Currently Chelan County Road 711 (Mission Ridge Road) is the only open road in the immediate vicinity of the Project Area. There are a number of roads that access the property from the east. These roads are technically closed but still receive public use. Mission Ridge Road is 0.2 to 0.4 miles west of the proposed Project Area. The proposed action would allow motorized access along a 0.6 mile access road, that originates from the existing Mission Ridge Ski Area parking lot, and approximately 4.2 miles of road within Section 19. Implementation of this project would not cause disturbance to any known gray wolf den or rendezvous site in the area.

The Project Area provides summer range for mule deer and elk (prey base for wolves). Fawning and calving habitat is also present in the Project Area, typically in areas with little disturbance and heavy cover, such as riparian vegetation away from more heavily travelled roads. It is unlikely that the Project Area provides spring and fall migration habitat. During the winter season, part of the Project Area is currently under the Mission Ridge Ski Area Operating permit and gets some use by skiers and snowshoers. The Project Area is not considered winter range for deer or elk.

Wolves are not currently known to reside in the Project Area. However, because wolves are wide-ranging, and the Project Area does provide potential habitat, disturbance could occur during project activities from noise caused by heavy equipment during construction and increased human activity during and after completion of the project. The duration, intensity and extent of these activities will vary depending on the phase of construction. Completion of the project would result in long-term human use along roads and within the development footprint. Although the project would increase the amount of human activity in

the area and could cause disturbance, the likelihood of additional disturbance is small, including the potential disturbance to denning habitat, because the Project Area is already impacted by human activity and noise (Thiel 1985; Mech et al., 1988).

The project would increase the amount of motorized human activity in the area. Project implementation would result in an increase of approximately 4.8 miles of new road, concentrated within the Project Site, potentially impacting less than one acre of potential calving or fawning habitat in riparian areas. Effects to riparian areas will be limited to crossings. Within the 28 mi^2 Squilchuck Creek Watershed and 33 mi^2 Stemilt Watershed, open road density would change by less than 0.2 mi/mi^2. Although gray wolf security habitat may decrease slightly due to increased motorized use, impacts will be negligible at the scale detected by wide-ranging carnivores.

Table 6. Road changes proposed within the Mission Ridge Proposed Expansion Project.

Analysis Area	Size of Area (mi^2)	Total Open Road (miles)		Open Road Density (mi/mi^2)	
		Existing Condition	Proposed Action	Existing Condition	Proposed Action
Squilchuck Watershed	28.0	112	116.8	4.03	4.20
Stemilt Watershed	33.1	174	178.8	5.26	5.40

Implementation of the proposed Project may affect, but is not likely to adversely affect the gray wolf. Effects to gray wolf will be negligible because although habitat for both wolves and their prey exists in the Project Area, wolves are not presently known to be using the area, impacts to ungulate habitat would be minimal and increases in road density are minimal at the watershed scale. Any negative effects to wolves would be due to disturbance from noise and human presence during project implementation and subsequent increased human activity. This project would be consistent with recovery regulations (USFWS 2003) as there would be no effect to known denning habitat or rendezvous sites. If wolf use is discovered at any time during the project, conservation measures such as area closures, would be implemented to reduce potential effects to discountable levels.

Canada Lynx (*Lynx canadensis*) – Threatened

The Canada lynx was listed as a Washington State threatened species in 1993, and became a Threatened species under the ESA in April 2000 (USFWS, 2000). State management guidance was originally found in the *Washington State Recovery Plan* for the Lynx (Stinson, 2001) and included designated Lynx Management Zones (LMZ). Washington Department of Fish and Wildlife up-listed lynx to Endangered in December 2016. US Fish and Wildlife Service (USFWS) designated critical habitat - revised as of 2014 (USFWS 2014a).

The lynx recovery outline stratified lynx habitat into three categories: core, secondary, and peripheral areas (USFWS, 2005). The Project Area is located within peripheral habitat. Lynx guidance also stratifies the landscape into Lynx Analysis Units (LAU), although it is no longer necessary to delineate LAUs in secondary/peripheral areas (Figure 4). The conservation measures in the recovery outline are intended to provide a greater degree of flexibility for management activities in secondary/peripheral areas as compared with the core areas. The focus of management is on providing a mosaic of forest structure to

support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area and maintaining landscape connectivity to allow for lynx movement and dispersal.

Lynx are generally associated with moist boreal forests with cold, snowy winters. The forest vegetation types consist of predominantly Engelmann spruce (*P.engelmanii*), subalpine fir (*A. lasiocarpa*) and lodgepole pine (*P. contorta*) (von Kienast 2003; Maletzke 2004; Koehler et al. 2008). Lynx avoid Douglas-fir, ponderosa pine forests, openings, recent burns, open canopy, and steep slopes (Koehler et al., 2008). In Washington, lynx are found above 1,250 meters (4,101 feet) (McKelvey et al., 2000; von Kienast, 2003; Maletzke, 2004). Lynx habitat includes dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multi-story stands with conifer boughs touching the snow surface (Interagency Lynx Biology Team, 2013). Lynx habitat is generally classified into foraging, denning and travel habitat. Lynx rely on a prey base that is primarily snowshoe hares. Foraging habitat consists of dense horizontal understory that provides food, cover and security from predators. Hares feed on conifers, deciduous trees, and shrubs (Hodges, 2000) and are often more dense in 20-year-old lodgepole pine stands with high tree and shrub densities (6,415 stems per acre) and a dense understory (Koehler, 1990). Lynx denning habitat consists of coarse woody debris, such as downed logs and windfalls, that provide security and thermal cover for lynx kittens (McCord and Cardoza, 1982; Koehler, 1990; Slough, 1999; Squires and Laurion, 2000).

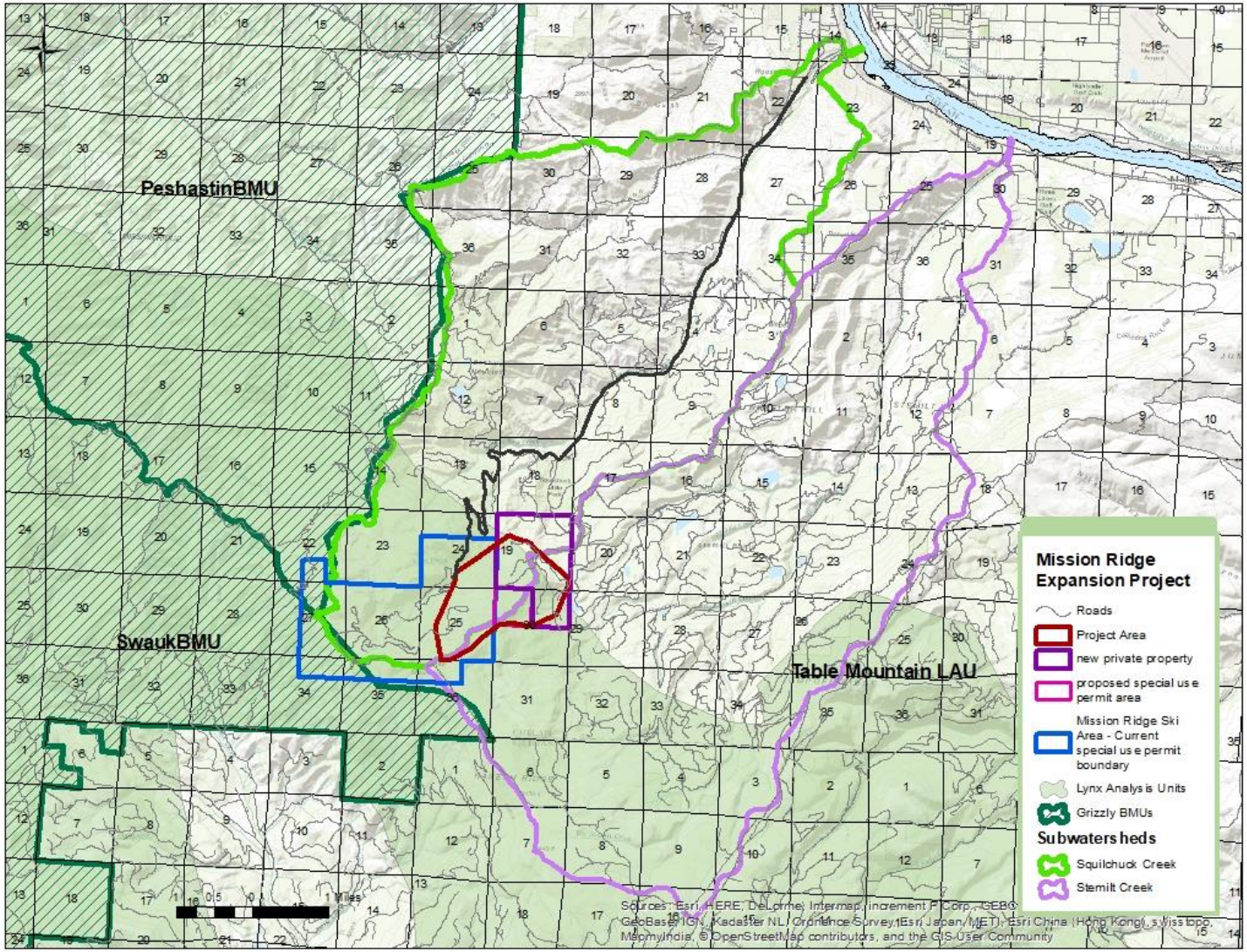
The boreal forest landscape is naturally dynamic. Forest stands within the landscape change as they undergo succession after natural or human-caused disturbances such as fire, insect epidemics, wind, ice, disease, and forest management (Elliot-Fisk, 1988; Agee 2000). Because wildfire, pathogens, wind, etc. lead to a naturally dynamic landscape within the boreal forest, lynx habitat is typically patchy. The boreal forest contains stands of differing ages and conditions, some of which are suitable as lynx foraging or denning habitat (or will become suitable in the future due to forest succession) and some of which serve as travel routes for lynx moving between foraging and denning habitat (McKelvey et al., 2000).

Lynx surveys following the national protocol (McDaniel et al., 2000) were conducted during the summers of 1998 to2003 on the Okanogan-Wenatchee National Forest, including the Wenatchee River Ranger District. Lynx presence has not been documented on the Wenatchee River Ranger District or the Project Area.

Direct and Indirect Effects

Portions of the Project Area occur within the Table Mountain LAU (Figure 4). The propose Project is not within a Washington State Lynx Management Zone. Mapped potential lynx habitat within the Project Area is classified as peripheral (unoccupied) (USFWS, 2005). Peripheral habitat areas are defined as follows: 1) Quality and quantity of habitat to support adequate snowshoe hare or lynx populations are questionable; 2) Habitat may occur in small patches and is not well-connected to larger patches of high quality habitat; and 3) May sustain short-term survival during lynx dispersal. Although LAUs are not required in peripheral habitat and there are no federal requirements to manage for lynx in unoccupied habitat, the Table Mountain LAU was delineated in the early 90's and is used for analysis purposes. The effects on lynx prey (snowshoe hare) habitat is still considered within unoccupied lynx habitat. A large percentage of vegetation in the Project Area is made up of non-prey habitat and consists of more mature, heavily stocked, decadent stands of Douglas-fir and lodgepole pine with little understory, open conifer stands or talus slopes.

Figure 4. Location of grizzly bear management units, lynx analysis units and roads in the vicinity of the Mission Ridge Proposed Expansion Project. Road data was obtained from DNR and is approximate.



The proposed project has the potential to affect the Canada lynx indirectly by altering prey habitat, primarily snowshoe hare, or directly through disturbance. However, the potential for lynx to be disturbed by project activities is very unlikely due to the lack of known lynx anywhere near the Project Area. In summary, implementation of the proposed Project may affect but is not likely to adversely affect the Canada lynx. The Project Area is on the edge of the range of Canada lynx within designated peripheral habitat. Although habitat conditions may be suitable in patches, lynx are highly unlikely to use the Project Area due to the fragmented and isolated nature of the habitat.

Grizzly Bear *(Ursus arctos)* – Threatened

The grizzly bear is listed as a Threatened species, with a determination of warranted for endangered status in the North Cascades (USFWS, 1975, 1998). Although grizzly bears once occurred throughout the North Cascades, their population has declined due to intensive historical trapping, hunting, predator control, and habitat loss (USFWS, 1997, 2011). The North Cascades Grizzly Bear Recovery Zone (NCGBRZ) was designated in 1997 (USFWS, 1997) and includes portions of the Okanogan-Wenatchee National Forest. The Project Area straddles the Recovery Zone boundary with the federal portion within the Recovery Zone and the private parcel adjacent but outside of the Recovery Zone. Although part of the Project Area is within the Recovery Zone, the entire Project Area is located outside of any Bear Management Unit (BMU) (Figure 4). The Project Area is 1.5 miles east of the Peshastin BMU and 1.5 miles north of the Swauk BMU. Core area for grizzly is defined as areas that are greater than 500 meters from an open road, motorized trail or high-use trail (IGBC, 1998) and is one metric to assess potential impacts to grizzly bears. However, because the project occurs outside of the recovery zone and any BMU, core was not evaluated.

A key component of grizzly bear management is sanitation planning. Careful planning and implementation of appropriate sanitation measures can reduce potential for wildlife-human conflicts and not only benefits bears but other wildlife species as well. The Applicant plans to include wildlife resistant sanitation measures in design plans for Resort operations and CCRs.

Direct and Indirect Effects

The addition of 4.8 miles of road would have no effect on core habitat for grizzly bears because implementation would occur outside of a BMU. Although the Project Area is located outside of grizzly BMUs, and is on the fringe of grizzly bear range in the North Cascades, the site is near BMUs and may provide potential habitat. The proposed Project will result in an increase in human activity in the area. Because grizzly bears are wide-ranging, disturbance could occur during project activities from noise. The likelihood of this is very small though due to the extremely low numbers of grizzly bears in the North Cascades, the long-term presence of human activities in the area, and the Project Area occurring outside areas deemed important for grizzly bear recovery. Project implementation may affect but is not likely to adversely affect grizzly bear.

If grizzly bear use is discovered at any time in the Project Area, conservation measures would be implemented to reduce potential affects to discountable levels. Conservation measures for the specific situation would be designed in cooperation with the USFWS and the WDFW, and could include an area closure.

Northern Spotted Owl (*Strix occidentalis caurina*) – Threatened

The spotted owl was federally listed as threatened on June 26, 1990 (USFWS, 1990). A revised recovery plan was signed on June 28, 2011 (USFWS, 2011). The spotted owl was listed within Washington in 1988 and is considered a state endangered species. WDFW completed a Periodic Status Review of the spotted owl in February 2016 (Buchanan, 2016) with a determination that in the absence of management

that effectively addresses competitive interactions with barred owls it is likely the spotted owl could become functionally extirpated in Washington in the near-term future and should maintain the endangered designation.

Despite over 25 years of federal protection, spotted owl populations have declined due to continued widespread habitat loss across the species range resulting from timber harvest and wildfire, and more recently due to competition from the barred owl (Livezey and Fleming, 2007; USDI Fish & Wildlife Service, 2011). For the Eastern Washington Cascades physiographic province, ongoing loss of habitat to wildfire and the effects of fire exclusion on vegetation were ranked as the greatest current threats (USDI Fish & Wildlife Service, 2011).

Management of spotted owl habitat focuses on suitable nesting, roosting, and foraging habitat and dispersal habitat types. A general definition of nesting and roosting habitat includes multi-layered, multi-species forests with closed-canopies (60 to 90 percent), with a component of Douglas-fir, and some old forest structural attributes (eg; large trees (greater than 30 inches DBH), Class IV snags) (Buchanan et al., 1993). Suitable nesting and roosting habitat was defined as having greater than 60 percent canopy closure for this project (USDI Fish and Wildlife, 1990; USFWS, 2011). Most nests occur in mistletoe platforms and/or abandoned goshawk nests in Douglas-fir (Buchanan, 1991; Sovern et al., 2011). Nesting habitat is generally below 5,000 feet in elevation (USFS, 2000). Nesting and roosting habitat are considered very similar (USFWS, 2011) although a decrease in the size and cover of overstory trees is associated with diminished habitat suitability (WAC 222-16-085). Foraging habitat may be similar to nesting and roosting habitat but not to the extent that may support successfully nesting owl pairs. Foraging habitat provides a mix of dry and mesic forest types that provide habitat for spotted owl prey species such as the northern flying squirrel, bushy-tailed woodrat, deer mouse, and voles (Richards, 1989; Forsman et al., 2001; Lehmkuhl et al., 2006a, b).

Spotted owls begin nesting activities in early March with juvenile dispersal from natal areas in August and September. Site specific monitoring has shown that within the Eastern Washington Cascades Province, after July 31, spotted owl young are mobile and generally considered to be able to move from disturbance. Dispersal habitat has been used to define the conditions necessary for spotted owls to move between patches of nesting, roosting and foraging habitats. Dispersal habitat does not contain the structural attributes, such as high canopy closure, and presence of large trees, and snags, associated with nesting and roosting habitats. In general, dispersal habitat is composed of single or multi-layered forests with moderate sized trees (10 to15 inches DBH), and canopy closure greater than 40 percent. Little research has been conducted to quantitatively define dispersal habitat for spotted owls. In general, nesting and roosting habitat provides all or most of spotted owl's habitat requirements, whereas foraging and dispersal habitats provide only a subset of the habitat requirements (USFWS, 2011).

The Project Area does not fall within designated spotted owl critical habitat or spotted owl emphasis areas. Designated spotted owl critical habitat is located two miles northwest of the Project Area. WDNR has designated spotted owl special emphasis areas (SOSEA) to provide for demographic and/or dispersal support as necessary to complement the northern spotted owl protection strategies on federal land within or adjacent to the SOSEA (Washington State's Forest Practices Rules, 222-16-086). The Project Area is approximately six miles southwest of the nearest SOSEA.

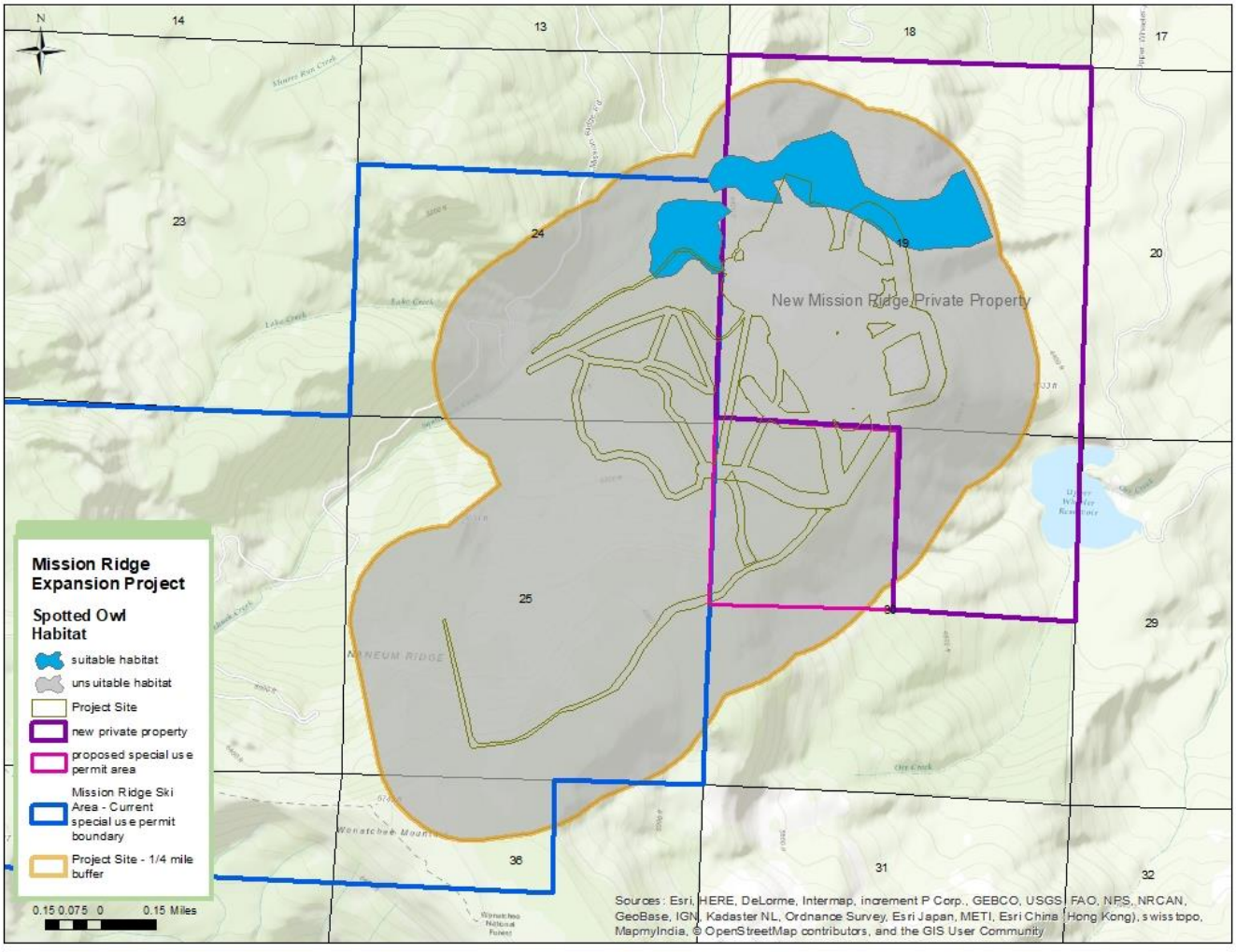
Habitat Conditions Assessment

Because spotted owl habitat had not been previously mapped in fine-scale detail in the Project Area we conducted a photo-interpretation and field verification to identify areas with suitable spotted owl habitat conditions. The habitat definition we used (USFS, 2012) is comparable to the habitat definition in WAC 222-16-085. We delineated habitat within one quarter mile of the Project Site to assess for potential habitat removal or disturbance.

We photo-interpreted vegetation polygons and attributed each polygon with detailed estimates of key spotted owl habitat components. These habitat components included: tree species, tree size classes, canopy cover, number of canopy layers, and presence of snags. From these data we derived a habitat map that was then taken to the field to validate the habitat mapping delineations. We then adjusted the habitat map based on our field verification to develop a final suitable spotted owl habitat map (Figure 5).

Because this map provides fine-scale habitat details, it was used to assess potential project impacts to spotted owl habitat in lieu of broader-scale habitat mapping done for regional spotted owl habitat mapping (Davis et al., 2016).

Figure 5. Northern spotted owl suitable habitat within the vicinity of the Mission Ridge Proposed Expansion Project.



Stands within the Project Area primarily consist of even aged, single story trees. The necessary large and old tree component and multi-layer canopy is often missing and there is little mistletoe that could support a nest, likely due to the younger age of the trees and preponderance of lodgepole pine. Based on our

habitat mapping, approximately 85 acres within a quarter mile area around the Project Site would qualify as suitable spotted owl habitat (Table 7, Figure 5). These stands are all under 50 percent overstory canopy and do not have many large trees or mistletoe so would be considered moderate to low quality suitable habitat. These stands are most likely used for dispersal and do not have the characteristics of nesting or roosting habitat, although they may provide foraging opportunities. Of those 85 acres, approximately eight acres may be impacted by project implementation and vegetation removal which could result in a degrade of habitat. Changes to the habitat quality of the stand would not result in a downgrade of the habitat classification.

We obtained historical spotted owl data from WDFW (October 2017) that indicated a single owl (unknown status) was located approximately 0.4 miles north of the Project Area in 1996, and a single resident owl was located approximately 0.6 miles to the southeast in 1998. Aerial imagery indicates the latter location has been heavily harvested since then. Surveys were conducted throughout the area from the late 1980s through 2006, and no spotted owls were detected on Forest Service land within 1.8 miles of the Project Area at that time. The closest spotted owl on Federal land was located 3.5 miles to the northwest in 1997. Surveys for northern spotted owls were not conducted in the area for the Mission Ridge Proposed Expansion because of poor habitat quality.

Table 7. Spotted owl habitat within the Mission Ridge Proposed Expansion Project.

	Potential for Disturbance (Within 0.25 mile of Project Site)			**Potential for Vegetation Removal** (Within Project Site Boundary)		
Habitat Type	acres (proportion)			acres (proportion)		
Landowner	Private	Federal	WDFW/ WADNR	Private	Federal	WDFW/ WADNR
Suitable	62	23	0	7	1	0
Unsuitable	420	450	559	148	58	18

Direct and Indirect Effects

The likelihood of resident, territorial spotted owls being present in the Project Area is extremely low. Although there are some small patches of forest along the northern boundary of the project that may be classified as lower quality suitable spotted owl habitat, there is generally an insufficient amount of suitable habitat in this landscape to support resident, territorial pairs. Spotted owls occupy large territories that encompass thousands of acres of suitable habitat. Although Forest Practice Rules require a minimum of 2,605 acres of suitable habitat within a home range (or 40 percent of the home range), Forsman et al. (2015) found home ranges consisted of much more suitable habitat (62 percent of home range). The small, fragmented patches of habitat, juxtaposed with larger areas of unsuitable habitat, at this elevation currently only function as dispersal habitat for transient spotted owls dispersing across the landscape, with limited foraging opportunities. Although dispersal habitat is important to spotted owls to provide habitat connectivity, the Project Area is located along the fringe of spotted owl range and at an elevation that is generally not occupied by owls. Implementation of the proposed Project will not change the function of suitable habitat and will not reduce the capacity of this landscape to support dispersing spotted owls.

Noise disturbance could affect owls during construction activities and increased human activity. The likelihood of disturbance would be small, and any impacts would be minor because suitable nesting habitat conditions do not occur within a 0.25 mile disturbance buffer of the project activities.

Based upon the available information and the evaluation of the direct and indirect effects, implementation of the Proposed Action "may affect, but is not likely to adversely affect" the northern spotted owl. This determination was made because approximately eight acres of potential habitat may be degraded. In addition, the potential for disturbance to nesting spotted owls from noise created above ambient conditions is low due to the lack of suitable nesting habitat conditions within a 0.25 mile disturbance buffer of project activities. Designated critical habitat for the northern spotted owl does not occur within the Project Area (USFWS 2012). Therefore, project implementation would have no effect on spotted owl critical habitat.

WDFW Priority Species with potential for occurrence

The Washington Department of Fish and Wildlife has identified fish, wildlife and habitat resources that are important for conservation through the Priority Habitats and Species (PHS) Program. We examined the PHS species list (WDFW, 2016b) for the Project Area to identify species and habitats that are likely to be in the vicinity. The following species were determined to have a high likelihood of occurrence in the Project Area: elk and mule deer, dusky and sooty grouse, western toad and northern goshawk.

Rocky Mountain Elk and Mule Deer

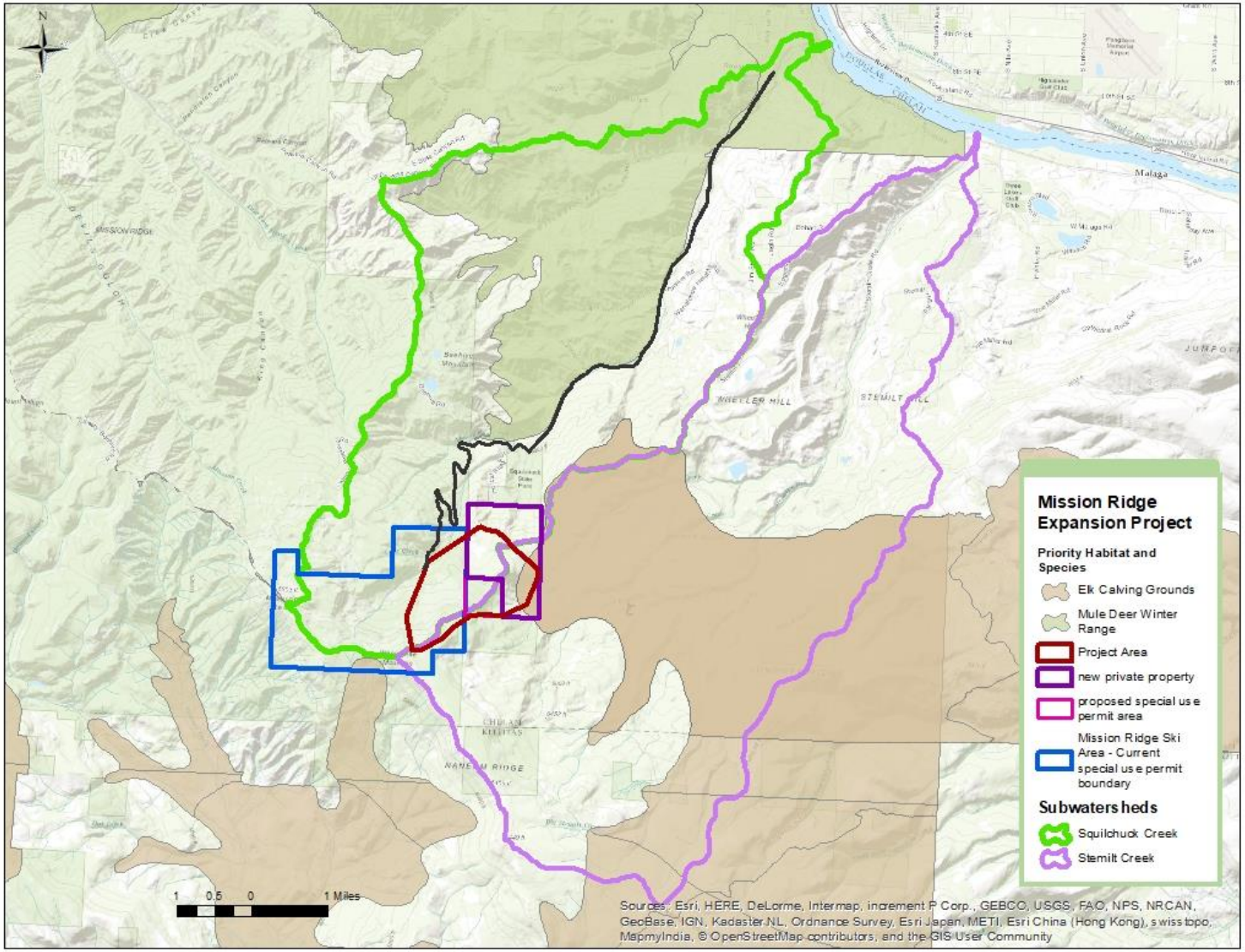
Rocky mountain elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus hemionus*) are considered priority species by WDFW and fall within the category of Species of Recreational, Commercial, and/or Tribal Importance. Priority areas include calving and fawning areas, migration corridors and winter range. Both elk and deer are classified as game animals (WAC 232-12-007) in Washington.

Mule deer are abundant in the East Cascades. Mule deer use a mosaic of habitat types that provide cover and forage in lower elevation winter ranges and higher elevation summer ranges. Habitat quality in these summer and winter ranges has a great effect on potential mule deer abundance and recruitment. The majority of summer range in the East Slope Cascades Mule Deer Management Zone is managed by the Okanogan-Wenatchee National Forest and WDNR, and high elevation summer range is readily available (WDFW, 2016). Mule deer populations in north-central and eastern Washington are stable to increasing (WDFW, 2014). Unlike elk, mule deer fawning is much more closely associated with riparian areas and often occurs where there is protective cover in the form of dense shrubs or forest that offer access to both water and abundant forage (NRCS, 2005). Fawns are born May through July, peaking in mid-June in the eastern Cascades (WDFW, 2016).

Similar to mule deer, elk are found in a wide variety of habitats, using alpine and mixed forest types for cover and more open areas that provide foraging habitat. Calving areas are not particularly different from general habitat. The calving season in Washington is from mid-May to mid-July (W. Meyers, pers. comm. 2002). Both elk and deer migrate to lower elevations in winter.

Elk and mule deer are common in the Stemilt and Squilchuck subwatersheds. The Project Area provides summer range for mule deer and elk in the Colockum Elk Herd. The WDFW Elk Management Plan Herd Population Objective for the Colockum elk herd is 4,050 to 4,950 and the herd is estimated at 6,018 individuals (WDFW 2014). Although the Colockum herd currently exceeds population objectives, WDFW has identified available habitat, hunting, and lethal removals related to resolving agricultural damage as limiting factors (WDFW, 2014). WDFW has set priorities for the Colockum herd around habitat conservation, habitat enhancement, resolving wildlife damage conflicts, and bull escapement. Fawning and calving habitat is present in the Project Area, typically in areas with little disturbance and heavy cover, such as riparian vegetation away from more heavily travelled roads. It is unlikely that the Project Area provides spring and fall migration habitat. The Project Area is not considered winter range for deer or elk. The closest winter range identified by the Okanogan-Wenatchee National Forest is over

Figure 6. Proximity of Mission Ridge Proposed Expansion Project relative to Rocky Mountain elk and mule deer winter range and calving areas as mapped by the Okanogan-Wenatchee National Forest and WDFW Priority Habitat and Species.



3.5 miles northwest of the Project Area. Mule deer winter range has been mapped just over two miles north of the Project Area in the Squilchuck Watershed (Figure 6).

Potential Impacts

There is a great deal of information on the effects of human activity, particularly roads and recreation, on ungulates (see Gaines et al., 2003 for review). Effects to elk vary from displacement due to human activity on hiking and ski trails, (Schultz and Bailey, 1978; Ferguson and Keith, 1982; Cassier et al., 1992) as well as roads (Johnson et al., 2000), to elevated levels of stress hormones (Creel et al., 2002, Millspaugh et al., 2001). Elk reproductive success has been shown to decrease following human disturbance to calving areas (Phillips and Alldredge, 2000). However, all disturbances are not created equal. Motorized vehicles, including ATVs, are more disruptive than hiking and mountain biking (Naylor et al., 2009) and road density has been implicated in increased hunting mortality (Hayes et al., 2002).

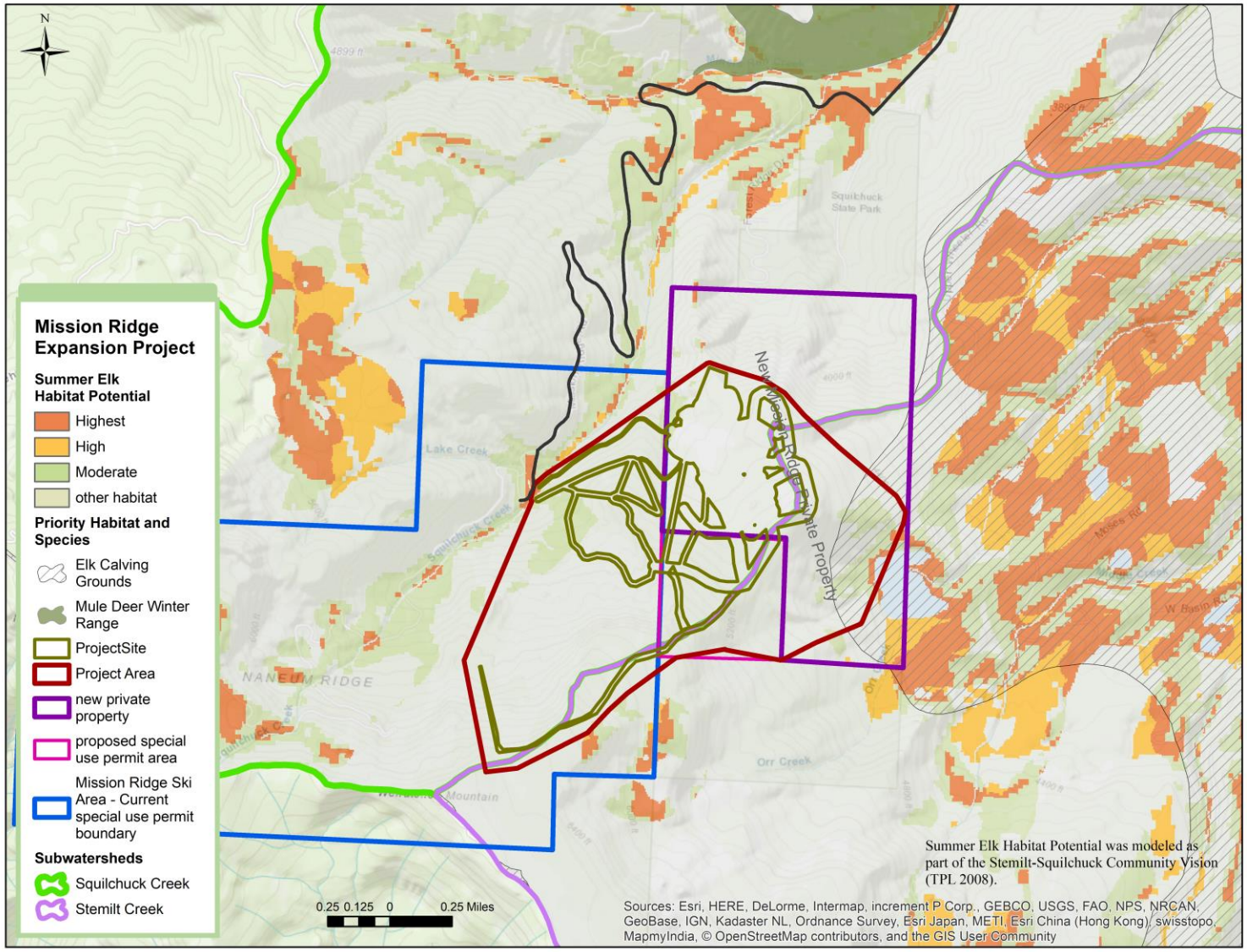
Because of the impact of human access on elk, assessing habitat effectiveness for summer elk range is a useful index to examine potential effects. Similar to gray wolves and grizzly bears, the addition of 4.8 miles of road to this landscape will have a negligible effect on the local mule deer and elk populations as road density within the subwatersheds would increase by less than 0.2 mi/mi^2. The area currently has road access from the east and is frequented by recreationists on motorized vehicles.

Human development has been shown to have mixed effects on elk. Morrison et al. (1995) found ski area development reduced elk use in specific areas. However, elk use increased following completion. Ciuti et al. (2012) found effects of human disturbance on elk behavior exceeded those of habitat and natural predators. In a human dominated landscape elk displayed increased vigilance and decreased foraging. However, they also discovered that it is not just the number of people but also the type of human activity that influences elk behavior (e.g. hiking vs. hunting). The greatest influence was recorded on public lands where hunting and motorized recreational activities were cumulative as compared to the national park in summer, where influence was less.

Potential summer elk habitat has been mapped for the Stemilt-Squilchuck subwatersheds as part of the Stemilt-Squilchuck Community Vision (Figure 7; TPL, 2008). Summer elk habitat was mapped based on proximity to water and food supply, slope and tree cover. Within the Project Area, 90 percent of the area is classified as “other habitats”, nine percent is classified as “moderate potential” and approximately one percent is classified as “high/highest potential” (Figure 7). Project implementation has potential to modify some summer habitat. Habitat removal may occur through construction of roads and infrastructure. Habitat loss may be mitigated however through creation of new foraging habitat within new ski runs. There could be an increase in noxious weeds as a result of construction activities. Weeds could compete with forage species, lowering forage habitat quality. Project activities would follow design criteria and mitigation measures for prevention of invasive weed spread, minimizing any effects.

A small area in the southeast portion of Section 19 and northeast corner of Section 30 is considered part of the Colockum Elk Calving Area – a priority habitat and species designation (Figure 6). Approximately 70 acres of the Calving Area would be within the Project Area. This area will not be part of proposed resort development but may be considered for Nordic skiing and summer activities such as hiking and mountain biking. As such habitat is this area will not be modified, but human activities in the area may necessitate seasonal restrictions to protect calving. Nordic skiing would generally be done by the time elk calving takes place, however, seasonal restrictions on summer hiking or biking on these trails may be necessary. In order to avoid disturbances and impacts to elk and deer during calving and fawning season the Applicant will coordinate with WDFW to incorporate best management practices, including seasonal trail restrictions.

Figure 7. Potential summer habitat for Rocky Mountain elk in the vicinity of the Mission Ridge Proposed Expansion Project (TPL, 2008).



The Project Area overlays a small portion of the Colockum Elk Herd and East Slope Cascade Mule Deer ranges. Although project implementation has the potential to displace these ungulate species and slightly decrease available habitat, increased forage availability in new ski runs may offset habitat loss and conservation measures to limit impacts to calving will protect elk during an important time period. Although project implementation may temporarily displace ungulates from parts of the Project Area, it is unlikely to have population level effects.

Western toad, Dusky and Sooty grouse, and northern goshawk

The western toad is a medium to large sized toad that is found throughout Washington. Although local populations may be healthy, populations across the range have declined precipitously. Western Toads occur in a variety of terrestrial habitats including prairies, forests, canyon grasslands and ponderosa pine-Oregon Oak habitat. They appear absent from most of the shrub steppe and steppe zones with the exception of the canyon grasslands in southeast Washington. Adult toads are primarily terrestrial, but often occur near permanent water bodies, especially in drier climates and during breeding (Hallock and McAllister, 2005). Riparian habitats will be protected by buffers and effects to toads should be minimal.

Dusky grouse and sooty grouse (previously known as blue grouse) are found in mountainous areas with open coniferous forests. The grouse in the Project Area are most likely Dusky grouse or a hybrid of the two subspecies (Schroeder 2006), and have been observed on the site. They are closely associated with true fir (*Abies* spp.) and Douglas fir (*Pseudotsuga menziesii*) forests that provide streams, springs and meadows. Nesting habitat covers a range of types and includes shrub-steppe, mountain shrub, open coniferous forest, clearcuts, old growth forest, and alpine tundra (Schroeder 2006). There is quite a bit of this habitat available within the Project Area, only a portion of which will be impacted. Effects to grouse populations would be minimal.

Northern goshawk are generally associated with forested areas with a large and old tree component. Northern goshawk select for mature conifer forests for nesting (USFS, 2012). We mapped approximately 110 acres of potential northern goshawk habitat within the Project Area, with less than one acre located on the private parcel. This habitat is considered lower quality because it does not provide the large and old forest structure northern goshawk use for nesting. Goshawk surveys were conducted within the Mission Ridge Ski Area in the late 1990's and no goshawk were located. Project implementation may result in limited habitat impacts on approximately 13 acres of lower quality habitat for construction of access roads and ski runs. The Project Area has very little old forest structure and impacts to lower quality goshawk habitat would not negatively impact goshawk populations.

PHS Species with low potential for occurrence

Of the list of potential wildlife species, several species were identified with a low likelihood of occurrence in the Project Area. These species included: Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed woodpecker, American marten, roosting concentrations of bat species, Cascade red fox, white-tailed jackrabbit and wolverine.

The Columbia spotted frog is associated with riparian habitat along permanent bodies of water and wetlands. Columbia spotted frogs are generally located in habitats from 520 to 950 meters (Leonard et al., 1993). Although it is possible that the Columbia spotted frog may occur within the riparian habitat along the perennial creeks and in the depressional wetlands when they hold water,

the Project Area is likely too high in elevation. They are *not* likely to be residents of the wetland habitat due to the ephemeral nature of the wetlands.

The golden eagle is associated with dry, open canopy plateaus with deep canyons, shrub steppe and grassland communities and transition zones between shrub, grassland and forested habitat. Nests generally are located on cliffs and occasionally in trees. Foraging habitat consist of shrub-steppe and grassland communities (Watson and Whalen, 2003). Golden eagle nesting and foraging habitats are very limited and are found only in an isolated patch in the north-east portion of the Project Area. The majority of the Project Area is located above the transition zone from shrub/grasslands to forest.

Flammulated owls and pileated woodpeckers are generally found in mountainous, mature, older forests with large snags and fallen trees at low to mid-elevations (Hays and Rodrick, 2003; Lewis and Azerrad, 2003). American marten also select for undisturbed mature coniferous or mixed forest, with snags/stumps and dead or live trees or stumps and coarse woody debris that provides subnivean sites in winter (Halfpenny et al., 1995). A large part of the Project Area on the private parcel was harvested and is now composed of single-age stands of trees less than 100 years old. Large and old trees and snags were largely removed during harvest operations.

White-headed woodpecker is found in areas with open canopy (i.e. less than 40 percent closed canopy) pine and fir forests with large decayed snags used for nesting and foraging (Garret et al., 1996; Gaines et al. 2017). Habitat in the majority of the Project Area is too dense for white-headed woodpecker, with overstory canopy cover of ponderosa pine forested areas greater than 25 percent and total canopy covers of 65 to 75 percent. Additionally, large and old trees and snags important for nesting and foraging habitat are lacking.

Roosting concentrations of Big-brown Bat, Myotis bats, Pallid Bat, or Townsend's Big-eared Bat may possibly be located in large trees, or within cliff like habitat (Hayes and Wiles, 2013), although both habitat types are limited within the Project Area. Bat roosts are often located within human created structures such as old barns and buildings, however, there are no structures currently on the site.

The known range of the Cascade Red Fox is restricted to the upper mountain forest, subalpine parkland, and alpine meadows of the Cascade Range, primarily in Mount Rainier National Park. The park provides excellent habitat for the fox and ample prey such as pocket gopher, snowshoe hare, songbirds, and huckleberries (Akins, 2017). Aubry (1984) indicated that they may also occupy the open forests on the eastern slope of the Cascades. As such, we have included the species here because data is lacking to determine extent of their range. Habitat for Cascade red fox may be available in the southern part of Section 19 and into current ski area although use is highly unlikely given current distribution and unlikely presence.

Wolverines are wide-ranging and can wander through a wide variety of habitat. They are primarily associated with alpine and subalpine habitats. Ongoing research projects and recent carnivore surveys have detected wolverines in the North Cascades of Washington. Wolverines did not historically occur on the Olympic Peninsula or in southwest Washington (WDFW, 2013). Although the Project Area is approximately one mile north of the closest habitat (within the existing ski area), it is approximately 20 miles east of the nearest wolverine observations from the past few years, so it's highly unlikely they would visit the area. The Project Area quickly transitions out of subalpine habitat types to lower elevation habitat types.

Because of the low probability of occurrence in the Project Area, there will be no effect to Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed

woodpecker, American marten, roosting concentrations of bat species, Cascade red fox and wolverine.

Land birds (Including Neotropical Migratory Birds)

In January 2001, President Clinton issued an executive order on migratory birds directing federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. The U.S. Fish and Wildlife Service released the "Birds of Conservation Concern" (USFWS, 2008) which lists those species the USFWS feels are in greatest need of conservation action at different geographic scales. It does not include conservation measures. The Project Area is located within the Pacific Flyway and Bird Conservation Region 9 – Great Basin. Of the 28 species listed for the Great Basin, only the golden eagle and calliope hummingbird potentially occur in the Project Area. White-headed woodpecker and peregrine falcon are also on the list, but nesting habitat associations limit the likelihood of resident populations. Golden eagle nesting habitat would be limited as well. No raptor nest sites have been located within the Project Area. The calliope hummingbird is fairly common but vulnerable to habitat loss. Habitat loss as a result of this project would not likely impact these bird species at a population level. The remaining species prefer more open grasslands and pine forests, mudflats, large marsh, large hardwood riparian, or waterfall habitat and do not have habitat within the Project Area, so there would be no effect to them from project activities.

WDFW Priority Habitats and Features

Wetlands

Wetlands are important landscape features that provide habitat for many plants and animals such as water lilies, sedges, amphibians and reptiles, as well as waterfowl, migrating birds, fish, and mammals (EPA, 2004). Wetlands function to absorb floodwaters, nutrients, sediments and pollutants before they reach other waterbodies. They also provide recreational opportunities for outdoor enthusiasts.

The two previously unmapped wetlands were assessed and delineated within the Project Area by qualified professional wetland biologists. It was determined that the wetlands fit the Class III category. Category III wetlands are wetlands with a moderate level of functions and can often be adequately replaced with a well-planned mitigation project (Hruby, 2014). The wetlands are within the Project Site and will be impacted. Per Chelan County Code (11.80.070) the Applicant will coordinate with Chelan County, WDFW and Washington Department of Ecology (11.80.110) to mitigate impacts to wetland habitats and species.

Aspen

Aspen is the most widely distributed native North American tree species (NRCS, 2017). Aspen provide habitat for a wide variety of wildlife, including hare, moose, black bear, elk, deer, grouse, migratory birds, and a variety of smaller animals. Aspen stands greater than one acre are considered priority habitats by WDFW. A small aspen stand (less than one acre) with scattered trees was identified within the Project Area. The stand does not meet the definition of a priority habitat but still provides a unique habitat feature on this landscape. The Applicant has proposed to minimize impacts to the aspen stand through site design.

Talus

Talus habitat is the accumulation of broken rocks and scree, often at the base of cliffs. Talus habitat is usually open with little vegetation cover (less than 10 percent). Talus has been shown to be habitat for larch mountain and Van Dyke's salamanders as well as the American pika (*Ochotona princeps*). The Project Area contains a substantial amount of talus, as does the

adjoining Mission Ridge Ski Area. More than 250 acres within the Project Area are open, rolling, talus fields with little vegetation, just over 40 acres of which are on the private parcel. Approximately 30 acres of talus will potentially be impacted within the Project Site. The level of impact will vary, from designation as a new ski run with no changes to the talus, to ground disturbance and talus redistribution as part of resort development. The Project Area is outside of the range of both larch mountain and Van Dyke's salamanders. The Project Area is on the margin of pika range and is likely too low in elevation for pika. As such talus habitat is not limited in this area and wildlife species associated with talus will not be affected.

Snags and Logs

Snags are standing dead trees that provide important habitat for numerous cavity nesting birds, such as woodpeckers and nuthatches, and mammals, such as squirrels and bears (Brown, 2002). Logs arise from fallen trees, large branches and snags. Log habitat, also referred to as downed wood or coarse woody debris, often serves a function similar to snags and provides nesting, denning, foraging habitat, hiding cover and shelter from inclement weather for a plethora of species. Snag habitat is limited on the site, particularly large snags, as a result of past timber harvest. The Applicant will incorporate design standards to limit large snag removal where it is safe to do so. Significant wind events have created a substantial amount of downed wood in portions of the Project Area and log habitat is not limited. Much of the log habitat is located in the southwest corner of Section 19 and will not be impacted by development.

Design Criteria and Mitigation Measures for Wildlife Species

Open Space

The project design includes open space areas adjacent and intermingled within the site plan. The proposed open space covers a total of 363 acres and consists of a mix of classifications, including: ski runs (41 ac), undesignated open space (49 ac), natural open space (258 ac), and managed open space (15 ac). Open space lands shall be preserved and managed to buffer native environments from intensive development or activities; to retain native plant communities; and, for developed areas, to provide an aesthetically pleasing landscape, provide habitat connections, and minimize risk of fire (Chelan County Code Chapter 11.89.060). Ski runs will be maintained for winter skiing. Maintenance may include removal of trees and some shrubs. Ski runs create openings in the forest that can function as foraging habitat for a number of species, including elk and deer, and can act as fuel breaks within the contiguous canopy. Undesignated open space connects the natural open space to the ski runs and provides a buffer between the developed space and the natural open space. The area within the natural open space designation is adjacent to the proposed development site to the north, east and south. This is the largest open space designation and consists of a variety of habitat types and terrain. Natural open space will be retained predominantly for its wildlife habitat and recreational opportunities compatible with wildlife objectives. The natural open space will not be actively managed or maintained other than potentially to minimize risk of fire. Managed open space would be interspersed among the residential and business development and includes maintained landscaped areas. This open space will likely provide habitat for those species with a high tolerance for human activity and will provide a park-like setting within the development area.

Additional mitigation measures and design criteria were developed to address potential impacts of the proposed action.

1. Protect all known listed Threatened, Endangered, and Sensitive species sites, and those discovered prior to or during implementation of project activities. Modify implementation activities, if protective measures prove inadequate, listed species are discovered, or new species are listed that could be affected.

2. If an active wolf den or rendezvous site is discovered in the vicinity of the project, modify activities to avoid disturbance while being used during the breeding season.
3. In order to avoid disturbances and impacts to elk and deer during calving and fawning season the Applicant will coordinate with WDFW to incorporate best management practices.
4. Applicant will coordinate with Chelan County Natural Resources and Washington State Department of Ecology to mitigate for impacts to Category III wetlands identified on the private parcel (Section 19) per guidance in "Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1)" (WADOE et al. 2006).
5. Because old growth and mature forests are extremely limited in this area, Applicant will leave trees and snags greater than 21 inches DBH whenever possible.
6. Applicant will incorporate sanitation measures to reduce potential for wildlife-human conflicts during construction and as part of community operations.

8. Plant Species and Habitat

This section of the Resources Report provides a summary of plant species and habitat, including federal and state listed species and associated habitats, that may be found in the vicinity of the Mission Ridge Proposed Expansion Project Area (Figure 1 and Figure 2).

Review of Existing Information

We consulted a combination of available species lists and spatial data sets to identify potential plant species and habitat areas of concern occurring in the Project Area vicinity.

The following provides an example of the types of sources that were included in the review:

- Washington Natural Heritage database. 2017. Ecoregions and Ecological Systems. Available at: https://www.dnr.wa.gov/NHPdata.
- US Environmental Protection Agency (EPA). Level III and IV Ecoregions of the Continental United States. Available at: https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states
- Review of Endemic Plants of the Wenatchee Mountains and Adjacent Areas September 10, 2012 E2 Segment 67 Prepared for The U.S. Fish and Wildlife Service Western Washington Fish and Wildlife Office Through Section 6 funding, Region 1 by Joseph Arnett Washington Natural Heritage Program Washington Department of Natural Resources PO Box 47014 Olympia, WA 98504-7014
- Washington Natural Heritage Program (WNHP) rare plant and nonvascular species and plant communities dataset. Features represent current element occurrences. Accessed July 19, 2017. Available at: https://www.dnr.wa.gov/NHPdata.
- US Fish and Wildlife Service. 2017. Listed plants database. Available at: https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=WA&status=listed
- Washington Department of Fish and Wildlife (WDFW). 2017. Wildlife Priority Habitats and Species (PHS), GIS data set. Available at: http://wdfw.wa.gov/mapping/phs/.
- Washington Department of Fish and Wildlife (WDFW). 2016. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.
- US Forest Service Sensitive Species (R6 ISSSSP). Available at: https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/

Special Status plant species and habitats in Project Area

We narrowed down available data to a list of those species that occur or potentially occur in the vicinity of the Project Area (Table 8). Species that are currently on or under consideration for the ESA or state endangered, threatened, or species of concern lists are identified. Review of the current Natural Heritage database and current Forest Service records indicated that there are *no* federally or state listed, or proposed for listing, endangered, or threatened plant species in the Project Area. There is also no listed critical habitat for any endangered or threatened plant species in the Project Area. We assessed the rare plant list for Chelan County to identify those species that might occur within the Project Area and suggest rare/sensitive plant species. According to habitat associations and topography we have identified a subset of plant species that may be present in the Project Area. Observations were recorded for Wenatchee larkspur *(Delphinium viridescens)* in 1996 and pasqueflower (*Anemone patens var. multifida*) in 2004, approximately three miles to the west and southwest of the Project Area.

We acknowledge the WNHP data set represents an ongoing and incomplete inventory of the state and does not eliminate the need for field surveys. Additionally, the US Forest Service requires

analysis of potential impacts to Sensitive Species (R6 ISSSSP). As such, surveys will be conducted for listed and sensitive species where potential habitat is identified on Forest Service and private lands as part of the NEPA/SEPA process. Surveys for these sensitive plant species will be conducted in coordination with the Wenatchee River Ranger District botanist and WNHP. If any listed species are found during project activities, a District botanist would be notified and appropriate mitigation measures taken.

Table 8. Plant species that potentially occur in the vicinity of the Project Area.

Scientific Name	**Common Name**	**State Status**	**Federal Status***
Species with high probability of occurrence**			
Anemone patens var. multifida	pasqueflower	Threatened	none
Carex proposita	Smoky Mountain sedge	Threatened	Sensitive
Pellaea breweri	Brewer's cliffbrake	Sensitive	Sensitive
Species with low probability of occurrence - riparian buffer protections in place to protect associated habitat			
Carex magellanica ssp. irrigua	poor sedge	Sensitive	Sensitive
Cicuta bulbifera	bulb-bearing water-hemlock	Sensitive	Sensitive
Dermatocarpon meiophyllizum	silverskin lichen	Threatened	Sensitive
Peltigera hydrothyria	hydrothyria lichen	Sensitive	Strategic
Potentilla glaucophylla var. perdissecta	diverse-leaved cinquefoil	Sensitive	none
Salix pseudomonticola	false mountain willow	Sensitive	Sensitive
Salix tweedyi	Tweedy's willow	Sensitive	none
Scouleria marginata	marginate splashzone moss	Threatened	Sensitive
Swertia perennis	swertia	Sensitive	Sensitive
Species with unlikely occurrence but limited data suggests possible surveys			
Agoseris elata	tall agoseris	Sensitive	none
Alectoria nigricans	witch's hair lichen	Threatened	none
Chaenactis thompsonii	Thompson's chaenactis	Sensitive	Sensitive
Delphinium viridescens	Wenatchee larkspur	Threatened	Sensitive
Hackelia venusta	showy stickseed	Endangered	Endangered
Iliamna longisepala	longsepal globemallow	Sensitive	Sensitive
Saxifraga hyperborea	pygmy saxifrage	Sensitive	none
Saxifragopsis fragarioides	strawberry saxifrage	Threatened	Sensitive
Sidalcea oregana var. calva	Wenatchee Mountain checker-mallow	Endangered	Endangered
Silene seelyi	Seely's silene	Sensitive	Sensitive

*A federal sensitive status refers to US Forest Service Region 6.
**Due to limited data relative to species distribution, plant species are classified relative to the likelihood of occurrence and need to conduct field surveys to confirm.

Potential Impacts

The Project Site will require clearing for construction of roads and buildings and some vegetation modifications under chair lifts and in ski runs. Some vegetation management will also be implemented to address forest health and the potential for wildfire. Trees will be harvested within the Project Area on an as-needed basis for facilitating the next construction phase of the project.

The Applicant will coordinate with WDNR to harvest trees on the private parcel in accordance with the Washington Forest Practices Act and will coordinate with the US Forest Service on tree removal within the US Forest Service parcel.

Invasive Species

The Applicant recognizes the importance of managing for invasive species. As such, Applicant will develop a plan to insure invasive species are not brought into the site on construction equipment, and all disturbed sites will be promptly reseeded and/or replanted to deter invasive species. If critical or otherwise valuable habitat and plant species are identified during construction, Applicant will adjust plans to protect or replace those areas.

Design Criteria and Mitigation Measures for Plant Species and Habitats

The following measures are proposed to preserve or enhance vegetation on the site:

1. Applicant proposes to minimize vegetation removal when possible.
2. Noxious weeds will be controlled within the Project Area.
3. Clean all heavy equipment (bulldozers, graders, backhoes, dump trucks, excavators, etc.) prior to entering National Forest System Lands. Inspect, remove, and properly dispose of weed seed and plant parts found by construction crews on their clothing and equipment on a daily basis.
4. Use only weed-free straw and mulch for all projects conducted or authorized by the Forest Service, on National Forest System Lands. If State certified straw and/or mulch is not available, use sources certified to be weed free using the North American Weed Free Forage Program standards or a similar certification process.
5. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists.
6. Use native plant materials as the first choice for re-vegetation, where timely natural regeneration of the native plant community is not likely to occur.

9. Literature Cited

Agee, J.K. 2000. Disturbance ecology of North American boreal forests and associated northern/mixed subalpine forests. Pages 39-82 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.

Akins, J. 2017. Conservation status of the Cascade red fox. Mount Rainier Science Brief. Mount Rainier National Park. Available at: https://www.nps.gov/articles/cascade-fox.htm. Accessed: 12 October 2017.

Aubry, K.A. 1984. The recent history and present distribution of the red fox in Washington. Northwest Science, 58(1):69-79.

Becker, S.A., T. Roussin, W. Jones, E. Krausz, S. Walker, S. Simek, D. Martorello, and A. Aoude. 2016. Washington Gray *Wolf Conservation and Management 2015 Annual Report.* Pages WA-1 to WA-24 in U.S. Fish and Wildlife Service Rocky Mountain Wolf Program 2015 Annual Report. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601.

Behnke, Robert J. 2002. Trout and Salmon of North America. The Free Press, New York.

Brown, T.K. 2002. Creating and Maintaining Wildlife, Insect, and Fish Habitat Structures in Dead Wood. *In* Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle Technical Coordinators. USDA Forest Service Gen. Tech. Rep. PSW-GTR-181. 2002. pp. 883-892.

Buchanan, J. B. 1991. Spotted owl nest site characteristics in mixed conifer forests of the eastern Cascade Mountains, Washington. M.S. Thesis, University of Washington, Seattle, WA. 76 pp.

Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1993. Characteristics of spotted owl nest trees in the Wenatchee National Forest. Journal of Raptor Research, 27(1):1-7.

Buchanan, J. B. 2016. Periodic status review for the Northern Spotted Owl in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 22 + iv pp.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NMFS- NWFSC-27. Available: http://www.nwfsc.noaa.gov/publications/techmemos/tm27/steelhead.pdf

Cassier, E.F., D.J. Freddy, and E.D. Ables. 1992. Elk responses to disturbance by cross country skiers in Yellowstone National Park. Wildlife Society Bulletin. 20(4): 375–381.

Ciuti S. J.M. Northrup, T.B. Munhly, S. Simi, M. Musiani, J.A. Pitt, and M.S. Boyce. 2012. Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear. PLoS ONE 7(11): e50611. doi:10.1371/journal.pone.0050611

Creel, S., J.E. Fox, A. Hardy, J. Sands, B. Garrott, and R.O. Peterson. 2002. Snowmobile activity and glucocorticoid stress responses in wolves and elk. Conservation Biology. 16(3): 809–814

Davis, R. J., B. Hollen, J. Hobson, JE Gower, and D. Keenum. 2016.Northwest Forest Plan—the first 20 years (1994–2013): status and trends of northern spotted owl populations and habitats. Gen. Tech. Rep. PNWGTR-929. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 54 p.

Elliot-Fisk, D.L. 1988. The boreal forest in Barbour, M.G. and W.D. Billings (eds.) North American terrestrial vegetation. Cambridge Univ. Press, Cambridge.

Ferguson, M.A.D. and L.B. Keith, L.B. 1982. Influence of Nordic skiing on distribution of moose and elk in Elk Island National Park, Alberta. Canadian Field-Naturalist. 96(1): 69–78.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research, 35(2): 141-150.

Forsman, E.D., Anthony, R.G., Dugger, K.M., Glenn, E.M., Franklin, A.B., White, G.C., Schwarz, C.J., Burnham, K.P., Anderson, D.R., Nichols, J.D., Hines, J.E., Lint, J.B., Davis, R.J., Ackers, S.H., Andrews, L.S., Biswell, B.L., Carlson, P.C., Diller, L.V., Gremel, S.A., Herter, D.R., Higley, J.M., Horn, R.B., Reid, J.A., Rockweit, J., Schaberl, J., Snetsinger, T.J., Sovern, S.G. 2011. Population demography of northern spotted owls. Studies in Avian Biology 40. Berkeley, CA: University of California Press. 106 p.

Forsman, E.D., Sovern, M. Taylor, and S.G. Biswell. 2015. Home range and habitat selection by northern spotted owls on the eastern slope of the Cascade Mountains, Washington. J. Raptor Res. 49(2):109-128.

Forest Practices Board (FPB). 2002. Forest Practices Board Manual Section 13 Determining Fish Use for the Purpose of Typing Water.

Frame, P.F., H.D. Cluff, and D.S. Hik. 2007. Response of wolves to experimental disturbance at homesites. Journal of Wildlife Management 71(2):316-320.

Fritts, S.H. 1992. Wolf recovery in the state of Washington. International Wolf (Winter):19-20.

Gaines, W.L., G.K. Neale, and R.H. Naney. 1995. Response of coyotes and gray wolves to simulated howling in Northcentral Washington. Northwest Science, 69(3):217-222.

Gaines, W.L., P. Singleton, and A.L. Gold. 2000. Conservation of rare carnivores in the North Cascades Ecosystem, western North America. Natural Areas Journal, 20:366-375.

Gaines, W.L, P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. General Technical Report, PNW-GTR-586. Portland, OR: Pacific Northwest Research Station, US Forest Service (USFS). 79 pp. Available online at http://www.fs.fed.us/pnw/pubs/gtr586.pdf (October 19, 2006).

Gaines, W.L., B.C. Wales, L.H. Suring, J.S. Begley, K. Mellen-McLean and S. Mohoric. 2017. Terrestrial species viability assessments for National Forests in northeastern Washington. General Technical Report PNW-GTR-907. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 324 pp.

Halfpenny, J.C., R.W. Thompson, S.C. Morse, T. Holden and P. Rezendes. 1995. Snow tracking. Chapter 5, Pg. 91-124 in Zielinski, W.J.; Kucera, T.E., technical editors. American marten, fisher, lynx, and wolverine: survey methods for their detection. Gen. Tech. Rep. PSW-GTR-157. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 163 p.

Hallock, L.A. and McAllister, K.R. 2005. Western Toad. Washington Herp Atlas. http://wdfw.wa.gov/conservation/herp_atlas/. Accessed 12 November 2017.

Hayes, S.G. D.J. Leptich, and P. Zager. 2002. Proximate factors affecting male elk hunting mortality in northern Idaho. Journal of Wildlife Management. 66(2):491–499.

Hayes, G. and G.J. Wiles. 2013. Washington bat conservation plan. Washington Department of Fish and Wildlife, Olympia, Washington. 138+viii pp.

Hays, D.W. and E.A. Rodrick. 2004. Flammulated owl. Pages 24-1 – 24-4 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Hodges, K.E. 2000. Ecology of snowshoe hares in southern boreal and montane forests. Pages 163-206 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.Hruby, T. (2014). Washington State Wetland Rating System for Eastern Washington: 2014 Update. (Publication #14-06-030). Olympia, WA: Washington Department of Ecology.

Interagency Grizzly Bear Committee (IGBC). 1998. Grizzly bear/motorized access management. Interagency Grizzly Bear Committee Taskforce Report. 7 pp.

Interagency Lynx Biology Team. 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Johnson, B.K., J.W. Kern, M.J. Wisdom, S.L. Findholt and J.G. Kie. 2000. Resource selection and spatial separation of mule deer and elk during spring. Journal of Wildlife Management. 64(3): 685–697.

Kerwin, J. 1999. Salmonid Habitat Limiting Factors Report for the Puyallup River Basin. Washington Conservation Commission.

Koehler, G.M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. Canadian Journal of Zoology 68(5):845-851.

Koehler, G.M., B.T. Maletzke, J.A. von Kienast, K.B. Aubry, R.B. Wielgus, and R.H. Naney. 2008. Habitat fragmentation and the persistence of lynx populations in Washington State. Journal of Wildlife Management, 72(7):1518-1524.Laufer, J.R. and P.T. Jenkins. 1989. *Historical and present status of the gray wolf in the Cascades Mountains of Washington*. Northwest Environmental Journal, 5:313-327.

Lehmkuhl, J.F., K.D. Kistler, and J.S. Begley. 2006a. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy. 87(2):371-379.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006b. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. Amphibians of Washington and Oregon.

Lewis, J.C. and J.M. Azerrad. 2004. Pileated woodpecker. Pages 29-1 – 29-9 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Livezey, K.E and T.L. Fleming. 2007. Effects of barred owls on spotted owls: the need for more than incidental detections and correlational analysis. Journal of Raptor Research 41(4):319-325.

Maletzke, B.T. 2004. Winter habitat selection of lynx (Lynx canadensis) in northern Washington. Masters of Science, Natural Resource Sciences. Washington State University. December 2004. 39pp.McCord and Cardoza 1982

McDaniel, G. W., K. S. McKelvey, J. R. Squires, and L. F. Ruggiero. 2000. Efficacy of lures and hair snares to detect lynx. Wildlife Society Bulletin 28:119–123.

McKelvey, K.S., Y.K. Ortega, G.M. Koehler, K.B. Aubry, and D. Brittell. 2000. Canada lynx habitat and topographic use patterns in north central Washington: a re-analysis. Pages 307-336 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires, editors. Ecology and conservation of lynx in the United States. University of Colorado Press, Boulder, CO.

Mech, L.D., S.H. Fritts, G.L. Radde, and W.J. Paul. 1988. Wolf distribution and road density in Minnesota. Wildlife Society Bulletin, 16(1): 85-87.

Mech, L.D., T.J. Meier, and J.W. Burch. 1991. Denali Park wolf studies: implications for Yellowstone. Transactions of the North American Wildlife and Natural Resources Conference, 56:86-90.

Millspaugh, J.J., R.J. Woods, K.E. Hunt, K.J. Raedeke, G.C. Brundige, B.E. Washburn and S.K. Wasser. 2001. Fecal glucocorticoid assays and the physiological stress response in elk. Wildlife Society Bulletin. 29(3): 899–907.

Mladenoff, D.J., T.A. Sickley, R.G.Haight, and A.P. Wydeven. 1995. A regional landscape analysis and prediction of favorable gray wolf habitat in the northern Great Lakes region. Conservation Biology, 9(2):279-294. Available online at http://www.blackwell-synergy.com/toc/cbi/9/2 (October 3, 2006).

National Oceanic and Atmospheric Administration (NOAA Fisheries). 2017a. Species Under the Endangered Species Act (ESA). NOAA Fisheries Office of Protected Resources. Available at: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish

National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries). 2017b. Endangered Species Act Critical Habitat. West Coast Region. Available at: http://www.westcoast.fisheries.noaa.gov/maps_data/endangered_species_act_critical_habitat.html

Natural Resources Conservation Science (NRCS). 2005. Mule deer (*Odocoileus hemionus*). Fish and Wildlife Habitat Management leaflet. Available at : https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010100.pdf

Natural Resources Conservation Science (NRCS). 2017. QUAKING ASPEN *Populus tremuloides* Plant Guide. Contributed by: USDA NRCS National Plant Data Center & the Biota of North America Program. Available at*:* https://plants.usda.gov/plantguide/pdf/cs_potr5.pdf

Naylor, L. M., M.J. Wisdom, and R. G. Anthony. 2009. Behavioral Responses of North American Elk to Recreational Activity. J. of Wildlife Management, 73: 328–338. doi:10.2193/2008-102

Phillips, G.E. A.W. Alldredge. 2000. Reproductive success of elk following disturbance by humans during calving season. Journal of Wildlife Management. 64(2): 521–530.

Richards, Jo Ellen. 1989. Spotted owl food habits and prey availability on the east slope of the Washington Cascades. M.S. Thesis, Colorado State University. 44p.

Rocchio, J. and R. Crawford. 2015. Ecological Systems of Washington State: A Guide to Identification. October 19, 2015. Washington Department of Natural Resources, Natural Heritage Program 1111 Washington St. SE, Olympia, WA 98504-7014. 384pp.

Schroeder, M. 2006. Blue grouse divided by two equals Dusky and Sooty Grouse. Washington Birder: 14(3): 3pp. Washington Department of Fish and Wildlife, Bridgeport, WA

Schultz, R.D.; Bailey, J.A. 1978. Responses of national park elk to human activity. Journal of Wildlife Management. 42(1): 91–100.

Slough, B.G. 1999. Characteristics of Canada lynx, Lynx canadensis, maternal dens and denning habitat. Canadian Field Naturalist, 113:605-608.

Sovern, S. G., E. D. Forsman, K. M. Dugger, and M. Taylor. 2011. Habitat use by Northern Spotted Owls during natal dispersal. Journal of Wildlife Management.

Squires, J.R., and T. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. In: Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S McKelvey, and J.R. Squire, eds. Ecology and Conservation of lynx in the United States. University Press of Colorado, Boulder, CO.

Steelquist, R. 1992. Field Guide to the Pacific Salmon. Sasquatch Books, Seattle, Washington.

Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

Thiel, R.P. 1985. Relationship between road density and wolf habitat suitability in Wisconsin. American Midland Naturalist, 113:404-407.

Trust for Public Land (TPL). 2008. Stemilt-Squilchuck Community Vision. September 2008. Prepared by The Trust for Public Land in partnership with The Stemilt Partnership, Chelan County. Written by Kitty Rasmussen. Accessed at: http://cloud.tpl.org/pubs/convis_wa_stemilt_1report.pdf

Upper Columbia Regional Technical Team (RTT). 2003. A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region. Discussion Draft.

U.S. Department of Agriculture (USDA) and US Department of the Interior (USDI). 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl; Standards and Guidelines for management of habitat of late-successional and old-growth related species within the range of the northern spotted owl (Northwest Forest Plan). USDA Forest Service and USDI Bureau of Land Management. Portland, OR. April 1994. Available online at http://www.reo.gov/general/aboutnwfp.htm.

U.S. Environmental Protection Agency (EPA). 2003. EPA Region 10 guidance for Pacific Northwest state and tribal temperature water quality standards. Region 10 Office of Water. EPA 910-B-03-002. April.

U.S. Environmental Protection Agency (EPA). 2004. Wetlands overview. EPA 843-F-04-011a. Office of Water. December 2004. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/500025PY.PDF?Dockey=500025PY.PDF

U.S. Environmental Protection Agency (EPA). 2017. Level III and IV Ecoregions of the Continental United States. Available at: ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/wa/wa_eco.pdf

U.S. Fish and Wildlife Service (USFWS). 1967. Endangered and Threatened Wildlife; Determination of Endangered Status for Gray Wolf (*Canis lupus)* in the conterminous States, except MN and where listed as an experimental population; Final Rule. *Federal Register* 32:4001. March 11, 1967.

U.S. Fish and Wildlife Service (USFWS). 1975. Endangered and Threatened Wildlife; Amendment Listing the Grizzly Bear *(Ursus arctos horribilus)* of the 48 Conterminous States as a Threatened Species; Final Rule. *Federal Register* 40(145):31734-31736. July 28, 1975.

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl; Final Rule. *Federal Register* 55(123):26114-26194. June 26, 1990.

U.S. Fish and Wildlife Service (USFWS). 1997. North Cascades Ecosystem recovery plan chapter—supplement to the grizzly bear recovery plan. Missoula, Montana, USA.

U.S. Fish and Wildlife Service (USFWS). 1998. Endangered and Threatened Wildlife and Plants: Findings on Petitions to Change the Status of Grizzly Bear Populations in the North Cascades Area of Washington and the Cabinet-Yaak Area of Montana and Idaho from Threatened to Endangered; Notice of 12-month petition finding. *Federal Register* 63(107):30453-30455. June 4, 1998.

U.S. Fish and Wildlife Service (USFWS). 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx (*Lynx canadensis)* and Related Rule; Final Rule. *Federal Register* 65(58):16051-16086. March 24, 2000.

U.S. Fish and Wildlife Service (USFWS). 2003. Endangered and threatened wildlife and plants; final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; Final and Proposed Rules. *Federal Register* 68(62):15803-15875. April 1, 2003.

U.S. Fish and Wildlife Service (USFWS). 2005. RECOVERY OUTLINE: Contiguous United States Distinct Population Segment of the Canada Lynx. September 14, 2005. 21 pp.

U.S. Fish and Wildlife Service (USFWS). 2006. Species Profile for Bull Trout. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E065.

U.S. Fish and Wildlife Service (USFWS). 2007. Grizzly Bear Recovery: North Cascades Ecosystem. [Online] http://www.fws.gov/mountain-prairie/species/mammals/grizzly/cascadesindex.html (Accessed Feb 2013).

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. Available at: http://www.fws.gov/migratorybirds/.

U.S. Fish and Wildlife Service (USFWS). 2011. *Revised Final Recovery Plan for the Northern Spotted Owl - Strix occidentalis caurina.* US Fish and Wildlife Service (USFWS). Portland, Oregon. xvi + 258 pp. Available online at http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/.

U.S. Fish and Wildlife Service (USFWS). 2011. Grizzly bear (*Ursus arctos horribilus*): 5-year review: summary and evaluation. Grizzly Bear Recovery Office, Missoula, Montana. August 2011. 205 pp.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Regist*er 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12-04/pdf/2012-28714.pdf

U.S. Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. US Fish and Wildlife Service (USFWS). Federal Register 79(177):54782-54846. September 12, 2014. https://www.gpo.gov/fdsys/pkg/FR-2014-09-12/pdf/2014-21013.pdf

U.S. Fish and Wildlife Service (USFWS). 2014b. Final Critical Habitat for Bull Trout Upper Columbia River Basins Unit: 10. Available at: https://www.fws.gov/pacific/bulltrout/finalcrithab/index.cfm?unit=10

U.S. Fish and Wildlife Service (USFWS). 2017. Species Information: Threatened and Endangered Animals and Plants. Available: http://www.fws.gov/oregonfwo/Species/default.asp.

U.S. Forest Service (USFS). 1990. Wenatchee National Forest land and resource management plan. USDA Forest Service, Pacific Northwest Region, Wenatchee, WA.

U.S. Forest Service (USFS). 2000. Environmental assessment, Mission Ridge Ski Area Master Plan Improvements. Okanogan-Wenatchee National Forest.

U.S. Forest Service (USFS). 2012. The Okanogan-Wenatchee National Forest Restoration Strategy. November 2012. 45 pp. Available online at https://ems-team.usda.gov/sites/fs-r06-owffrs/EMDS%20Practitioners/RestorationStrategyDoc2012.pdf

von Kienast, J.A. 2003. Winter habitat selection and food habits of lynx on the Okanogan Plateau, Washington. Thesis, University of Washington, Seattle, USA. Washington Department of Fish and Wildlife (WDFW). 1998. Washington State Salmonid Stock Inventory: Bull Trout/Dolly Varden.

Washington Conservation Commission (WCC). 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages)., Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2006. WRIA 40 Diversion Screening and Fish Passage Inventory Report.

Washington Department of Fish and Wildlife (WDFW). 2013. Threatened and Endangered Wildlife in Washington: 2012 Annual Report. Listing and Recovery Section, Wildlife Program, Washington Department of Fish and Wildlife, Olympia. 251 pp.

Washington Department of Fish and Wildlife (WDFW). 2014. Game management plan July 2015 – June 2021. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA. 159 pp.

Washington Department of Fish and Wildlife (WDFW). 2016. Washington State Mule Deer Management Plan, Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 144 p.

Washington Department of Fish and Wildlife (WDFW). 2016b. Wildlife Priority Habitats and Species (PHS) Report. Available at: http://wdfw.wa.gov/conservation/phs/.

Washington Department of Fisheries (WDF), Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI): summary report.

Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. (WADOE) March 2006. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1). Washington State Department of Ecology Publication #06-06-011a. Olympia, WA.

Watson, J. and M. Whalen. 2004. Golden eagle. Pages 8-1 – 8-7 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Wiles, Gary J., H.L. Allen, G.E. Hayes. 2011. Wolf Conservation and management plan for Washington. Washington Department of Fish and Wildlife. Olympia, Washington. 292 pages. Available online at http://wdfw.wa.gov/publications/00001/wdfw00001.pdf.

Wydoski, R.S., and R.R. Whitney. 2003. Inland Fishes of Washington. University of Washington Press, Seattle.

APPENDIX A

Wetland Delineation Report

Mission Ridge

WETLAND DELINEATION REPORT

Dennis Beich, Ecosystems North West,
Suzanne Tomassi, Avia Environmental

September 2017

(Formatting of original report was modified to fit within this resource report. No content was modified.)

Contents

I. INTRODUCTION 55

II. METHODS 55

III. PROPERTY DESCRIPTION 55

IV. FINDINGS 56

DOCUMENT SEARCH 56

FIELD INVESTIGATION 57

V. REGULATORY IMPLICATIONS 60

LOCAL REGULATIONS 60

STATE AND FEDERAL REGULATIONS 61

Introduction

Ecosystems North West was contracted by Washington Conservation Science (WCS) to conduct wetland determination and delineation on three specific site within a property owned by Mission Ridge in Section 19 of Township 21N, Range 20E in Chelan County. The subject property and adjacent Mission Ridge Ski and Board Resort are proposed and current special use permit areas, respectively.

Base information for this report was obtained from WCS; publically available aerial photographs; and planning, zoning, and critical areas information databases from local, State, federal, and non-governmental websites.

This investigation was conducted to determine whether three specific locations qualify as regulatory wetlands as defined in Chelan County Code (CCC) Chapter 14.10, and to delineate any wetland areas identified in these locations.

Portions of this work were subcontracted to Avia Environmental.

Methods

A documentation search was conducted and included County inventories, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database, State and federal threatened and endangered species lists, the National Wetland Inventory (NWI), and the Washington Department of Natural Resources (WDNR) Natural Heritage Program database.

Three small areas of the property were investigated in detail during a September 6, 2017 field visit by Dennis Beich, PWS. Methodology used for wetland determination was that of the Washington State Department of *Ecology's Wetland Identification and Delineation Manual* (Manual) and *Western Mountains, Valleys, and Coast Regional Supplement*. Soil, hydrology, and vegetation were examined throughout the property to determine whether they fit criteria set forth in the Manual. Data were recorded at four of these points (Appendix A). Wetland boundaries were marked with pink pin flags.

Wetlands were rated using the Washington State Wetland Rating System for Eastern Washington: 2014 Update and buffers determined per CCC 11.80.

Property Description

The area of investigation is generally sloping with many depressions, including the wetland areas described herein. Average slope is approximately 2 t0 10 percent. Non-wetlands in the area are a mosaic of mid-age Ponderosa pine forest with areas of meadow and emergent vegetation. These areas are described in more detail in Section IV.

The USDA Soil Survey for the area indicates the possible presence of Loneridge very stony loam, Stemilt silt loam, and rock outcrop in the area (see Appendix B for details and soils map).

Findings

DOCUMENT SEARCH

Threated and endangered species for which records exist in the study area vicinity are as follows:

- Northern spotted owl (*Strix occidentalis*)
- Gray wolf (*Canis lupus*)
- Grizzly bear (*Ursus arctos*)
- Lynx (*Lynx canadensis*)
- Fisher (*Pekania pennanti*)

Northern spotted owl is the only one of these species noted within approximately two miles of the study site. Other mammal species are unlikely to occur on the site, as it is located at the far extents of their ranges. WDFW PHS species noted in the wider vicinity are:

- Elk (*Cervus elaphus*)
- Mule deer (*Odocoileus hemionus*)
- Northern goshawk (*Accipiter gentilis*)
- Western cutthroat (*Oncorhynchus clarki lewisi*)
- Rainbow trout (*Oncorhynchus mykiss*) (resident)

See Appendix C for the full PHS report.

The NWI online database does not depict any wetlands on the study area. Chelan County uses NWI in lieu of a County-specific inventory.

WDNR's website does not indicate the presence of Natural Heritage sites on the study area.

FIELD INVESTIGATION

Two small emergent wetlands were discovered on the study site. These are referred to herein as Wetland A and Wetland B, and located approximately as depicted in Figure 1. As well, a small aspen (*Populus tremuloides*) stand was investigated to determine whether it met wetland criteria.

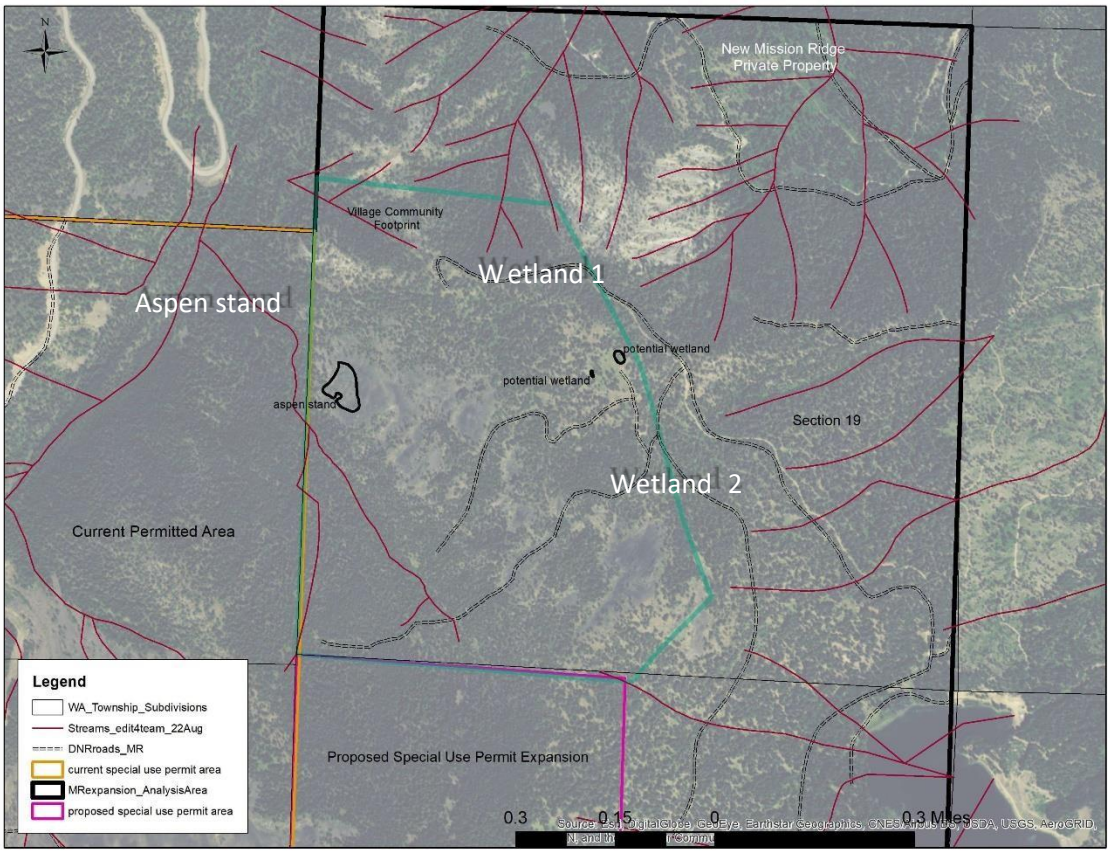


Figure 1. Approximate locations of wetlands and aspen stand in the study area.

Wetland 1

Wetland 1 is a small depression with emergent vegetation (Photo 1). Vegetation in Wetland 1 is dominated by common spikerush (*Eleocharis palustris*) and an unidentified sedge (*Carex* sp.), with analogue sedge (*C. simulata*) and meadow foxtail (*Alopecurus pratensis*) also common. Two soil strata were observed: black (10YR 2/1) loamy clay (0-7 inches) and grayish brown (2.5Y 5/2) clay (7-13 inches).

No redoximorphic features were observed. Wetland hydrology is supported primarily by groundwater, and no outlet is present. Although no ponding was present during the site visit, field indicators for seasonal ponding exceeding ½ of the wetland area were observed. Few habitat features are present and the wetland has low structural and compositional diversity. Please see Appendix D for details of wetland function and potential.

The buffer of Wetland 1 is typical mid-age Ponderosa pine dominated eastside forest with and understory of Wood's rose, pine grass (Calamagrostis rubescens), fescue grasses (*Festuca* sp.), and legumes (Fabaceae-Leguminosae).

Wetland 1 rates as Category III with water quality, hydrologic, and habitat function scores of 5, 6, and 7, respectively.



Photo 1. Wetland 1

Wetland 2

A second small depression, Wetland 2, was identified roughly 350 feet WSW of Wetland 1 (Photo 2). Approximately twice the size of Wetland 1, Wetland 2 is dominated by sedges (*Carex* sp.), blue joint grass (*Calamagrostis canadensis*), and cinquefoil (*Popentilla* sp.). Soils consist of black (10YR 2/1) clay loam (0-4 inches), brown (10YR 3/2) clay loam (4-7 inches), and dark gray (2.5Y 4/1) clay loam (7-12 inches) with oxidized roots in the soil matrix with 10 inches of the surface.

Wetland hydrology is indicated by both the oxidized rhizospheres along living roots and the presence of drift deposits.

The buffer of Wetland 1 is Ponderosa forest with subalpine fir (Abies lasiocarpa) and an understory of pine grass, fescue grasses, and strawberry (*Fragasia vesca*).

Wetland 2 is also Category III and score similarly to Wetland 1, although water quality and hydrology scores are each lower by one point. Habitat features in the wetland include loose rock and standing snags. Total score for Wetland 2 is 16.



Photo 2. Wetland 2

Aspen Stand

An area of quaking aspen was investigated as a possible wetland. Although the species' facultative status is FACU, it has been assigned special status when it is found within wetlands. The area investigated is in upland habitat located on a talus slope with no exposed soil and several layers of rock. The rock layers were at least 16 inches deep in test pits dug in an unsuccessful attempt to find soil substrate. No wetland hydrologic indicators were present at the time of the site visit. Dominant vegetation is quaking aspen, juniper (*Juniperus communis*) (UPL), and bitter brush (*Purshia tridentata*) (UPL), each constituting approximately 20% coverage. The remaining area is bare rock.

Regulatory Implications

LOCAL REGULATIONS

Chelan County regulates wetlands through CCC 11.80, Wetland Areas Overlay District. Wetland buffers are determined based on the wetland category associated with the wetland. Buffer widths also vary depending on the intensity of planned land use. Some exemptions apply to standards regulations, including some passive, educational, maintenance, and noxious species control uses (CCC 11.80.020).

As Category III wetlands, Wetlands 1 and 2 require standard buffers of 75 and 150 feet for low- and high-impact adjacent activities, respectively (CCC 11.80.060(6)). Regulatory buffers are required to be maintained in their natural condition. Buffer widths may be modified only when approved by the County and pursuant to the conditions in CCC 80.11.070. Under this code provision, the applicant but demonstrate:

"(1) That width averaging will not degrade the wetland structure, function and values; and

(2) The total area contained within the wetland buffer after averaging is no less than that contained within the wetland buffer, outlined by the requirements of this chapter, prior to averaging. The revised wetland buffer width shall not be less than seventy-five percent of the wetland buffer widths outlined within this chapter, or be less than twenty-five feet, whichever is greater; and

(3) Failure to adjust the buffer would result in a hardship to the property owner; and

(4) The need for buffer averaging is not due to the landowner's own actions; and

(5) That low-intensity land uses would be located adjacent to areas where buffer width is reduced, and that such low-intensity land uses are guaranteed in perpetuity by covenant, deed restriction, easement, or other legally binding mechanism; and

(6) A wetland report pursuant to Section 11.80.100, if required by the administrative authority, supporting the newly delineated wetland buffer, has been prepared and submitted."

The County administrator may increase the required buffer if it is determined that a wider buffer is needed to protect a wetland (CCC 80.11.090). Buffer widths may be varied by the County on lots, tracts, and parcels legally created prior to January 5, 1999, provided the applicant can demonstrate that standard requirements significantly interferes with reasonable use of the property, the need for variance is not the result of the applicants own actions, the shoreline environmental (if applicable) will not be impacted, the project is compatible with the Chelan County Comprehensive Plan and Shoreline Master Program, and the public will not be negatively impacted (CCC 11.80.090).

Buffer reduction may be no greater than 50% of the standard, and may not be less than 25 feet for Category II, III, and IV wetlands and 150 feet for Category I wetlands. The County administrator may require a mitigation plan to be implemented to avoid or compensate for any buffer impacts.

STATE AND FEDERAL REGULATIONS

Wetlands are also regulated by the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act. Any filling of Waters of the State, including wetlands (except isolated wetlands), would likely require notification and permits from the Corps. Wetlands 1 and 2 would likely be considered isolated by the Corps, as no hydrologic connection to other aquatic areas are evident. Federally permitted actions that could affect endangered species may also require consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Please note that the findings of this report are subject to the verification and agreement of local, State and/or federal regulatory authorities.

Appendix A. – Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-1

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus ponderosa* 2.	30	yes	UPL
3.			
4.			
50% = ___, 20% =	30	= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1. *Rosa woodsii*	5	yes	FACU
2.			
3.			
4.			
5.			
50% = ___, 20% =	5	= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Calamagrostis rubescens*	50	yes	UPL
2. *Fescue sp*	30	yes	UPL
3. *Legume sp*	5	no	
4.			
5.			
6.			
7.			
8.			
50% = ___, 20% =	85	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ☐ ☒

Remarks:

SOIL Sampling Point: TH-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100						LOAMY CLAY

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Histic Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) Reduced Vertic
- ☐ 2 cm Muck (A10) Red Parent
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks: some rocks present

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) **(Nonriverine)**
- ☐ Sediment Deposits (B2) **(Nonriverine)**
- ☐ Drift Deposits (B3) **(Nonriverine)**
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) **(Riverine)**
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) **(Riverine)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-2

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?**	**Yes ☒ No ☐**
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
50% = ___, 20% =		= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% =		= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Carex sp*	30	yes	FACW
2. *Eleocharis palustris*	50	yes	OBL
3. *Carex simulata*	10	yes	OBL
4. *Alopecurus pratensis*	10	yes	FACW
5.			
6.			
7.			
8.			
50% = ___, 20% =	100	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

US Army Corps of Engineers Arid West – Version 2.0 Project Site: Mission Ridge

SOIL Sampling Point: TH-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100						LOAMY CLAY
7-13	2.5Y 5/2	70	7.5YR 5/6	30	C	M		CLAY LOAM

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)

Indicators for Problematic Hydric Soils[3]:

- ☐ Sandy Redox (S5) 1 cm Muck (A9)
- ☐ Stripped Matrix (S6) 2 cm Muck (A10)
- ☐ Loamy Mucky Mineral (F1) Reduced Vertic
- ☐ Loamy Gleyed Matrix (F2) Red Parent
- ☐ Depleted Matrix (F3) Other (Explain in

- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) **(Nonriverine)**
- ☐ Sediment Deposits (B2) **(Nonriverine)**
- ☒ Drift Deposits (B3) **(Nonriverine)**
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)

- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) **(Riverine)**
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) **(Riverine)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Mission Ridge | City/County: Chelan County/ | Sampling Date: 9/6/16

Applicant/Owner: Mission Ridge Resort | State: WA | Sampling Point: TH-3

Investigator(s): Dennis Beich | Section, Township, Range: Sec 19 T21N R20E

Landform (hillslope, terrace, etc.): hilly | Local relief (concave, convex, none): concave | Slope (%): -2

Subregion (LRR): LRRB Lat: 47,2965 Long: -120,3777 Datum: ___ Soil Map Unit Name: ___ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Abies lasiocarpa* 2.	20	yes	UPL
3.			
4.			
50% = ___, 20% =	20	= Total Cover	
Sapling/Shrub Stratum (Plot size:5m)			
1.			
2.			
3.			
4.			
5.			
50% = ___, 20% =		= Total Cover	
Herb Stratum (Plot size:2m)			
1. *Calamagrostis rubescens*	80	yes	UPL
2. *Fescue sp*	10	yes	UPL
3. *Fragasia vesca*	10	yes	UPL
4.			
5.			
6.			
7.			
8.			
50% = ___, 20% =	90	= Total Cover	
Woody Vine Stratum (Plot size:___)			
1.			
2.			
50% = ___, 20% =			
% Bare Ground in Herb Stratum 0		= Total Cover	
		over of Biotic Crust	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of :	Multiply by:
OBL species	x1 =
FACW species	x2 =
FAC species	x3 =
FACU species	x4 =
UPL species	x5 =
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ☐ ☒

Remarks:

SOIL Sampling Point: TH-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					LOAM	
6-12	10YR 4/3	100					LOAM	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **(LRR C)** Histosol (A1)
- ☐ **(LRR B)** Histic Epipedon (A2)
- ☐ (F18) Black Histic (A3)
- ☐ Material (F21) Sulfide (A4)
- ☒ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**) Redox Dark Surface (F6)
- ☐ Depleted Below Dark Surface (A11) Depleted Dark Surface (F7)
- ☐ Thick Dark Surface (A12) Redox Depressions (F8)
- ☐ Sandy Mucky Mineral (S1) Vernal Pools (F9)
- ☐ Sandy Gleyed Matrix (S4)

Indicators for Problematic Hydric Soils[3]:

- ☐ Sandy Redox (S5) 1 cm Muck (A9)
- ☐ Stripped Matrix (S6) 2 cm Muck (A10)
- ☐ Loamy Mucky Mineral (F1) Reduced Vertic
- ☐ Loamy Gleyed Matrix (F2) Red Parent
- ☐ Depleted Matrix (F3) Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
☐ Surface Water (A1)	☐ Salt Crust (B11)	☐ Water Marks (B1) **(Riverine)**
☐ High Water Table (A2)	☐ Biotic Crust (B12)	☐ Sediment Deposits (B2) **(Riverine)**
☐ Saturation (A3)	☐ Aquatic Invertebrates (B13)	☐ Drift Deposits (B3) **(Riverine)**
☐ Water Marks (B1) **(Nonriverine)**	☐ Hydrogen Sulfide Odor (C1)	☐ Drainage Patterns (B10)
☐ Sediment Deposits (B2) **(Nonriverine)**	☐ Oxidized Rhizospheres along Living Roots (C3)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3) **(Nonriverine)**	☐ Presence of Reduced Iron (C4)	☐ Crayfish Burrows (C8)
☐ Surface Soil Cracks (B6)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Thin Muck Surface (C7)	☐ Shallow Aquitard (D3)
☐ Water-Stained Leaves (B9)	☐ Other (Explain in Remarks)	☐ FAC-Neutral Test (D5)

Field Observations:

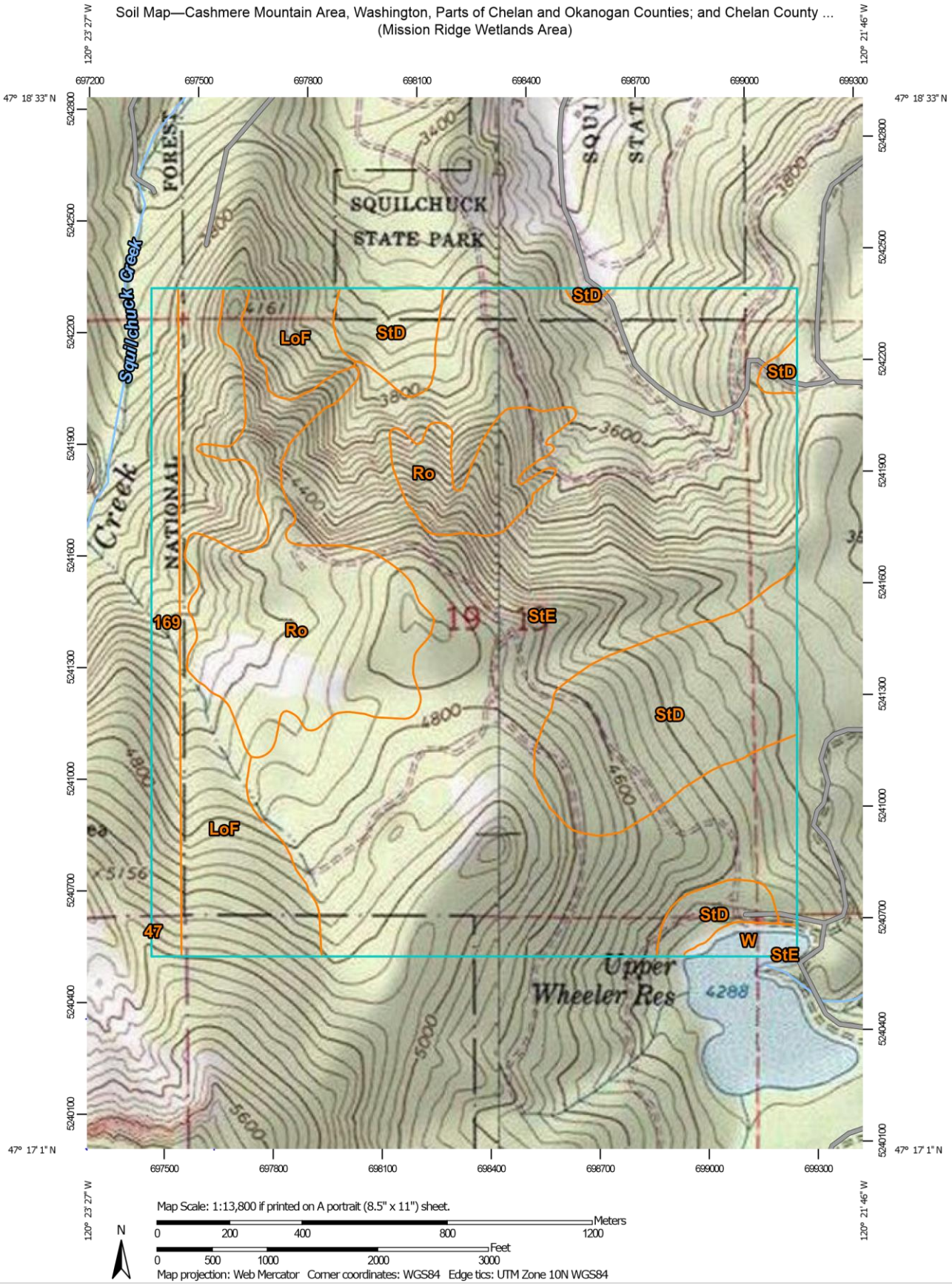
Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B. Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Topographic Map
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cashmere Mountain Area, Washington, Parts of Chelan and Okanogan Counties
Survey Area Data: Version 15, Sep 8, 2016

Soil Survey Area: Chelan County Area, Washington (Parts of Chelan and Kittitas Counties)
Survey Area Data: Version 12, Sep 8, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 24, 2012—Sep 21, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
47	Blewett-Rock outcrop complex, 30 to 60 percent slopes	0.1	0.0%
169	Loneridge very stony loam, 30 to 60 percent slopes	34.7	4.4%
Subtotals for Soil Survey Area		**34.7**	**4.4%**
Totals for Area of Interest		**791.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LoF	Loneridge very stony loam, 25 to 65 percent slopes	93.9	11.9%
Ro	Rock outcrop	115.3	14.6%
StD	Stemilt silt loam, 0 to 25 percent slopes	104.4	13.2%
StE	Stemilt silt loam, 25 to 45 percent slopes	437.4	55.3%
W	Water	5.4	0.7%
Subtotals for Soil Survey Area		**756.5**	**95.6%**
Totals for Area of Interest		**791.2**	**100.0%**

Appendix C. PHS Vicinity report and map

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic
REPORT DATE: 10/07/2017 5.47

Query ID: P171007174703

Common Name / Scientific Name / Notes	Site Name / Source Dataset / Source Record / Source Date	Priority Area / Occurrence Type / More Information (URL) / Mgmt Recommendations	Accuracy	Federal Status / State Status / PHS Listing Status	Sensitive Data / Resolution	Source Entity / Geometry Type
Columbia spotted frog Rana luteiventris	WS_OccurPoint 18285 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Columbia spotted frog Rana luteiventris	WS_OccurPoint 18280 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Elk Cervus elaphus	NONEUM BASIN CALVING PHSREGION 901504	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM MIGRATION PHSREGION 901510	Migration Migration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM ELK CALVING PHSREGION 901501	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Lake	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Lake	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Mule deer Odocoileus hemionus	MISSION CREEK DEER PHSREGION 901318	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons

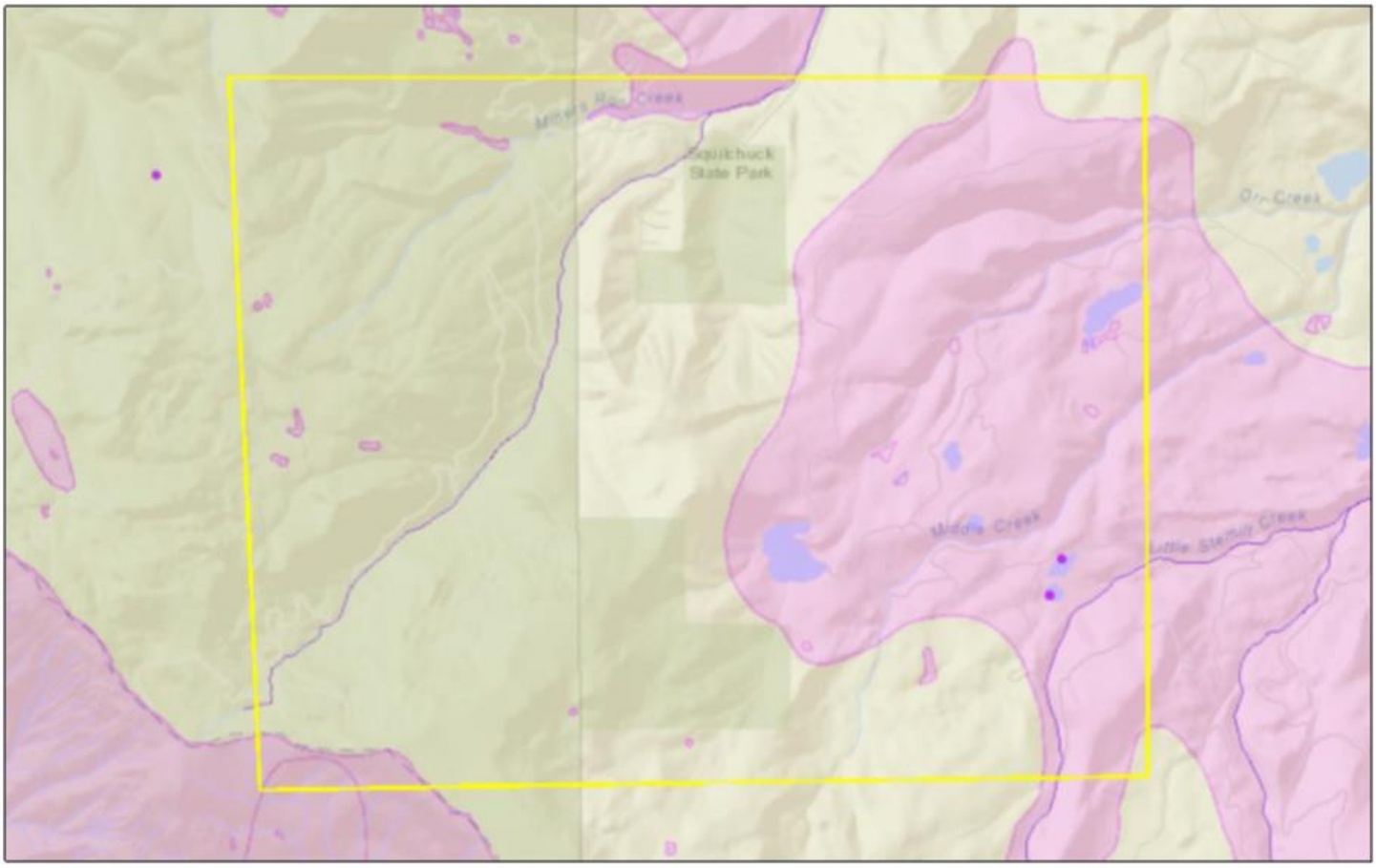
Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102022 May 21, 1998	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102001 June 13, 1992	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 92889 May 16, 2001	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105435 June 05, 1996	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 100673 May 12, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105701 May 27, 1998	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Rainbow Trout Oncorhynchus mykiss	Squilchuck Creek SWIFD 3531	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Western toad Anaxyrus boreas	WS_OccurPoint 18278 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Western toad Anaxyrus boreas	WS_OccurPoint 18283 September 16, 1999	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Westslope Cutthroat Oncorhynchus clarki lewisi	Little Stemilt Creek SWIFD 3572	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm http://wdfw.wa.gov/publications/pub.php?	NA	N/A N/A PHS LISTED	N AS MAPPED	 Lines
Wetlands	STEFFEN POND PHSREGION 901534	Aquatic Habitat N/A http://www.ecy.wa.	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necesssary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to vraition caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

WDFW Test Map



October 7, 2017

PHS Report Clip Area
PT
LN

POLY
AS MAPPED
SECTION

QTR-TWP
TOWNSHIP

1:59,509

0 0.5 1 2 mi
0 0.75 1.5 3 km

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

THIS PAGE LEFT BLANK INTENTIONALLY

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): ____Mission Ridge 1_____ Date of site visit: ____9-6-17_

Rated by_____Dennis Beich, PWS____ Trained by Ecology? _x_ Yes ___ No Date of training __2014

HGM Class used for rating___Depressional_____ Wetland has multiple HGM classes?____Y ___x_N

NOTE: **Form is not complete without the figures requested** (*figures can be combined*). Source of base aerial photo/map_____Google maps_____

OVERALL WETLAND CATEGORY _III_ (based on functions___ or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 22-27
_____**Category II** – Total score = 19-21
____X__**Category III** – Total score = 16-18
_____**Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	(H) M L	(H) M L	H (M) L	
Landscape Potential	H M (L)	H M (L)	(H) M L	
Value	H M (L)	H (M) L	H (M) L	**TOTAL**
Score Based on Ratings	5	6	7	18

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	**II III**
Alkali	**I**
Wetland of High Conservation Value	**I**
Bog and Calcareous Fens	**I**
Old Growth or Mature Forest – slow growing	**I**
Aspen Forest	**I**
Old Growth or Mature Forest – fast growing	**II**
Floodplain forest	**II**

None of the above	

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	N/A
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	N/A
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	1
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	N/A
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	N/A

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size ___At least 30% of the open water area is deeper than 10 ft (3 m)

(NO) – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks; ___The water leaves the wetland **without being impounded**.

(NO) - go to 3 YES – The wetland class is **Slope**
NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?
___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
___ The overbank flooding occurs at least once every 10 years.

(NO) - go to 4 YES – The wetland class is **Riverine**
NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 5 (YES) – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT

AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number 1

DEPRESSIONAL WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality		Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?		
1.1. Characteristics of surface water outflows from the wetland:		
Wetland has no surface water outlet	points = 5 (circled)	5
Wetland has an intermittently flowing outlet	points = 3	
Wetland has a highly constricted permanently flowing outlet	points = 3	
Wetland has a permanently flowing, unconstricted, surface outlet	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions of soils)*	YES = 3 NO = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes)		
Wetland has persistent, ungrazed, vegetation for > 2/3 of area	points = 5 (circled)	
Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area	points = 3	5
Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area	points = 1	
Wetland has persistent, ungrazed vegetation < 1/10 of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.*		
Area seasonally ponded is > ½ total area of wetland	points = 3 (circled)	3
Area seasonally ponded is ¼ - ½ total area of wetland	points = 1	
Area seasonally ponded is < ¼ total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	13

Rating of Site Potential If score is: **__x__ 12- 16 = H ___ 6- 11 = M ___ 0- 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1- D 2.3? Source_____	Yes = 1 No = 0	0
Total for D 2	Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___3 or 4 = H ___1 or 2 = M __x__ 0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]? Yes = 1 No = 0		0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)? Yes = 2 No = 0		0
Total for D 3	Add the points in the boxes above	0

Rating of Value If score is: **___2-4 = H ___1 = M ___x 0 = L** *Record the rating on the first page*

Wetland name or number 1

DEPRESSIONAL WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and erosion.

	Points (only 1 score per box)
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland:	8
Wetland has no surface water outlet — points = 8	
Wetland has an intermittently flowing outlet — points = 4	
Wetland has a highly constricted permanently flowing outlet — points = 4	
Wetland has a permanently flowing unconstricted surface outlet — points = 0	
(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).*	
Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 8	8
Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 6	
The wetland is a headwater wetland — points = 4	
Seasonal ponding: 1 ft - < 2 ft — points = 4	
Seasonal ponding: 6 in - < 1 ft — points = 2	
Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0	
Total for D 4 — Add the points in the boxes above	16

Rating of Site Potential If score is: **x 12-16 = H** **6-11 = M** **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in a land use that generates runoff? Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses? Yes = 1 No = 0	0
Total for D 5 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: **3 = H** **1 or 2 = M** **x 0 = L** *Record the rating on the first page*

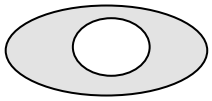
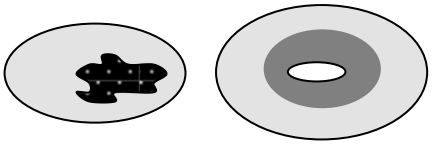
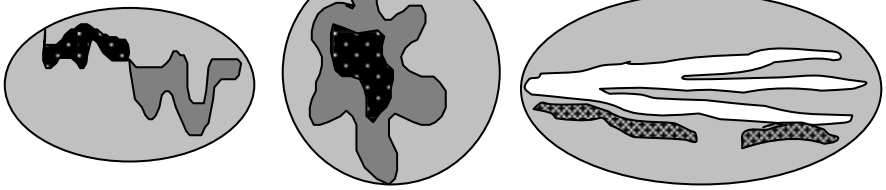
D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The wetland is in a landscape that has flooding problems.	1
Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.*	
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND	
Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2	
Surface flooding problems are in a sub-basin farther down-gradient — points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0	
There are no problems with flooding downstream of the wetland points = 0	
D 6.2. Has the site has been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 — Add the points in the boxes above	1

Rating of Value If score is: **2-4 = H** **x 1 = M** **0 = L** *Record the rating on the first page*

Wetland name or number 1

These questions apply to wetlands of all HGM classes. (only 1 score per box) **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ____Aquatic bed _x_ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover __x_Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover ____Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ____Scrub-shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	1
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? ***A****nswer YES for Lake Fringe wetlands*. Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No*. Yes = 3 No = 0	3
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. D*ifferent patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species __7__ Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0	1

Wetland name or number 1

H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points  Riparian braided channels with 2 classes All three diagrams in this row are **High** = 3 points	Figure__ 1

H 1.6. Special habitat features *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ____Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ____Cattails or bulrushes are present within the wetland. ____Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ____Emergent or shrub vegetation in areas that are permanently inundated/ponded. ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity __X_ Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	1
Total for H 1 Add the points in the boxes above	7

Rating of Site Potential If score is:___**15-18 = H** __**x**__**7-14 = M** ___**0-6 = L** *Record the rating on the first page*

Wetland name or number 1

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat _____ **+** [(% moderate and low intensity land uses)/2] ____ **=**_____% > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat _____ **+** [(% moderate and low intensity land uses)/2] ____ **=**_____% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use points = (- 2) Does not meet criterion above points = 0	0
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 Add the points in the boxes above	6

Rating of Landscape Potential If score is: **__x__ 4-9 = H ___1-3 = M ___< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: **___2 = H __x_1 = M ___0 = L** *Record the rating on the first page*

Wetland name or number 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Vernal pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool*. ☐ The soil in the wetland is shallow [< 1 ft (30 cm)deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. Yes **–** Go to **SC 1.1** No = **Not a vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? Yes **–** Go to **SC 1.2** No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? Yes = **Category II** No = **Category III**	**Cat. II** **Cat. III**
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ¾ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. Yes = **Category I** No= **Not an alkali wetland**	**Cat. I**
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 3.2** No – Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 3.4** No = **Not a WHCV**	**Cat. I**

SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? Yes = **Category I** No =**Not a WHCV**	

SC 4.0 Bogs and Calcareous Fens Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? *Use the key below to identify if the wetland is a bog or calcareous fen.* ***If you answer yes you will still need to rate the wetland based on its functions.*** SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils*. Yes – Go to **SC 4.3** No – Go to **SC 4.2** SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 4.3** No = **Is not a bog for rating** SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5? Yes = **Category I bog** No – Go to **SC 4.4 NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog. SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy? Yes = **Category I bog** No – Go to **SC 4.5** SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks? Yes = **Is a Calcareous Fen for purpose of rating** No – Go to **SC 4.6** SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met: ☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems ☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland Yes = **Is a Category I calcareous fen** No = **Is not a calcareous fen**	**Cat. I** **Cat. I**

SC 5.0. Forested Wetlands Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H 1.1*) ☐ The wetland is within the 100 year floodplain of a river or stream ☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species ☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see definitions in question H3.1)* Yes – Go to **SC 5.1** No = **Not a forested wetland with special characteristics**	

Wetland name or number 1

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)? Yes = **Category I** No – Go to **SC 5.2**	**Cat. I**
SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species? Yes = **Category I** No – Go to **SC 5.3**	**Cat. I**
SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)? Yes = **Category II** No – Go to **SC 5.4**	**Cat. II**
SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream? Yes = **Category II** No = **Not a forested wetland with special characteristics**	**Cat. II**
Category of wetland based on Special Characteristics *Choose the highest rating if wetland falls into several categories* If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number_____

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Old-growth/Mature forests:** Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in oldgrowth; 80-200 years old west and 80-160 years old east of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

☐ **Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

- **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

- **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

This page left blank intentionally

Wetland name or number 2

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Mission Ridge 2 Date of site visit: 9-6-17

Rated by Dennis Beich, PWS Trained by Ecology? x Yes No Date of training 2014

HGM Class used for rating Depressional *Wetland has multiple HGM classes?* Y x N

NOTE: **Form is not complete without the figures requested** (*figures can be combined*). Source of base aerial photo/map Google maps

OVERALL WETLAND CATEGORY III (based on functions or special characteristics)

3. Category of wetland based on FUNCTIONS

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

_____**Category I** – Total score = 22-27

_____**Category II** – Total score = 19-21

X **Category III** – Total score = 16-18

_____**Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	(H) M L	H (M) L	
Landscape Potential	H M (L)	H M (L)	(H) M L	
Value	H M (L)	H M (L)	H (M) L	**TOTAL**
Score Based on Ratings	4	5	7	16

4. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	**II** **III**
Alkali	**I**
Wetland of High Conservation Value	**I**
Bog and Calcareous Fens	**I**
Old Growth or Mature Forest – slow growing	**I**
Aspen Forest	**I**
Old Growth or Mature Forest – fast growing	**II**
Floodplain forest	**II**
None of the above	

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	N/A
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	N/A
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	1
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	N/A
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	N/A

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	

1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

6. Does the entire unit **meet both** of the following criteria?
   ____The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   ____At least 30% of the open water area is deeper than 10 ft (3 m)

   (NO) – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

7. Does the entire wetland unit **meet all** of the following criteria?
   ____The wetland is on a slope (*slope can be very gradual*),
   ____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks; The water leaves the wetland **without being impounded**.

   (NO) - go to 3 YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

8. Does the entire wetland unit **meet all** of the following criteria?
   ____The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   ____The overbank flooding occurs at least once every 10 years.

   (NO) - go to 4 YES – The wetland class is **Riverine**

NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

9. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 5 (YES) – The wetland class is **Depressional**

10. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have more* than 2 HGM classes *within a wetland boundary, classify the wetland as Depressional for the rating.

Wetland name or number 2

DEPRESSIONAL WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

	Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland has no surface water outlet — points = (5) Wetland has an intermittently flowing outlet — points = 3 Wetland has a highly constricted permanently flowing outlet — points = 3 Wetland has a permanently flowing, unconstricted, surface outlet — points = 1	5
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions of soils)* YES = 3 NO = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes) Wetland has persistent, ungrazed, vegetation for > 2/3 of area — points = (5) Wetland has persistent, ungrazed, vegetation from 1/3 to 2/3 of area — points = 3 Wetland has persistent, ungrazed vegetation from 1/10 to < 1/3 of area — points = 1 Wetland has persistent, ungrazed vegetation < 1/10 of area — points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.* Area seasonally ponded is > ½ total area of wetland — points = 3 Area seasonally ponded is ¼ - ½ total area of wetland — points = (1) Area seasonally ponded is < ¼ total area of wetland — points = 0	1
Total for D 1 — Add the points in the boxes above	11

Rating of Site Potential If score is: **__x__ 12- 16 = H _____ 6- 11 = M _____ 0- 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	0
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1- D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___ 3 or 4 = H _____ 1 or 2 = M __x__ 0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)? Yes = 2 No = 0	0
Total for D 3 — Add the points in the boxes above	0

Rating of Value If score is: **___ 2-4 = H _____ 1 = M _____ x 0 = L** *Record the rating on the first page*

Wetland name or number 2

DEPRESSIONAL WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and erosion.

Points (only 1 score per box)

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland: **8**

- Wetland has no surface water outlet — points = 8 (circled)
- Wetland has an intermittently flowing outlet — points = 4
- Wetland has a highly constricted permanently flowing outlet — points = 4
- Wetland has a permanently flowing unconstricted surface outlet — points = 0

(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).* **4**

Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding points = 8 Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent pondingpoints = 6 The wetland is a headwater wetland — points = 4

- Seasonal ponding: 1 ft - < 2 ft — points = 4 (circled)
- Seasonal ponding: 6 in - < 1 ft — points = 2
- Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0

Total for D 4	Add the points in the boxes above	12

Rating of Site Potential If score is: **__x_ 12-16 = H_____6-11 = M_____0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in a land use that generates runoff?	Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?	Yes = 1 No = 0	0
Total for D 5	Add the points in the boxes above	0

Rating of Landscape Potential If score is: **___3 = H_____1 or 2 = M ___x_0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The wetland is in a landscape that has flooding problems. **0**

Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND

- Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2
- Surface flooding problems are in a sub-basin farther down-gradient — points = 1 (circled)

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why*_____points = 0

There are no problems with flooding downstream of the wetland points = 0

D 6.2. Has the site has been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0 — **0**

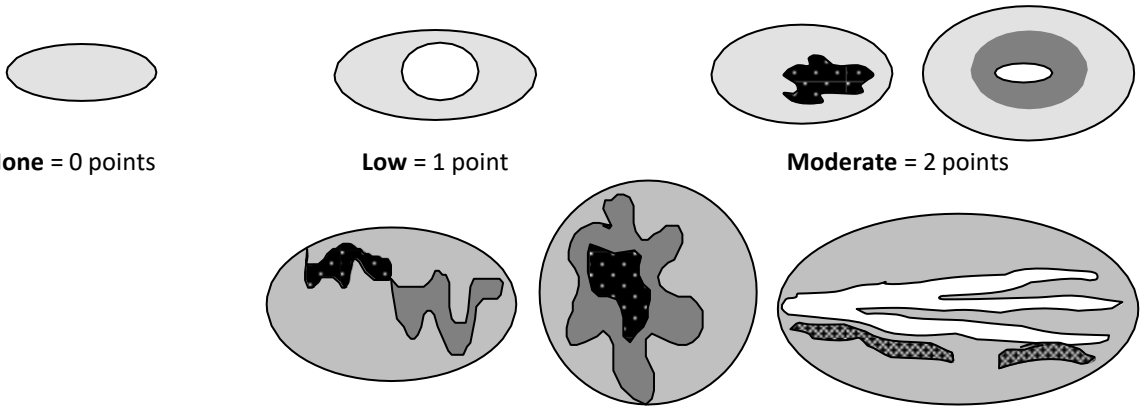
Total for D 6	Add the points in the boxes above	0

Rating of Value If score is: **___2-4 = H __x_1 = M_____0 = L** *Record the rating on the first page*

Wetland name or number 2

These questions apply to wetlands of all HGM classes. (only 1 score per box) **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ____Aquatic bed _x_ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover __x_Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover ____Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ____Scrub-shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	1
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? ***A****nswer YES for Lake Fringe wetlands*. Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No*. Yes = 3 No = 0	3
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. D*ifferent patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species __7 Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0	1

Wetland name or number 2

H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points Riparian braided channels with 2 classes All three diagrams in this row are **High** = 3 points	Figure___ 1

H 1.6. Special habitat features *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ____Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ____Cattails or bulrushes are present within the wetland. _X_Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ____Emergent or shrub vegetation in areas that are permanently inundated/ponded. ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity _X Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	3
Total for H 1 Add the points in the boxes above	9

Rating of Site Potential If score is:___**15-18 = H** __**x**__**7-14 = M**_____**0-6 = L** *Record the rating on the first page*

Wetland name or number 2

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat_____**+** [(% moderate and low intensity land uses)/2]_____**=**_____% > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat_____**+** [(% moderate and low intensity land uses)/2]_____**=**_____% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use points = (- 2) Does not meet criterion above points = 0	0
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 Add the points in the boxes above	6

Rating of Landscape Potential If score is: **x 4-9 = H 1-3 = M < 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* ☒ Site meets ANY of the following criteria: points = 2 It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is: **2 = H x 1 = M 0 = L** *Record the rating on the first page*

Wetland name or number 2

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Vernal pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool*. The soil in the wetland is shallow [< 1 ft (30 cm)deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. Yes **–** Go to **SC 1.1** No = **Not a vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes **–** Go to **SC 1.2** No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? Yes = **Category II** No = **Category III**	**Cat. II** **Cat. III**
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? The wetland has a conductivity > 3.0 mS/cm. The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland More than ¾ of the plant cover consists of species listed on Table 4 A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. Yes = **Category I** No= **Not an alkali wetland**	**Cat. I**
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 3.2** No – Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 3.4** No = **Not a WHCV**	**Cat. I**

SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? Yes = **Category I** No =**Not a WHCV**	

SC 4.0 Bogs and Calcareous Fens Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? *Use the key below to identify if the wetland is a bog or calcareous fen.* ***If you answer yes you will still need to rate the wetland based on its functions.*** SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils*. Yes – Go to **SC 4.3** No – Go to **SC 4.2** SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 4.3** No = **Is not a bog for rating** SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5? Yes = **Category I bog** No – Go to **SC 4.4 NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog. SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy? Yes = **Category I bog** No – Go to **SC 4.5** SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks? Yes = **Is a Calcareous Fen for purpose of rating** No – Go to **SC 4.6** SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met: ☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems ☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland Yes = **Is a Category I calcareous fen** No = **Is not a calcareous fen**	**Cat. I** **Cat. I**

SC 5.0. Forested Wetlands Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H 1.1*) ☐ The wetland is within the 100 year floodplain of a river or stream ☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species ☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see definitions in question H3.1)* Yes – Go to **SC 5.1** No = **Not a forested wetland with special characteristics**	

Wetland name or number 2

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)? Yes = **Category I** No – Go to **SC 5.2**	**Cat. I**
SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species? Yes = **Category I** No – Go to **SC 5.3**	**Cat. I**
SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)? Yes = **Category II** No – Go to **SC 5.4**	**Cat. II**
SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream? Yes = **Category II** No = **Not a forested wetland with special characteristics**	**Cat. II**
Category of wetland based on Special Characteristics *Choose the highest rating if wetland falls into several categories* If you answered No for all types, enter "Not Applicable" on Summary Form	

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

 Aspen Stands: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

 Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

 Old-growth/Mature forests: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in oldgrowth; 80-200 years old west and 80-160 years old east of the Cascade crest.

 Oregon White Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

 Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

 Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

 Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

 Cliffs: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

 Talus: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

 Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

 Shrub-steppe: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

- **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

- **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

THIS PAGE LEFT BLANK INTENTIONALLY

APPENDIX B

Chelan County Natural Resources Stream Typing for Parcel Number 212019000000 Report

Chelan County Natural Resource Department
411 Washington Street, Suite 201, Wenatchee, WA 98801 Phone (509) 667-6640 Fax (509) 667-6527

August 17, 2017

Stream Typing for Parcel Number 212019000000

On August 16, 2017 a site visit was made to Chelan County parcel #**212019000000**, at the request of Josh Jorgensen, on behalf of Tamarack Saddle LLC. The parcel is the site of a potential future development and expansion of Mission Ridge Ski Area. The stream type request was part of an effort to understand natural resource considerations and potential permitting requirements before submitting designs and permit applications to the County. The stream typing was only done within the conceptual expansion area within parcel 212019000000 (see Figures 1 and 2, maps of parcel and conceptual expansion area). According to the Washington Department of Natural Resources (DNR) FPARS mapping tool, many stream segments are present within the conceptual expansion area. The streams located in the conceptual expansion area are all listed as

"N" streams, or non-fish bearing (with the exception of one "U", or unknown stream). Each stream within the expansion area was typed and recorded.

For the purposes of this report, the conceptual expansion area was divided into two sections, sections A and B. Within these sections, streams showing on the DNR FPARs layer were numbered as a tracking system for reporting. The numbers and letters shown in Figure 2 correspond to the streams discussed in this report. Photos for each stream typed are inserted in the report with the determination.

Section A: Section A showed 8 streams according to the FPARs map; 7 "N' and 1 "U". The results of the stream typing in Section A are as follows.

Stream 1: Stream 1 is shown on the FPARs map in an area of complex terrain, with depressions that suggest the presence of water. Short sections of channelized terrain were noted, but these sections typically end in berms or ridges that water could not pass over. An old road grade follows the general path of the largest of these depressions, with no drainage structures present in the road grade (culverts, ditches, waterbars, etc). The road is still intact, indicating that water does not flow in the path of the depression often. Vegetation in these depressions and short sections of channel-like topography is upland-type vegetation (kinnikinnick, pipsissewa, oceanspray, vine maple). Though it is likely that water collects in these depressions during wet seasons or snow melt-off, **this stream does not qualify as a stream** due to lack of a continuous, defined and measurable channel, riparian vegetation, and surface connection with a larger stream.



Photo 1. A typical section of channel-like depression, terminating in a berm.



Photo 2. Another section of channel-like depression, showing lack of riparian vegetation and defined, measureable channel. The complex topography in this area results in many of these channel-like features which likely collect water during snowmelt, but do not qualify as a stream.

Stream 2: According to FPARs map, this stream begins on a steep side hill, just below the road on the northern edge of the expansion area. Upon inspection, there were no indicators of any type of stream in this area. The area is uniformly forested with thick dog-hair stands, with virtually no understory vegetation. No topographic features, defined channels, or riparian vegetation exist in this area. The stream shown on the map is likely a modeled extension of a topographical feature lower on the hillslope that appears as a gully or draw. **This stream does not qualify as a stream.**



Photo 3. The vicinity of stream 2, no evidence of a stream.

Stream 3: See notes for stream 2; this stream has no indicators of being a stream, for all of the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 4. The vicinity of stream 3, no evidence of a stream.

Stream 4: See notes for stream 2; this stream has no indicators of being a stream, for all of the reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 5. The vicinity of stream 4. The vegetation is growing at the edge of the road, but there is a distinct lack of understory vegetation on the forest floor, and no indicators of riparian vegetation or a defined channel of any kind.

Stream 5: See notes for stream 2; this stream has no indicators of being a stream, for the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 6. The vicinity of stream 5. There is no evidence of a defined measureable channel or riparian vegetation in this area.

Stream 6: See notes for stream 2; this stream has no indicators of being a stream, for the same reasons stated in the stream 2 description. **This stream does not qualify as a stream.**



Photo 7. The vicinity of stream 6. There are no indicators of presence of a stream in this area.

Note: Streams 2-6 were assessed by traversing across the hillslope about 150 below the road shown on the area map. This assessment provided adequate evidence that there are no streams located north of the road in the expansion area.



Photos 8. This photo shows the typical terrain in this area; steep hillside dropping off very steeply into sandstone cliff/gully formations above the housing community of Forest Ridge. There were no indications of streams on this section.

Stream 7: Stream 7 is shown on the FPARs map to enter the expansion area at the beginning of its path, and cross the road on the eastern edge of the expansion area. The road was searched for any evidence of water conveyance under the road or water passage over the road. No evidence of water conveyance was found. The sides of the road were also examined for evidence of a channel and/or riparian vegetation intersecting the road, and neither were found. The area of the stream shown on the map was searched, and no evidence of a measurable defined channel or riparian vegetation was found. **This stream does not qualify as a stream.**



Photo 9. The road along the eastern edge of the expansion area, in the vicinity of where stream 7 is shown on the map. There is no evidence of water conveyance under, over, or alongside the road in the form of ditches, culverts, or waterbars; nor is there any other evidence of a stream in the area.

Stream 8: Stream 8 is mapped as a "U", or Unknown stream on the FPARs map. The vicinity of this stream was investigated thoroughly, and no evidence of a measurable defined channel or any riparian vegetation was found. The topography of the area does not have an obvious water conveyance route, and is rolling and complex. **This stream does not qualify as a stream.**

Section B: Section B shows 6 streams according to the FPARs map, all of which are labeled as "N" streams. The results of the stream typing of the 6 streams in Section B are as follows.

Stream 1: Stream 1 does not actually enter the parcel identified for this stream typing, and is located on US Forest Service land. Stream 2, as discussed below, was typed as an Np stream, and any associated setback for Stream 2 would overlap and extend beyond any setback from Stream 1 that may extend into the expansion area, negating the need to type this stream for the purposes of this report.

Stream 2: Stream 2 was found to have a wetted, defined channel, with associated riparian vegetation, that begins just outside the southwest corner of the parcel. While stream characteristics were not in evidence above where the wetted channel begins just outside of the parcel boundary (making the actual stream slightly shorter than what is shown on the FPARs map, see Figure 3), the stream inside the parcel and within the expansion area was found to have flowing water, a defined channel, and riparian vegetation. The stream

appears to begin as a spring just below a steep hillside, and continues down on the path labeled as Stream 2 on the attached FPARs map. **This stream does qualify as an Np (non fish-bearing perineal) stream.**



Photo 10. Looking downslope to the start of Stream 2, which appears to begin from a spring on a steep hillside just outside of the parcel. Riparian vegetation is evident from this angle.



Photo 11. Flowing water appears below the steep hillside pictured above. The hillside above contains riparian vegetation, but the flowing water and defined channel appear about 50 feet lower than the start of the riparian vegetation.

Stream 3: Stream 3 does exhibit characteristics of an Np stream, but the stream as evidenced by a wetted channel and riparian vegetation begins below (downstream, north) of the road grade in the southwest corner of the parcel shown on the FPARs map. Just below the road grade, a depression occurs and riparian vegetation is evident. About 100 feet below the road grade, groundwater collects at the surface in a few small ponds; the water then travels in an easterly direction to meet with Stream 4. This easterly direction varies from what is shown on the FPARs map; rather than traveling north before merging with Stream 4, the wetted channel travels north east and merges with stream 4 higher up than what is shown on the FPARs map. See Figure 3 for mapping detail. **This stream does qualify as an Np stream.**



Photo 12. Water collects in a few small ponds before continuing its flow down and into a defined wetted channel. The stream below the intersection of Streams 3 and 4 is labeled as Stream 3, and meets the qualifications of being an Np stream. Stream 3 above the intersection with Stream 4 is also an Np stream, but only up to the road grade.



Photo13. Stream 2 continues to flow below the small ponds in a northeasterly direction before intersecting with Stream 4.

Stream 4: Stream 4 was observed as a short section of defined, measurable channel with riparian vegetation but no water, present from just outside the boundary of the expansion area to the intersection with Stream 3. The channel was observed to be of variable width with sections of about 3 feet at the widest, and have riparian vegetation present. The channel tapers out and disappears just north of the southern parcel boundary. The characteristics of this stream, including a defined measurable channel, riparian vegetation, a surface connection with a larger stream, but no water present indicate that **this stream qualifies as a Ns (non fish-bearing seasonal) stream.**



Photo 14. The measurable channel of Stream 4 is about 3 feet at its widest. As seen in this photo, the channel did not have running water at the time of this stream typing.



Photo 15. Riparian vegetation growing in the channel. While these species, including elderberry, bead lily, and mosses are not considered entirely riparian dependent species, vegetation in the channel differs significantly from the surrounding forest, indicating presence of more moisture in the channel. This fact, combined with the presence of the channel, indicates this is at least a seasonal, non-fish bearing stream.

Stream 5: Stream 5 shows on the FPARs map as a short stream section that quickly joins a larger stream. Upon inspection, no visible channel or riparian vegetation was located in this area. The area is covered by a talus field, which supports an aspen stand. The aspen stand is unusual as it grows directly from the talus, indicating presence of water below the rock. However, as there is no evidence of surface water or any kind of channel here, **this stream does not qualify as a stream**. The aspen stand will be examined by a wetlands biologist, as aspen qualifies as a wetland species.



Photo 16. The vicinity of Stream 5, showing the talus field with a small aspen community. There is no channel or any other riparian vegetation present in this area, negating the presence of a stream. However, the area will be assessed by a wetland biologist due to the presence of the aspen.

Stream 6: Stream 6 is shown on the FPARs map to begin in low angle terrain near the center of the parcel. Upon inspection, there is no evidence of a channel or riparian vegetation in the central area of the parcel. About halfway between where the stream is shown to begin on the FPARs map, and the confluence with Stream 2, the benchy terrain begins to exhibit short sections of channel-like features. However, these features do not connect with each other (nor are they in line), and do not contain riparian vegetation. Most of the depressions contain upland species such as kinnikinnick, pipsissewa, pine grass, and ponderosa pine, with the lower section containing bitterbrush. These terrain features are similar to those of Stream 1 in Section A, and tend to appear as dishes or depressions that often end in berms that water could not travel over.

The FPARs map shows the stream taking a sharp left bend before joining Stream 2, but this is impossible as water would have to travel side-hill to accomplish this bend. Rather, there is a larger depression leading directly downslope that does hold a semi-defined channel and some vegetation that could be considered riparian (elderberry), but this depression also ends in a large berm with no evidence of water passing over or under it, before reaching Stream 2. The complex terrain in this area makes the determination of a stream typing difficult, but due to the lack of a defined, measurable, contiguous channel, presence of obvious riparian vegetation, and surface connection with a larger stream, it is determined that **this stream does not qualify as a stream.** The terrain features here likely collect water during snow melt, but they are most likely present because of the geology and complexity of the terrain rather than water conveyance.



Photo 17. The vicinity of the central area of the parcel, where Stream 6 is shown to begin on the FPARs map. There is no indication of any channel or riparian vegetation in this area.



Photo. Lower down, after following the path of Stream 6 as shown on the FPARs map, terrain features such as the one pictured above begin to appear. These terrain features are disconnected and do not hold riparian vegetation or measurable, defined channels.



Photo 18. Another terrain feature with a channel-like section, but with no riparian vegetation and not connected to a channel feature below.



Photo 19. The area near where Stream 6 is shown to take a sharp left bend on the FPARs map. This type of bend is impossible here, as the stream would have to travel side-hill. There is also no evidence of riparian vegetation here, but rather distinctly upland species such as bitterbrush.

This stream typing was undertaken with the help of Andrea Lyons, a consultant with WA Conservation Science Institute, who is assisting Tamarack Saddle LLC with preparation of a resource management plan for the conceptual expansion of Mission Ridge Ski Area. Andrea's familiarity with the conceptual expansion area was of great help in locating and typing the streams shown on the FPARs map. All stream type determinations were made solely by me and were based on visual inspections of the vicinities of all streams shown on the FPARs map. If there are any questions please contact me @ 509-630-5303 or erin.mckay@co.chelan.wa.

Sincerely,

Erin McKay, Chelan County Natural Resource Specialist

Figure 1.

Chelan County GIS Parcel Search

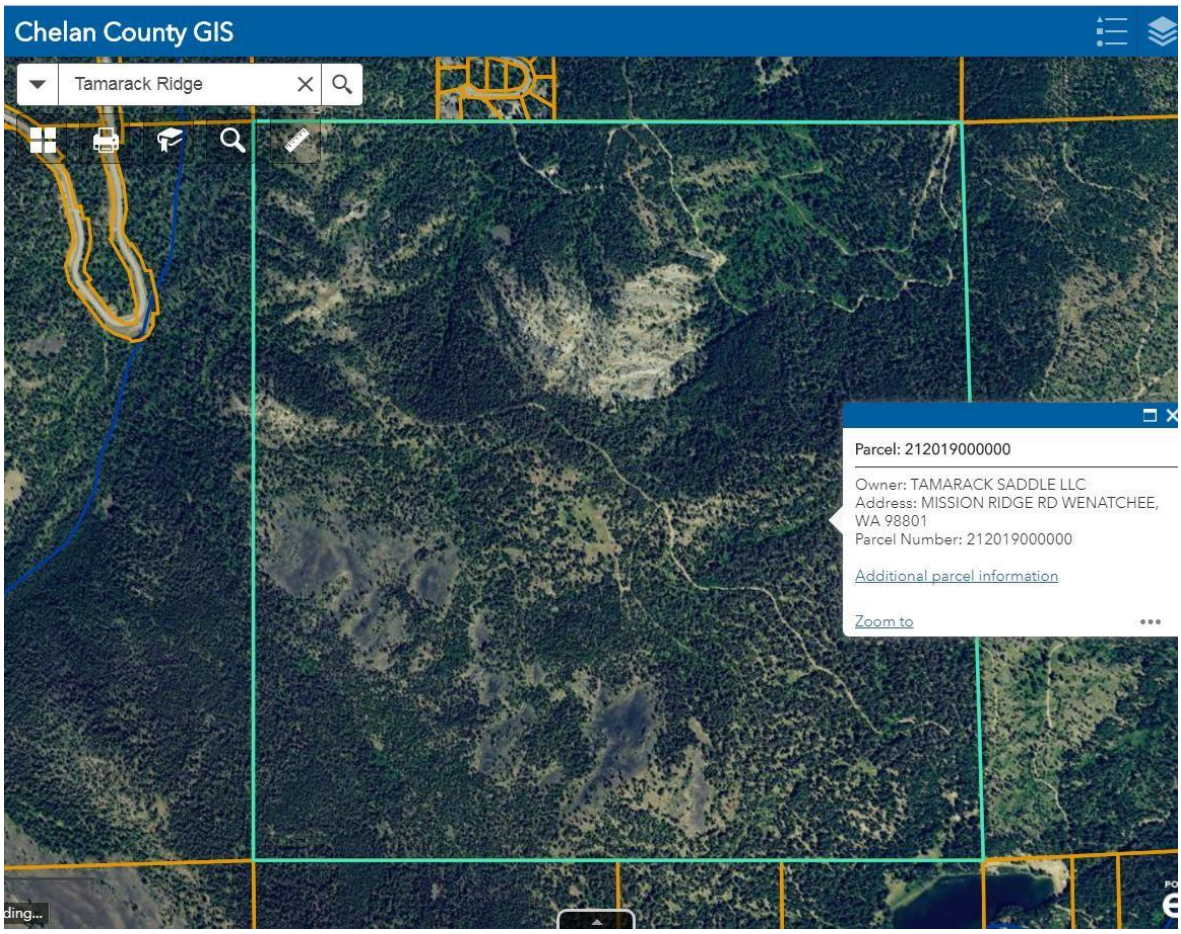


Figure 2.

FPARs map with Sections A and B drawn and labeled, and with each stream numbered as a tracking system for reporting.

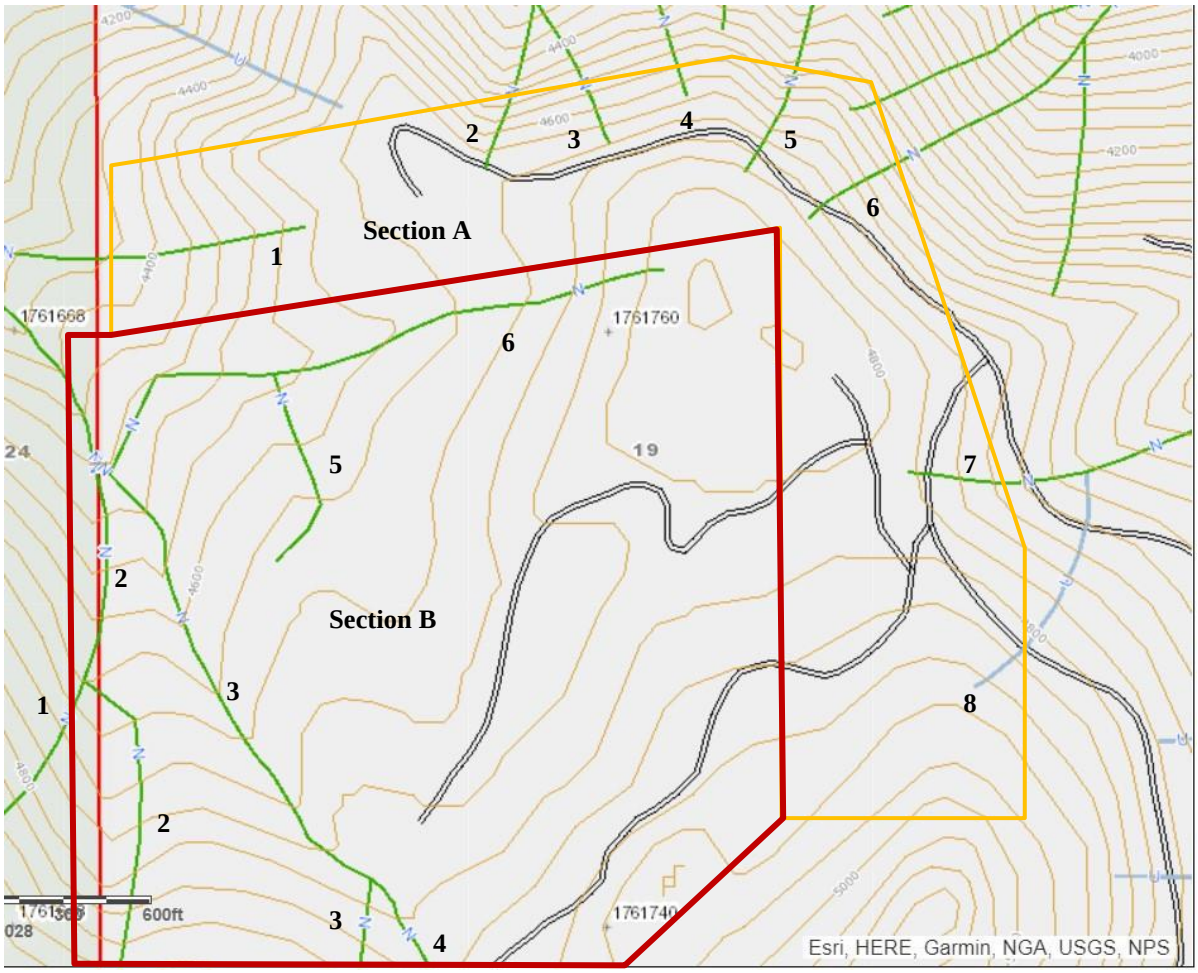
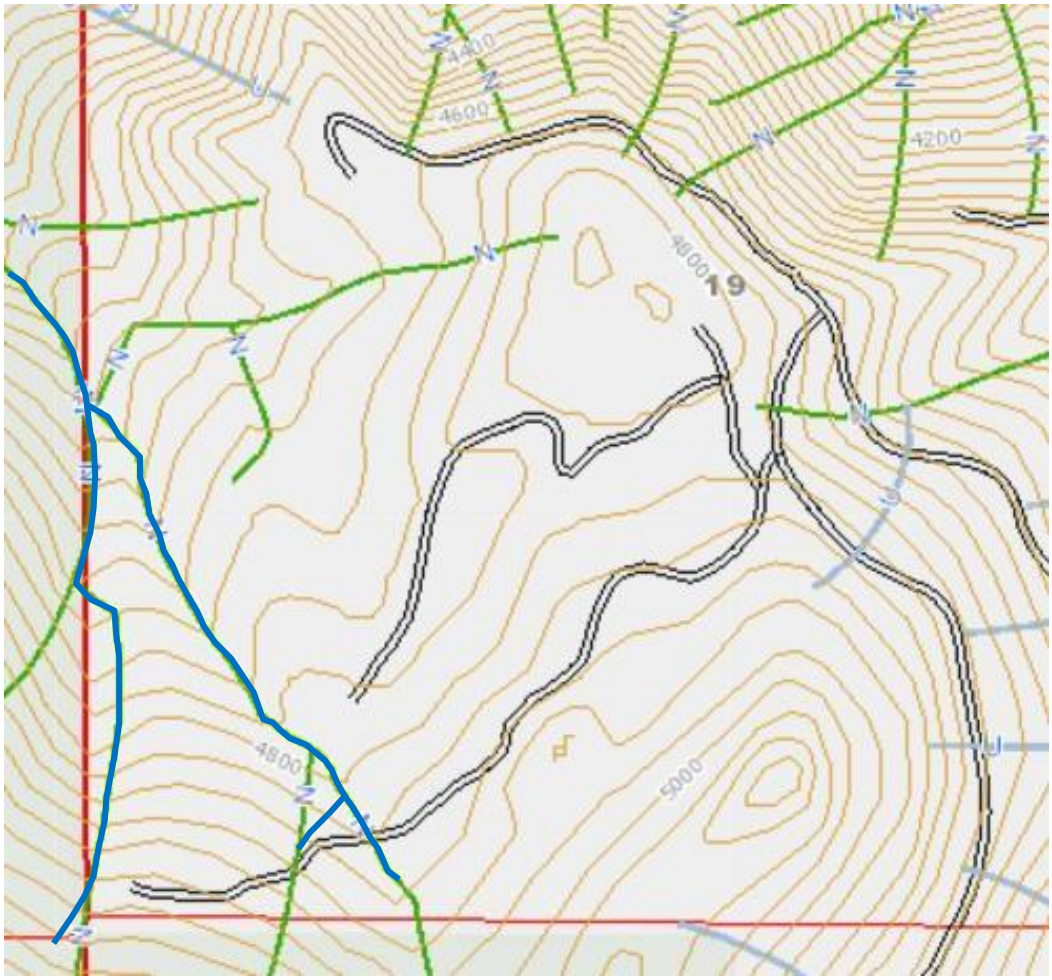


Figure 3.

Streams determined to actually qualify as streams, shown in dark blue. Only Streams 2 (Np), 3 (Np), and 4 (Ns), were found to qualify as streams. Corrections to FPARs streams are shown here as well.



FPARs mapping tool, Washington Department of Natural Resources. 2017.

resource management plan for the conceptual expansion of Mission Ridge Ski Area. Andrea's familiarity with the conceptual expansion area was of great help in locating and typing the streams shown on the FPARs map. All stream type determinations were made solely by me and were based on visual inspections of the vicinities of all streams shown on the FPARs map. If there are any questions please contact me @ 509-630-5303 or erin.mckay@co.chelan.wa.

Sincerely,
Erin McKay, Chelan County Natural Resource Specialist

Figure 1.
Chelan County GIS Parcel Search



APPENDIX C

Priority Habitat and Species Report and Map for the Mission Ridge Expansion Project Area.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic Query ID: P170327105804

REPORT DATE: 03/27/2017 10.58

Common Name / Scientific Name / Notes	Site Name / Source Dataset / Source Record / Source Date	Priority Area / Occurrence Type / More Information (URL) / Mgmt Recommendations	Accuracy	Federal Status / State Status / PHS Listing Status	Sensitive Data / Resolution	Source Entity / Geometry Type
Elk Cervus elaphus	NONEUM BASIN CALVING PHSREGION 901504	Breeding Area Parturition http://wdfw.wa.gov/publication s/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM ELK CALVING PHSREGION 901501	Breeding Area Parturition http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Elk Cervus elaphus	COLOCKUM MIGRATION PHSREGION 901510	Migration Migration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Mule deer Odocoileus hemionus	MISSION CREEK DEER PHSREGION 901318	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Northern goshawk Accipiter gentilis	KING CANYON WS_OccurPoint 52590 August 19, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 92889 May 16, 2001	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 100673 May 12, 1992	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102001 June 13, 1992	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 102022 May 21, 1998	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105435 June 05, 1996	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 105701 May 27, 1998	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publication s/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

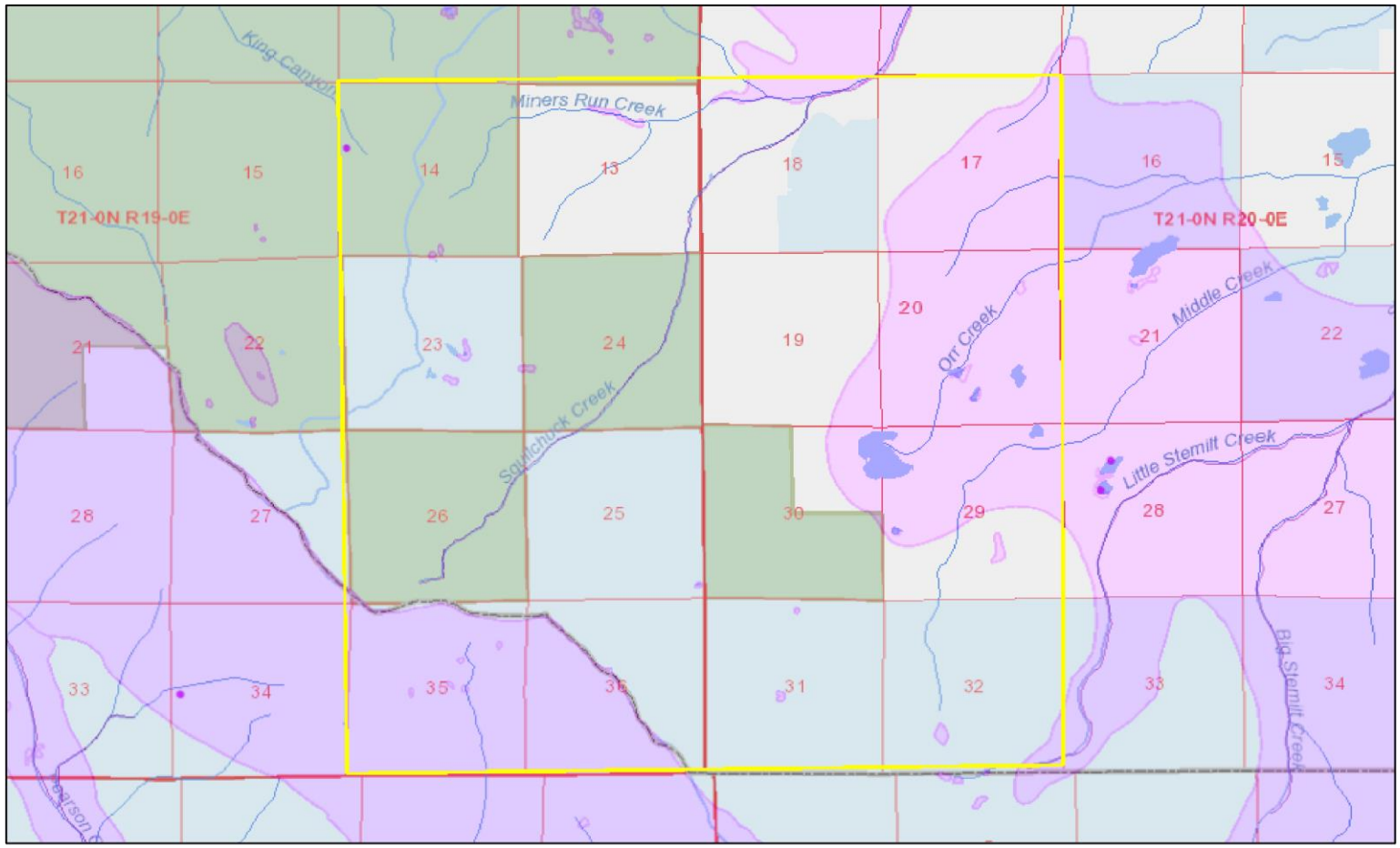
Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Rainbow Trout Oncorhynchus mykiss	Squilchuck Creek SWIFD 3531	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/divers	NA :y/soc/soc.htm	N/A N/A PHS LISTED	N AS MAPPED	Lines
Westslope Cutthroat Oncorhynchus clarki lewisi	Little Stemilt Creek SWIFD 3572	Occurrence/Migration Occurrence, http://wdfw.wa.gov/v:y/soc/soc.htm http://wdfw.wa.gov/publications,	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Westslope Cutthroat Oncorhynchus clarki lewisi	SWIFD 3650	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm http://wdfw.wa.gov/publications/pub.php?	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to vraition caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type

WDFW Test Map



APPENDIX G

Plants and Animals Reports

2024 Cascade Red Fox: Supplemental to the SEPA Wildlife Report (Washington Conservation Science Institute)

Cascade Red Fox

Supplement to the SEPA Wildlife Report

William L. Gaines

WASHINGTON CONSERVATION SCIENCE INSTITUTE

Leavenworth, Washington

Cascade Red Fox (*Vulpes vulpes cascadensis*) – State Endangered, USFS Sensitive Species

Methods

The methods used to conduct the assessment of potential effects to Cascade red fox are the same as described in WCSI (2018). The Project Area, used to assess potential direct and indirect effects, encompasses 1,058 acres of State, national forest, and private lands, and is where ground disturbance and vegetation modification is most likely to occur. The Assessment Area, used to address cumulative effects, includes the entire subwatersheds in which the project area overlaps. These include the Squilchuck and Stemilt subwatersheds that cover 28 square miles and 33 square miles, respectively.

Potential habitat for Cascade red fox was based on mapping of subalpine and alpine areas (see Species Review below) using vegetation mapping from a recent landscape evaluation (see Gaines et al. 2019).

Species Overview

The Cascade red fox historically occurred in the subalpine, parkland, upper montane forest, and alpine habitats of the Cascade Range of Washington and southern British Columbia. The lack of detections of Cascade red foxes in British Columbia in recent decades indicates that this species is now restricted to Washington (Lewis et al. 2021). Additionally, a southward range contraction appears to have occurred in Washington in recent decades, as the only known population now occurs in the South Cascades (south of the I-90 corridor and approximately 40 miles southwest of the project area). It now occurs within ≤50% of its historical range in the State (Lewis et al. 2021). A small number (n=5) of red foxes have been detected at remote camera stations north of I-90 since 2001 (approximately 25 miles west of the project area), however, a resident population has not been detected north of I-90 since the 1980s.

The Cascade red fox occurs year-round in subalpine meadow, parkland, upper montane forest and alpine habitats near the crest of the Cascade Range (Lewis et al. 2021). It prefers open-forest habitats, more typically found on the eastern slope of the Cascade Range (Aubry 1984, Akins 2017). They remain at high elevations (generally >4,000 feet) throughout the year, meaning they make a living in some of the harshest winter conditions for any mammal in the Cascades.

Habitat connectivity for Cascade red fox is most influenced by land cover type and to a lesser degree by elevation (Akins 2017). Connectivity is facilitated by subalpine parkland and upper montane forest habitats and hindered by mid-elevation forests. Roads and rivers do not significantly influence habitat connectivity for red foxes (Akins 2017).

Limited information is available on denning habitats of red foxes. However, several dens have been documented near human habitation in Mount Rainier National Park

and at Crystal Mountain Ski Resort (Aubry 1983, Akins and Chestnut, unpub. Data). Dens were located at the upper elevation extent of montane forest (Lewis et al. 2021).

Cascade red fox feed primarily on small mammals but also consume plants (berries), insects, and occasionally birds (Aubry 1983). The primary small mammal prey includes snowshoe hares, pocket gophers, and voles.

Several factors have been identified as influencing Cascade red fox survival and viability. These include climate change and the loss of a persistent snowpack, invasion by non-native foxes, and competition from coyotes. However, the primary factor that is relevant to the proposed ski area expansion is the habituation of foxes to human foods, which has been frequently observed at other high elevation human developments (e.g., Mount Rainier National Park, Crystal Mountain and White Pass Ski Areas and at Mount Adams (Lewis et al. 2021)). The feeding of red foxes at these sites places foxes at risk of conflicts with people, conflicts with visitor's pets, or visitor caused mortality (e.g., collisions with vehicles). These conflicts with foxes and people have not been observed at the existing Mission Ridge Resort, presumably due to the lack of any Cascade red foxes in the area.

The proposed ski resort development on private lands does not occur in high elevation habitats typically associated with red foxes but would lead to increased use of these habitats by skiers within the existing ski area (see Cumulative Effects) that does include subalpine and alpine habitats. The subalpine and alpine habitats occur on adjacent state and national forest lands. However, extensive remote camera surveys conducted in 2019-2021 (as part of an elk study, Gaines et al. 2022) failed to detect any Cascade red foxes, although other carnivores (black bears, cougars, bobcats, coyotes, wolves) were detected. This suggests there is a low probability that Cascade red foxes currently inhabit the proposed development area.

Environmental Baseline (No Action Alternative)
Portions of the Project Area consist of mid-successional forests with high canopy closure comprised of Douglas-fir and lodgepole pine and limited understory plants. Some areas include open conifer forests comprised of Douglas-fir and ponderosa pine, and areas of talus. These forest types are not typically associated with Cascade red fox primary habitats. The upper elevations of the Project Area include subalpine habitats more typically associated with Cascade fox habitats. There are approximately 706 acres of potential Cascade red fox habitat in the Project Area, and 9,225 acres of potential habitat in the Assessment Area.

Recent camera surveys (50 remote cameras in the upper portions of the Assessment Area and throughout the Project Area, operated for 2 years) in the area did not result in any detections of Cascade red fox suggesting that their occurrence in the Project Area and Assessment Area is unlikely. Both the Project Area and the

Assessment Area occur east of the main Cascade Range, which is the primary area identified as historical and current occupied habitat.

Proposed Action

Direct and Indirect Effects

There are approximately 225 acres of potential Cascade red fox habitat that would be impacted by ski runs, ski trails, ski lift construction, roads, and housing developments in the Project Area. This represents about 32% of the potential habitat in the Project Area.

Habituation of red foxes to human foods has been documented in other ski areas that are located in areas where Cascade red fox occurrences have been recently documented. The proposed development includes the installation of wildlife resistant sanitation facilities that would reduce the potential for red foxes to access human foods and waste. However, the results of recent camera surveys suggest there is relatively low probability that Cascade red foxes occur in the Project Area.

Cumulative Effects

The proposed actions of this alternative would impact about 2% of the potential Cascade red fox habitat in the Assessment Area. Other actions that may occur in the Assessment Area and could affect potential Cascade red fox habitat include vegetation management treatments on State lands in the upper Stemilt basin.

The direct, indirect, and cumulative effects of the proposed action is "not likely to jeopardize the continued existence" or lead to a need for further federal listing of the Cascade red fox. This is due to (1) recent surveys did not reveal the occurrence of red foxes in the Project or Assessment Areas, (2) the Project Area occurs well east of the primary habitat, and current and historical distribution of Cascade red foxes, and (3) the Proposed Actions include measures to limit wildlife access to human foods and garbage reducing the potential for wildlife to become habituated to human foods.

Literature Cited

Akins, J. 2017. Distribution, genetic structure, and conservation status of the Cascade red fox in southern Washington. Dissertation, University of California, Davis, CA.

Akins, J.R., K.B. Aubry, and B.N. Sacks. 2018. Genetic integrity, diversity, and population structure of the Cascade red fox. Conservation Genetics https://doi.org/10.1007/s10592-018-1070-y.

Aubry, K.B. 1983. The Cascade red fox: distribution, morphology, zoogeography, and ecology. Dissertation, University of Washington, Seattle, WA.

Aubry, K.B. 1984. The recent history and present distribution of the red fox in Washington. Northwest Science 58: 69-79.

Gaines, W.L., J.S. Begley, D.C. Churchill, and R.J. Harrod. 2019. Stemilt-Squilchuck Landscape Evaluation: final report. Washington Conservation Science Institute, Leavenworth, WA.

Gaines, W.L., A.L. Lyons, J.S. Begley, and E. McKay. 2022. Stemilt-Squilchuck Elk Camera Study: Elk movements, calving and timing of use. Washington Conservation Science Institute, Leavenworth, WA.

Lewis, J.C., J.R. Akins, and T. Chestnut. 2021. Status report of the Cascade red fox in Washington. Washington Department of Fish and Wildlife, Olympia, WA.

Washington Conservation Science Institute. 2018. Mission Ridge Expansion Project: Supplemental to SEPA Checklist. Aquatics, Wildlife and Botany Resources Report. Washington Conservation Science Institute, Leavenworth, WA.

APPENDIX G

Plants and Animals Reports

2024 Utility Corridor: Supplemental to the SEPA Fish and Wildlife Report (Washington Conservation Science Institute)

Utility Corridor

Supplement to the SEPA Fish and Wildlife Report

November 2024

WASHINGTON CONSERVATION SCIENCE INSTITUTE

William L. Gaines and James S. Begley

Utility Corridor Project

Introduction

The Utility Corridor project was not included in the original Mission Ridge Expansion project that was evaluated in the Fish, Wildlife and Plants report (WCSI 2018). Thus, this report amendment addresses the additional potential impacts of the Utility Corridor project on federal and state listed species. The project includes installation of water pipes and booster pumps plus utilities within an existing powerline corridor (Figure 1). The project area includes both federal (approximately 44 acres) and private (approximately 29 acres) lands running parallel to Squilchuck Creek for approximately 2 miles. The project would include vegetation clearing for approximately 30 feet on each side of the centerline of the corridor. In addition, there are booster pumps would be installed along the lines (see Figure 1 for approximate locations) each requiring a footprint of approximately 100 feet by 100 feet.

Methods

The species lists from the Fish, Wildlife and Plants report (WCSI 2018) was updated with new species listings or status changes (e.g., red fox) to determine the species potentially affected by the Utility Corridor project (Table 1, Appendix A). Field visits were completed in the fall of 2024 to identify and map habitats within the project area. In this amendment, a brief description of each species and their habitats in the project area, followed by the potential direct, indirect, and cumulative effects associated with the Utility Corridor project are presented.

The Utility Corridor Project Area is 100 feet from the centerline of the existing powerline corridor and was used to assess potential direct and indirect effects. This area encompasses 44 acres of national forest and 29 acres of private lands, and is where the direct and indirect effects are most likely to occur. The Assessment Area is the same as used in WCSI (2018), in the draft Mission Ridge Expansion Environmental Assessment, and in the red fox amendment (WCSI 2024). The assessment area is used to address cumulative effects and includes the Squilchuck and Stemilt subwatersheds that cover 28 square miles and 33 square miles, respectively (Fig. 2).

Table 1. The fish, wildlife, and plant species and habitats that may occur in the Utility Corridor Project Area an are addressed in this supplemental report.

Species	**Status**	**Status in Project Area**
Federally Listed Species		
Northern Spotted Owl	Federal Threatened, State Endangered	Potential habitat present
Gray Wolf	Federal Endangered, State Endangered	Potential habitat present

State Candidate and PHS Species		
Northern Goshawk	State-Candidate	Potential habitat present
Townsend's Big-eared Bat	State-Candidate	Potential habitat present
Columbia Spotted Frog	State Candidate	Potential habitat present
Western Toad	State Candidate	Potential habitat present
Mountain Sucker	State Candidate	Unknown
Pileated Woodpecker	State Candidate	Potential habitat present
American Marten	PHS Species	Potential habitat present
Dusky Grouse	PHS Species	Potential habitat present
Sooty Grouse	PHS Species	Potential habitat present
Elk	PHS Species	Potential habitat present
Mule Deer	PHS Species	Potential habitat present
Plants and Priority Habitats		
Pasque Flower	State Threatened	Likely to be present
Smoky Mountain Sedge	Federal Sensitive, State Threatened	Likely to be present
Brewer's Cliff Brake	Federal Sensitive, State Sensitive	Likely to be present
Wetlands	PHS habitat	0.5 acres wetland
Riparian	PHS habitat	20 acres
Old Growth Forest	PHS habitat	2 acres

Federal/State Listed Species

Northern Spotted Owl and Critical Habitat-Threatened

The northern spotted owl is federally listed as a Threatened species (USFWS 1990). A recovery plan was completed in 2011 (USFWS 2011) and revised critical habitat was designated in 2012 (USFWS 2012). In 1994, the Northwest Forest Plan amended the Okanogan-Wenatchee Land and Resource Management Plan. One of the primary components of the Northwest Forest Plan was the designation of a system of reserves to provide for the conservation and recovery of wildlife species, such as the northern spotted owl, that are associated with late-successional forests. Additionally, the Washington State Department of Fish and Wildlife designated

Spotted Owl Special Emphasis Areas to supplement the level of protection for spotted owls provided in the federal reserves. The Utility Corridor project area and the assessment area does not include any designated critical habitat for the northern spotted owl, any of the federal reserves that were designated under the Northwest Forest Plan, and does not include a State designated Special Emphasis Area for spotted owls. Outside of reserves or critical habitat, the management of spotted owls focuses on the protection of suitable habitat around spotted owl activity centers.

Forest conditions that provide for nesting/roosting functions for northern spotted owls in the eastern Cascades are generally characterized as having a relatively high degree of structural complexity (see Gaines et al. 2015 for a recent summary). These forest conditions generally include a high canopy closure (e.g., >70%) and multiple canopy layers (e.g., multiple age or size classes of trees). These forests are generally composed of grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) forested plant associations in dry and mesic forests, and western hemlock (*Tsuga heterophylla*) in moist forest associations (Buchanan et al. 1995, Herter et al. 2002, Irwin et al. 2000, Loehle et al. 2011). The presence of large snags and coarse downed wood is quite variable in spotted owl nesting habitat, but mistletoe appears to be regularly associated with nesting habitat (Buchanan et al. 1995, Loehle et al. 2011, Marshal et al. 2003).

Spotted owls begin nesting in early March and extends until juveniles disperse from the nesting area in August and September. Monitoring of spotted owl nests in the eastern Cascades has shown that spotted owl juveniles are generally mobile enough to move away from disturbance by the end of July.

The primary prey species for northern spotted owls in the eastern Cascades include northern flying squirrels (*Glaucomys sabrinus*) and bushy-tailed woodrats (*Neotoma cinerea*) (Forsman et al. 2001, 2004; Lehmkuhl et al. 2006a,b). Foraging habitat includes nesting/roosting habitat but also includes forests that are less structurally complex and would not support successful nesting.

Dispersal habitat is used by spotted owls to move between patches of nesting/ roosting, and foraging habitats. Dispersal habitat is composed of single or multi-layered forests with moderate sized trees, and canopy closure >40%.

Surveys for northern spotted owls were conducted throughout the assessment area from the late 1980s through 2006, and again during 2018. A single spotted owl was located within the assessment area in 1996 and a resident single spotted owl within the assessment area in 1998. No spotted owl nesting has been documented within the Utility Corridor project area or in the assessment area. There are 5 acres of suitable spotted owl habitat in the Utility Corridor project area, 3 acres on private lands and 2 acres on federal lands. There are approximately 1,754 acres of spotted owl habitat within the assessment area and 243 acres occurs on federal lands.

The effects of the Utility Corridor project will be assessed on spotted owls and their habitats using the following indicators: potential for disturbance during nesting and changes to amount of suitable habitat.

Direct and Indirect Effects

There is limited potential for disturbance to occur to nesting habitat, however, this potential is low, and timing restrictions would be implemented if needed.

The clearing that would occur to provide for the installation of the utility lines and the booster pumps would result in the removal of approximately 2 acres of suitable spotted owl habitat, 1 acre on federal land and 1 acre on private land.

Cumulative Effects

The clearing that would occur during the installation of the utility lines and booster pumps would reduce the amount of suitable spotted owl habitat in the assessment area to 1,752 acres. Approximately 242 acres of this habitat occurs on federal lands, with the remaining habitat on private land (586 acres), WDFW land (435 acres), WDNR land (263 acres) and county land (226 acres). None of these lands are in a land allocation that emphasizes spotted owl habitat. There are ongoing projects within the assessment area (not associated with the Mission Ridge Ski Expansion) on county land and WDNR lands for forest thinning and fuel reduction treatments that could reduce spotted owl habitat by 489 acres. This would result in cumulative effects to about 28% of the spotted owl habitat in the assessment area.

There are 15,403 acres of dispersal habitat in the assessment area. Five acres would be removed as a result of the Mission Ridge Expansion project and an additional approximately 500 acres may be removed as a result of other ongoing or proposed projects on Chelan County, WDNR and WDFW lands. Cumulatively, this would reduce the amount of dispersal habitat by about 505 acres (3%) in the assessment area.

Summary of Effects

The activities associated with the Mission Ridge Ski Expansion and the Utility Corridor project do not occur in an area designated to emphasize spotted owl recovery. The project occurs on the eastern edge of the range of the spotted owl. The Utility Corridor project would remove 2 acres of suitable spotted owl habitat within theUtility Corridor project area. There is limited potential for disturbance to occur to nesting habitat, however, this potential is low, and timing restrictions would be implemented if needed. Based on the direct, indirect, and cumulative effects, the Mission Ridge Ski Expansion and Utility Corridor project “may effect, but is not likely to adversely effect” spotted owls and their habitat.

There is no designated critical habitat for the northern spotted owl in the Utility Corridor project area or in the assessment area. Therefore, a determination of “no effect” to spotted owl critical habitat has been made.

Gray Wolf - Endangered

The gray wolf is federally listed as an Endangered species in the western two thirds of Washington State (USFWS 2003). Recovery regulations require consideration of potential impacts to known denning habitat or rendezvous sites (USFWS 2003).

Gray wolves historically occurred throughout much of the state of Washington but were nearly extirpated by the 1940s through aggressive predator control efforts (Laufer and Jenkins 1989, Gaines et al. 2000). In the early 1990s, wolves started to be documented again in the Cascade Mountains (Fritts 1992, Gaines et al. 1995) and have sense recolonized the northeastern portion of the state and much of the North Cascades with at least 260 wolves in 42 packs and 25 breeding pairs (WDFW et al. 2024). The closest pack to the assessment area is the Naneum Pack which now only has one wolf maintaining a territory (WDFW et al. 2024). Wolves have been documented to occur in the upper Stemilt and Squilchuck Basins and may occasionally move through the project area (see remote camera results in Gaines et al. 2022). However, there are no known den or rendezvous sites.

Wolf packs are generally comprised of breeding pairs and older offspring that help in the feeding and care of current-year pups. Wolf activity during pup rearing is centered on den and rendezvous sites that are used throughout the spring until mid-summer (Mech 1970, USFWS 2003). Gray wolves are considered to be vulnerable to human disturbance while at den and rendezvous sites (Mech et al. 1991, Frame et al. 2007).

The gray wolf is dependent upon an adequate supply of prey, primarily deer and elk (Messier 1995, Vales and Peek 1995, WDFW 2011). Mule deer and elk occur in the project area (see Deer and Elk below). Elk habitat quality was assessed using the approach described in Gaines et al. (2019).

The effects of the Utility Corridor project will be assessed on gray wolves and their habitats using the following indicators: potential for disturbance during the pup-rearing period, effects to security habitat, and effects to their primary prey.

<u>Direct and Indirect Effects</u>

At this time, the Naneum wolf pack is not a known breeding pair, meaning there are no known den or rendezvous sites associated with this pack. Pack monitoring by the Washington Department of Fish and Wildlife occurs during the late-winter and if a den or rendezvous sites are discovered, mitigation measures would be applied to protect these sites and reduce human disturbance. The potential for disturbance to gray wolves during the pup-rearing period from the Utility Corridor project is very low.

The implementation of the Utility Corridor project would not change the availability of security habitat for wolves.

The Utility Corridor project would have limited impacts to deer and elk habitat (see Deer and Elk below).

Cumulative Effects

Within the assessment area, the proposed Mission Ridge expansion activities would reduce security habitat for wolves on private lands by 2.5 acres. Existing activities within the assessment area already reduces security habitat on private lands. Cumulatively, the existing security habitat for wolves would be reduced by less than 1% across all land ownerships. This is largely due to the existing high levels of human activities that precludes security habitat.

Within the assessment area elk habitat quality would change but only to a limited degree. The amount of area rated as low quality elk habitat would increase from 50 to 52% of the assessment area, the amount rated as moderate would be reduced from 44 to 42% of the assessment area, and the amount of high quality habitat would remain at 6% of the assessment area. While disturbance from Mission Ridge Ski Area expansion and Utility Corridor project may alter elk movement patterns and displace within portions of the project area, elk are highly mobile and capable to finding alternative routes between summer and winter ranges. The activities would not alter the availability of elk as a food resource for wolves.

Summary of Effects

The direct, indirect, and cumulative effects associated with the Utility Corridor project "may effect but is not likely to adversely effect" gray wolves and their habitat. This determination is made based on the following: 1) no know denning or rendezvous sites and mitigations to protect sites if discovered, 2) no effects to security habitat in the Utility Corridor project area and limited effects to security habitat within the assessment area, and 3) limited effects to prey species within the Utility Corridor project area and within the assessment area.

State Candidate and PHS Species
Northern Goshawk-Candidate, Pileated Woodpecker-Candidate

Northern goshawks and pileated woodpeckers are associated with forested areas with older forests mixed conifer forests with high canopy closure. Northern goshawks select mature conifer forests for nesting (Lewis and Azerrad, 2003, USFS, 2012). We mapped approximately 8 acres of potential northern goshawk and pileated woodpecker habitat within the Utility Corridor project area, all on private land. There are approximately 4,200 acres of potential habitat within the assessment area.

Direct and Indirect Effects

Vegetation clearing associated with the Utility Corridor project would remove approximately 3 acres of potential goshawk and pileated woodpecker habitat.

Cumulative Effects
There are ongoing projects in the assessment area, not associated with the Mission Ridge Expansion, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce habitat for goshawks and pileated woodpeckers by 489 acres. The cumulative effects of the activities across all land ownerships would reduce the amount of habitat by 630 acres (15%) within the Assessment Area.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion Project and Utility Corridor, habitat for northern goshawk and pileated woodpecker would be reduced but remaining habitat (approximately 3,570 acres) would most likely be adequate to maintain their viability (Gaines et al. 2017).

Townsends Big-eared Bat-Candidate

Roosting habitat for Townsend's big-eared bat may possibly be located in large trees or large snags (Woodruff and Ferguson, Hayes and Wiles 2013). Bat roosts are often located within human created structures such as old barns and buildings. There are approximately 10 acres of forested area within the Utility Corridor project area that could provide large tree and/or large snag habitat for bats.

Direct and Indirect Effects
Vegetation clearing associated with the Utility Corridor project would remove up to 4 acres of potential roosting habitat for big-eared bats, 1 acre on federal land and 3 acres on private lands.

Cumulative Effects
Tree removal associated with the Mission Ridge Expansion project would result in loss of some snag habitat on 58 acres of federal lands and 16 acres of state lands in the Project Area.

There are ongoing projects, not associated with the Mission Ridge Expansion Project, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce forest canopy, restore spatial pattern, and manage for restoration of large trees on 489 acres within the Assessment Area. These treatments would retain large snags and promote the development of large trees that may benefit bats but would reduce the amount of small snag habitat.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, the project would not likely effect the viability of the Townsend's big-eared bat. The activities within the assessment area reduce snag and large tree habitat, but only on a small portion (<4%) of the habitat available in the assessment area.

Columbia Spotted Frog and Western Toad-Candidates

The Columbia spotted frog is associated with riparian habitat along permanent bodies of water and wetlands (Leonard et al., 1993). Potential habitat for the Columbia spotted frog and Western toad may occur within the riparian habitat of Squilchuck Creek (approximately 20 acres) and in the wetland (0.5 acres) that occurs in the Utility Corridor project area and 2,650 acres of riparian and wetland habitats within the assessment area.

The western toad is a medium to large sized toad that is found throughout Washington. Although local populations may be healthy, populations across the range have declined. Western toads occur in a variety of terrestrial habitats including prairies, forests, canyon grasslands and ponderosa pine-Oregon oak habitat. Adult toads are primarily terrestrial, but often occur near permanent water bodies, especially in drier climates and during breeding (Hallock and McAllister, 2005).

Direct and Indirect Effects

Approximately 8 acres of riparian and wetland habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 4 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects

There are approximately 2,650 acres of riparian and wetland habitats within the assessment area. Approximately 8 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted as a result of the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects

The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would not likely affect the viability of Columbia spotted frog or western toad. All riparian and wetland habitats within the project area and assessment area would be protected by federal, state, or county regulations.

American Marten (PHS)

American marten are generally found in mature and older forests with large snags and fallen trees at mid to high-elevations (Munzing and Gaines 2008). There are

approximately 8 acres (all on private land) of potential habitat within the Utility Corridor project area and 5,100 acres within the assessment area.

Direct and Indirect Effects
Vegetation clearing associated with the Utility Corridor project would remove approximately 3 acres of potential habitat for the American marten, all on private lands.

Cumulative Effects
There are ongoing projects, not associated with the Mission Ridge Expansion, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce American marten habitat by 489 acres. The cumulative effects of the activities across all land ownerships would reduce the amount of American marten habitat by 630 acres (12%) within the Assessment Area.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion Project and Utility Corridor, habitat for the American marten would be reduced but remaining habitat 4,470 acres) would likely be adequate to maintain their viability (Gaines et al. 2017).

Mountain Sucker-Candidate

Mountain sucker are found in high elevation mountainous areas in western North America. In Washington, Mountain sucker are only found in the Columbia River basin, east of the Cascade mountain range, in the Columbia River and its tributaries including the Cowlitz, Yakima, Wenatchee, and Palouse River basins (Wydoski and Whitney, 2003). Mountain sucker inhabit small mountain streams, generally less than 40 feet wide with summer water temperatures ranging from 12 to 21°C. They are small fish reaching up to nine inches in length and can live up to nine years. Preferred substrates are comprised of sand, gravel, and boulders. They can also be found in large rivers and lakes and reservoirs. In early to mid-summer, mountain sucker generally spawn in riffles below pools. Mountain sucker feed primarily on algae and diatoms and invertebrate larvae. They may provide a food source for other fish species such as trout and aquatic birds. In 1998, mountain sucker was listed as a state candidate species by WDFW because of lack of information on its distribution and status in Washington (Wydoski and Whitney, 2003).

There are approximately 10 acres of stream associated riparian habitats that occur within the Utility Corridor project area and 2,650 acres in the assessment area.

Direct and Indirect Effect
Approximately 7.5 acres of riparian habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 3.5 acres of stream riparian habitats occur on private lands and would be subject to riparian mitigations associated with county regulations.

Cumulative Effects
There are approximately 2,650 acres of riparian habitats within the assessment area. Approximately 7.5 acres of riparian habitats would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian will be impacted from the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects
The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project is unlikely to affect the viability of the Mountain Sucker. All riparian habitats within the project area and assessment area would be protected by federal, state, or county regulations.

Dusky and Sooty Grouse-PHS

Dusky grouse and sooty grouse (previously known as blue grouse) are found in mountainous areas with open coniferous forests. The grouse in the Utility Corridor project area are most likely dusky grouse or a hybrid of the two subspecies (Schroeder 2006) and have been observed on the site. They are closely associated with streams, springs, and meadows (Ware et al. 2008). There are approximately 20 acres of riparian habitat and wetland habitat in the Utility Corridor project area, and 2,650 acres of riparian and wetland habitats within the assessment area.

Direct and Indirect Effects
Approximately 8 acres of habitat for dusky and sooty grouse occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 4 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects
There are approximately 2,650 acres of riparian area and wetlands that provide habitat for dusky and sooty grouse within the assessment area. Approximately 8 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted from the Mission Ridge Expansion project. Impacts to riparian and wetland habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects
The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would have some limited impacts habitat for dusky and sooty grouse. However, most impacts to riparian and wetland habitats within the project area and assessment area would be mitigated by federal, state, or county regulations.

Rocky Mountain Elk and Mule Deer-PHS

Elk are a state-listed Priority Species and a Federal Management Indicator Species. Elk are often seen in the vicinity of the project area (Gaines et al. 2022). These elk are part of the Colockum Elk Herd and use the Stemilt and Squilchuck watershed area as summer range and the Stemilt portion of the assessment area as calving habitat. The project area is used as summer range and elk likely migrate through the project area as they move from summer to winter ranges. Elk calving in Washington is generally from mid-May to mid-July.

Recent research has highlighted the importance of forage quality and quantity on elk summer range, particularly in late summer and early fall, and how nutrition influences elk body condition, productivity, calf growth, and survival (Cook et al. 2004, 2013, 2018). Recently developed methods used to assess elk habitat better account for elk nutrition (Rowland et al. 2018) and to better assess how proposed projects may influence elk forage or elk access to high value forage areas, in addition to other factors that influence elk habitat use (i.e. roads) (Rowland et al. 2018, Wisdom et al. 2018). Therefore, to assess elk habitat within the project area, key indicators that were used included elk forage, cover, security habitat, and terrain to assess habitat quality (see Gaines et al. 2019 for a detailed description).

Mule deer are a state-listed Priority Species and a Federal Management Indicator Species. Deer are common within the project area. The Stemilt and Squilchuck watersheds are used by mule deer for summer range and at the lower elevations as winter range. The project area is used by mule deer as summer range and is adjacent to winter range. Mule deer often use riparian areas with dense vegetative cover for fawning during May through July in eastern Washington (WDFW 2016). Habitat quality, in particular forage quality and quantity, can influence mule deer habitat use, productivity, and survival (Forrester and Wittmer 2013). The key indicators used to assess habitat quality for mule deer included forage, cover, and habitat security (Table 2).

Table 2. A comparison of pre- and post-project habitat quality indices for deer and elk in the Utility Corridor project area.

Pre-Post Project	**Habitat Quality Acres (%)**			
	Low	**Moderate**	**High**	**Very High**
Pre Project	25 (35%)	36 (51%)	10 (14%)	0
Post Project	32 (45%)	32 (45%)	7 (10%)	0

Direct and Indirect Effects

Implementation of the Utility Corridor project would reduce 3 acres of high quality habitat and 4 acres of moderate quality habitat to low quality habitat as a result of

vegetation removal and disturbance associated with construction activities (Table 2).

Cumulative Effects

The proposed Mission Ridge Expansion activities on private lands reduces elk and deer habitat quality on 524 acres from activities associated with the human development (houses, condos, road, etc.). While elk and deer may continue to use these areas, they would be subject to relatively high levels of human disturbance.

Within the assessment area and across all landownerships, elk and deer habitat quality would change but only to a limited degree. The amount of area rated as low quality habitat would increase from 50 to 52% of the assessment area, the amount rated as moderate would be reduced from 44 to 42% of the assessment area, and the amount of high quality habitat would remain at 6% of the assessment area.

Summary of Effects

While disturbance from Mission Ridge Ski Area expansion and the Utility Corridor project may alter elk and deer movement patterns and displace them from portions of the assessment area, elk and deer are highly mobile and capable of finding alternative routes between summer and winter ranges.

Priority Habitats - Wetlands and Riparian Habitats

Wetlands are important landscape features that provide habitat for many plants and animals such as water lilies, sedges, amphibians and reptiles, as well as waterfowl, migrating birds, fish, and mammals (EPA 2004). Wetlands function to absorb floodwaters, nutrients, sediments and pollutants before they reach other waterbodies.

One wetland was assessed and delineated within the Project Area by qualified professional wetland biologists (Ecosystems Northwest 2024). It was determined that the wetlands fit the Class III category. Category III wetlands are wetlands with a moderate level of functions and can often be adequately replaced with a well-planned mitigation project (Hruby 2014).

There are approximately 20 acres of riparian habitat and 0.5 acres of wetland habitat in the Utility Corridor project area, and 2,650 acres of riparian and wetland habitats within the assessment area.

Direct and Indirect Effect

Approximately 8 acres of riparian and wetland habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 4 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects

There are approximately 2,650 acres of riparian and wetland habitats within the assessment area. Approximately 8 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted from the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/ wetland regulations.

Summary of Effects

The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would have some limited impacts on riparian and wetland habitats. All riparian and wetland habitats within the project area and assessment area would be protected by federal, state, or county regulations.

Old-Growth Forest Habitat

There are approximately 2 acres of old growth forest habitat identified in the project area (old growth maps based on Davis et al. 2015).

Direct and Indirect Effects

The vegetation clearing associated with the Utility Corridor could potentially remove 0.2 acres of old growth habitat.

Cumulative Effects

There are approximately 3,765 acres of old growth forest identified within the assessment area. The Utility Corridor project would have minimal impacts to old growth forest habitats.

Literature Cited

Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1995. Within-stand nest site selection by spotted owls in the eastern Washington Cascades. Journal of Wildlife Management 59: 301-310.

Cook, J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. DelCurto, L.D. Bryant, and L.L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monograph 155: 1-61.

Cook, R.C., J.G. Cook, D.J. Vales, B.K. Johnson, SM. McCorquodale, LA. Shipley, RA. Riggs, LL. Irwin, SL. Murphie, BL. Murphie, KA. Schoenecker, F. Geyer, P. Briggs Hall, RD. Spencer, DA. Immell, DH. Jackson, BL. Tiller, PJ. Miller, and L, Schmitz. 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. J. Wildlife Management 184(1):1-45.

Cook, J.G., R.C. Cook, R.W. Davis [and others]. 2018. Development and evaluation of a landscape nutrition model for elk in western Oregon and Washington. Wildlife Monograph 199: 13-30.

Davis, R.J., J.L. Ohmann, R.E. Kennedy, W.B. Cohen, M.J. Gregory, Z. Yang, H.M. Roberts, A.N. Gray, and T.A. Spies. 2015. Northwest Forest Plan-The first20 years (1994-2013): Status and trends of late-successional and old growth forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-911.

Ecosystems Northwest. 2024. Wetland delineation and stream typing report for Mission Ridge. Ecosystems Northwest, Mount Shasta, CA.

Forrester, T.D., and H.U. Wittmer. 2013. A review of the population dynamics of mule deer and black-tailed deer *Odocoileus hemionus* in North America. Mammal Review 43(4): https://doi.org/10.1111mam.12002.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research, 35(2): 141-150.

Forsman, E.D., R.G. Anthony, E.C. Meslow and C.J. Zabel. 2004. Diets and foraging behavior of northern spotted owls in Oregon. Journal of Raptor Research 38: 214-230.

Frame, P.F., H.D. Cluff, and D.S. Hik. 2007. Response of wolves to experimental disturbance at homesites. Journal of Wildlife Management 71(2):316-320.
Fritts, S.H. 1992. Wolf recovery in the state of Washington. International Wolf (Winter):19-20.

Gaines, W.L., G.K. Neale, and R.H. Naney. 1995. Response of coyotes and gray wolves to simulated howling in Northcentral Washington. Northwest Science, 69(3):217-222.

Gaines, W.L., P. Singleton, and A.L. Gold. 2000. Conservation of rare carnivores in the North Cascades Ecosystem, western North America. Natural Areas Journal, 20:366-375.

Gaines, W.L., P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-586.

Gaines, W.L., M. Haggard, J.F. Lehmkuhl, A.L. Lyons, and R.J. Harrod. 2007. Short-term response of land birds to ponderosa pine restoration. Restoration Ecology 15(4): 670-678.

Gaines, W., M. Haggard, J. Begley, J. Lehmkuhl, and A. Lyons. 2010. Short-term effects of thinning and burning restoration treatments on avian community composition, density, and nest survival in the eastern Cascades dry forests, Washington. Forest Science 56(1): 88-99.

Gaines, W.L., J.B. Buchanan, J.F. Lehmkuhl, K. Halupka, and P.H. Singleton. 2015. Chapter 3: Northern spotted owl issues and objectives. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-915.

Gaines, W.L., B.C. Wales, L.H. Suring, J.S. Begley, K. Mellen-McLean and S. Mohoric. 2017. Terrestrial species viability assessments for National Forests in northeastern Washington. General Technical Report PNW-GTR-907. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 324 pp.

Gaines, W.L., J.S. Begley, D. Churchill, and R.J. Harrod. 2019b. Stemilt-Squilchuck Landscape Evaluation. Final Report to the Chelan County Natural Resources Department, Wenatchee, Wa. June 2019.

Gaines, W.L., A.L. Lyons, J.S. Begley, and E. McKay. 2022. Stemilt-Squilchuck Elk Camera Study: elk movements, calving, and time of use. Final Report to the Chelan County Natural Resources Department, Wenatchee, Wa.

Hays, D.W. and E.A. Rodrick. 2004. Flammulated owl. Pages 24-1 – 24-4 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Herter, D.R. L.L. Hicks, H.C. Stabins, J.J. Millspaugh, A.J. Stabins, and L.D. Melampy. 2002. Roost side characteristics of northern spotted owls during the nonbreeding season in central Washington. Forest Science 48: 437-444.

Hruby, T. 2014. Washington State Wetland Rating System for Eastern Washington: 2014 update. Publication No. 14-06-030. Washington Department of Ecology, Olympia, WA.

Irwin, L.L., D.F. Rock, and G.P. Miller. 2000. Stand structures used by northern spotted owls in managed forests. Journal of Raptor Research 34: 175-186.

Irwin, L.L., L.A. Clark, D.C. Rock, and S.L. Rock. 2007. Modeling foraging habitat of California spotted owls. Journal of Wildlife Management 71: 1183-1191.

Laufer, J.R. and P.T. Jenkins. 1989. Historical and present status of the gray wolf in the Cascades Mountains of Washington. Northwest Environmental Journal, 5:313-327.

Lehmkuhl, J.F., K.D. Kistler, and J.S. Begley. 2006a. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy. 87(2):371-379.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006b. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Lewis, J.C. and J.M. Azerrad. 2004. Pileated woodpecker. Pages 29-1 – 29-9 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA

Loehle, C., L. Irwin, J. Beebe, and T. Fleming. 2011. Factors influencing the distribution of northern spotted owls in the eastern Cascades, Washington. Northwestern Naturalist 92: 19-36.

Marshall, K., M. Mamone, and R. Barclay. 2003. A survey of Douglas-fir dwarf mistletoe brooms used for nests by northern spotted owls on the Applegate Ranger District and Ashland Resource Area in southwest Oregon. Western Journal of Applied Forestry 18(2): 115-117.

Mech, L.D. 1970. The wolf: the ecology and behavior of an endangered species. Doubleday Publishing Co., New York.

Mech, L.D., T.J. Meier, and J.W. Burch. 1991. Denali Park wolf studies: implications for Yellowstone. Transactions of the North American Wildlife and Natural Resources Conference, 56:86-90.

Messier, F. 1995. On the functional and numeric responses of wolves to changing prey density. In Carbyn, L.N., S.H. Fritts, and D.R. Seip (eds). Ecology and conservation of wolves in a changing world: 187-198. Edmonton, AB: Canadian Circumpolar Institute.

Munzing, D., and W.L. Gaines. 2008. Monitoring American marten on the east-side of the North Cascades of Washington. Northwestern Naturalist 89: 67-75.

Rowland, M.M., R.M. Nielson, M.J. Wisdom [and others]. 2018. Linking nutrition with landscape features in a regional habitat-use model for elk in western Oregon and Washington. Wildlife Monograph 199: 31-49.

Schroeder, M. 2006. Blue grouse divided by two equals Dusky and Sooty Grouse. Washington Birder: 14(3): 3pp. Washington Department of Fish and Wildlife, Bridgeport, WA

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl; Final Rule. *Federal Register* 55(123):26114-26194. June 26, 1990.

U.S. Fish and Wildlife Service (USFWS). 2003. Endangered and threatened wildlife and plants; final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; Final and Proposed Rules. *Federal Register* 68(62):15803-15875. April 1, 2003.

U.S. Fish and Wildlife Service (USFWS). 2011. *Revised Final Recovery Plan for the Northern Spotted Owl - Strix occidentalis caurina.* US Fish and Wildlife Service (USFWS). Portland, Oregon. xvi + 258 pp. Available online at http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Register* 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12- 04/pdf/2012-28714.pdf

Vales, D. J. and J. M. Peek. 1995. Projecting the potential effects of wolf predation on elk and mule deer in the east front portion of the northwest Montana wolf recovery area. Pages 211-222 in L. N. Carbyn, S. H. Fritts, and D. R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, Edmonton, Alberta, Canada.

Ware, D. 2008. Management recommendations for Blue Grouse (Ducky and Sooty grouse). Washington Department of Fish and Wildlife, Olympia, WA.

Washington Conservation Science Institute (WCSI). 2018. Mission Ridge Expansion Project. Supplemental SEPA Checklist. Aquatics, Wildlife and Botany Resources Report. Report on File, Washingtion Conservation Science Institute, P.O. Box, Leavenworth, WA. 98826.

Washington Department of Fish and Wildlife (WDFW). 2011. Washington Gray Wolf Conservation and Management Plan. Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2016. Washington State Mule Deer Management Plan, Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 144 p.

Washington Department of Fish and Wildlife, Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, Yakama Nation, Swinomish Indian Tribal Community, and U.S. Fish and Wildlife Service. 2024. Washington gray wolf conservation and management 2023 annual report. Washington Department of Fish and Wildlife, Ellensburg, WA, USA.

Wisdom, M.J., M.M. Rowland, R.M. Nielson [and others]. 2018. Modeling to evaluate elk habitat: contemporary approaches for western Oregon and Washington. Wildlife Monograph 199: 8-12.

Woodruff, K., and H. Ferguson. 2008. Management recommendations for Townsend's big-eared bat. Washington Department of Fish and Wildlife, Olympia, WA.

Wydoski, R.S., and R.R. Whitney. 2003. Inland Fishes of Washington. University of Washington Press, Seattle.

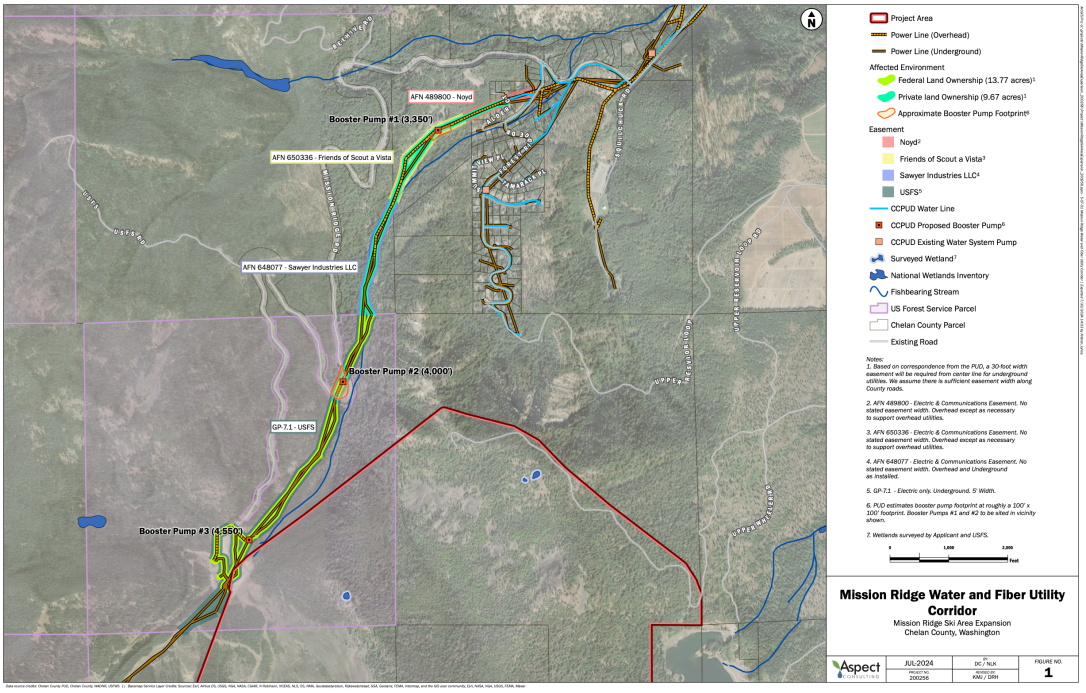


Figure 1. Map showing the Utility Corridor and booster pump locations.

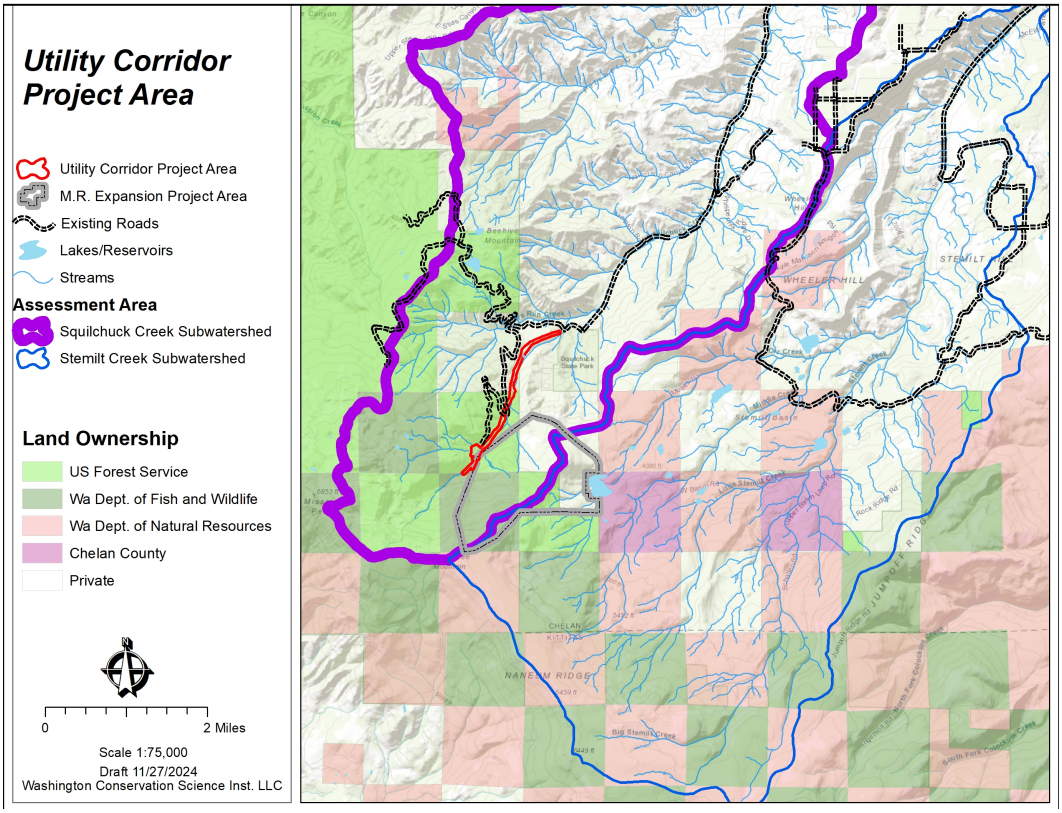


Figure 2. Map of the Utility Corridor Project Area and the Assessment Area.

Appendix A.
Species not likely to occur in the Utility Corridor Project area.

Species	**Status**	**Status in Project Area**
Golden Eagle	State Candidate	Not Likely present due to lack of habitat
Cascade Red Fox	Federal Threatened, State Candidate	Not likely present due to lack of habitat
Grizzly Bear	Federal Threatened, State Endangered	Not likely present
Canada Lynx	Federal Threatened, State Endangered	Not likely present due to lack of habitat
Wolverine	Federal Threatened, State Candidate	Not likely present due to lack of habitat
White-headed Woodpecker	State Candidate	Habitat not present
Flammulated Owl	State Candidate	Habitat not present
Spring Chinook Salmon	Federal Endangered, State Candidate	Not likely to be present due to lack of habitat and passage barriers
Bull Trout	Federal Threatened, State Candidate	Not likely to be present to due lack of habitat and other natural limiting factors
Steelhead	Federal Threatened, State Candidate	Not likely to be present due to passage barriers
Leopard Dace	State Candidate	Not likely to be present due to lack of habitat
Pygmy Whitefish	State Candidate	Not likely to be present due to lack of habitat
Umatilla Dace	State Candidate	Not likely to be present due to lack of habitat
Whitebark Pine	Federal Threatened	Not likely to be present, too low in elevation

Smoky Mountain Sedge	Federal Sensitive, State Threatened	Not likely to be present, too low in elevation
Brewer's Cliff Brake	Federal Sensitive, State Sensitive	Not likely to be present, too low in elevation
Pasque Flower	State Threatened	Not likely to be present, too low in elevation
Aspen	PHS habitat	Not present
Shrub Steppe	PHS habitat	Not present

APPENDIX G

Plants and Animals Reports

2025 Utility Corridor: Supplemental to the SEPA Fish and Wildlife Report (Washington Conservation Science Institute)

Utility Corridor

Supplement to the SEPA Fish and Wildlife Report

May 2025 Amendment

WASHINGTON CONSERVATION SCIENCE INSTITUTE

William L. Gaines and James S. Begley

Utility Corridor Project

Introduction

The Utility Corridor project was not included in the original Mission Ridge Expansion project that was evaluated in the Fish, Wildlife and Plants report (WCSI 2018). Thus, this report amendment addresses the additional potential impacts of the Utility Corridor project on federal and state listed species. The project includes installation of water pipes and booster pumps plus utilities within an existing powerline corridor (Figure 1a). The project area includes both federal (approximately 44 acres) and private (approximately 32 acres) lands running parallel to Squilchuck Creek for approximately 2 miles. The project would include vegetation clearing for approximately 30 feet on each side of the centerline of the corridor. In addition, there are booster pumps would be installed along the lines (see Figure 1a for approximate locations) each requiring a footprint of approximately 100 feet by 100 feet.

Methods

The species lists from the Fish, Wildlife and Plants report (WCSI 2018) was updated with new species listings or status changes (e.g., red fox) to determine the species potentially affected by the Utility Corridor project (Table 1, Appendix A). Field visits were completed in the fall of 2024 and spring of 2025 to identify and map habitats within the project area. In this amendment, a brief description of each species and their habitats in the project area, followed by the potential direct, indirect, and cumulative effects associated with the Utility Corridor project are presented.

The Utility Corridor Project Area is 100 feet from the centerline of the existing powerline corridor and was used to assess potential direct and indirect effects. This area encompasses 44 acres of national forest and 32 acres of private lands, and is where the direct and indirect effects are most likely to occur. The Assessment Area is the same as used in WCSI (2018), in the draft Mission Ridge Expansion Environmental Assessment, and in the red fox amendment (WCSI 2024). The assessment area is used to address cumulative effects and includes the Squilchuck and Stemilt subwatersheds that cover 28 square miles and 33 square miles, respectively (Fig. 2a).

Table 1. The fish, wildlife, and plant species and habitats that may occur in the Utility Corridor Project Area an are addressed in this supplemental report.

Species	**Status**	**Status in Project Area**
Federally Listed Species		
Northern Spotted Owl	Federal Threatened, State Endangered	Potential habitat present
Gray Wolf	Federal Endangered, State Endangered	Potential habitat present

State Candidate and PHS Species		
Northern Goshawk	State-Candidate	Potential habitat present
Townsend's Big-eared Bat	State-Candidate	Potential habitat present
Columbia Spotted Frog	State Candidate	Potential habitat present
Western Toad	State Candidate	Potential habitat present
Mountain Sucker	State Candidate	Unknown
Pileated Woodpecker	State Candidate	Potential habitat present
American Marten	PHS Species	Potential habitat present
Dusky Grouse	PHS Species	Potential habitat present
Sooty Grouse	PHS Species	Potential habitat present
Elk	PHS Species	Potential habitat present
Mule Deer	PHS Species	Potential habitat present
Plants and Priority Habitats		
Pasque Flower	State Threatened	Likely to be present
Smoky Mountain Sedge	Federal Sensitive, State Threatened	Likely to be present
Brewer's Cliff Brake	Federal Sensitive, State Sensitive	Likely to be present
Wetlands	PHS habitat	0.5 acres wetland
Riparian	PHS habitat	20 acres
Old Growth Forest	PHS habitat	2 acres

Federal/State Listed Species

Northern Spotted Owl and Critical Habitat-Threatened

The northern spotted owl is federally listed as a Threatened species (USFWS 1990). A recovery plan was completed in 2011 (USFWS 2011) and revised critical habitat was designated in 2012 (USFWS 2012). In 1994, the Northwest Forest Plan amended the Okanogan-Wenatchee Land and Resource Management Plan. One of the primary components of the Northwest Forest Plan was the designation of a system of reserves to provide for the conservation and recovery of wildlife species, such as the northern spotted owl, that are associated with late-successional forests. Additionally, the Washington State Department of Fish and Wildlife designated

Spotted Owl Special Emphasis Areas to supplement the level of protection for spotted owls provided in the federal reserves. The Utility Corridor project area and the assessment area does not include any designated critical habitat for the northern spotted owl, any of the federal reserves that were designated under the Northwest Forest Plan, and does not include a State designated Special Emphasis Area for spotted owls. Outside of reserves or critical habitat, the management of spotted owls focuses on the protection of suitable habitat around spotted owl activity centers.

Forest conditions that provide for nesting/roosting functions for northern spotted owls in the eastern Cascades are generally characterized as having a relatively high degree of structural complexity (see Gaines et al. 2015 for a recent summary). These forest conditions generally include a high canopy closure (e.g., >70%) and multiple canopy layers (e.g., multiple age or size classes of trees). These forests are generally composed of grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) forested plant associations in dry and mesic forests, and western hemlock (*Tsuga heterophylla*) in moist forest associations (Buchanan et al. 1995, Herter et al. 2002, Irwin et al. 2000, Loehle et al. 2011). The presence of large snags and coarse downed wood is quite variable in spotted owl nesting habitat, but mistletoe appears to be regularly associated with nesting habitat (Buchanan et al. 1995, Loehle et al. 2011, Marshal et al. 2003).

Spotted owls begin nesting in early March and extends until juveniles disperse from the nesting area in August and September. Monitoring of spotted owl nests in the eastern Cascades has shown that spotted owl juveniles are generally mobile enough to move away from disturbance by the end of July.

The primary prey species for northern spotted owls in the eastern Cascades include northern flying squirrels (*Glaucomys sabrinus*) and bushy-tailed woodrats (*Neotoma cinerea*) (Forsman et al. 2001, 2004; Lehmkuhl et al. 2006a,b). Foraging habitat includes nesting/roosting habitat but also includes forests that are less structurally complex and would not support successful nesting.

Dispersal habitat is used by spotted owls to move between patches of nesting/ roosting, and foraging habitats. Dispersal habitat is composed of single or multi-layered forests with moderate sized trees, and canopy closure >40%.

Surveys for northern spotted owls were conducted throughout the assessment area from the late 1980s through 2006, and again during 2018. A single spotted owl was located within the assessment area in 1996 and a resident single spotted owl within the assessment area in 1998. No spotted owl nesting has been documented within the Utility Corridor project area or in the assessment area. There are 5 acres of suitable spotted owl habitat in the Utility Corridor project area, 3 acres on private lands and 2 acres on federal lands. There are approximately 1,754 acres of spotted owl habitat within the assessment area and 243 acres occurs on federal lands.

The effects of the Utility Corridor project will be assessed on spotted owls and their habitats using the following indicators: potential for disturbance during nesting and changes to amount of suitable habitat.

Direct and Indirect Effects

There is limited potential for disturbance to occur to nesting habitat, however, this potential is low, and timing restrictions would be implemented if needed.

The clearing that would occur to provide for the installation of the utility lines and the booster pumps would result in the removal of approximately 2 acres of suitable spotted owl habitat, 1 acre on federal land and 1 acre on private land.

Cumulative Effects

The clearing that would occur during the installation of the utility lines and booster pumps would reduce the amount of suitable spotted owl habitat in the assessment area to 1,752 acres. Approximately 242 acres of this habitat occurs on federal lands, with the remaining habitat on private land (586 acres), WDFW land (435 acres), WDNR land (263 acres) and county land (226 acres). None of these lands are in a land allocation that emphasizes spotted owl habitat. There are ongoing projects within the assessment area (not associated with the Mission Ridge Ski Expansion) on county land and WDNR lands for forest thinning and fuel reduction treatments that could reduce spotted owl habitat by 489 acres. This would result in cumulative effects to about 28% of the spotted owl habitat in the assessment area.

There are 15,403 acres of dispersal habitat in the assessment area. Five acres would be removed as a result of the Mission Ridge Expansion project and an additional approximately 500 acres may be removed as a result of other ongoing or proposed projects on Chelan County, WDNR and WDFW lands. Cumulatively, this would reduce the amount of dispersal habitat by about 505 acres (3%) in the assessment area.

Summary of Effects

The activities associated with the Mission Ridge Ski Expansion and the Utility Corridor project do not occur in an area designated to emphasize spotted owl recovery. The project occurs on the eastern edge of the range of the spotted owl. The Utility Corridor project would remove 2 acres of suitable spotted owl habitat within the Utility Corridor project area. There is limited potential for disturbance to occur to nesting habitat, however, this potential is low, and timing restrictions would be implemented if needed. Based on the direct, indirect, and cumulative effects, the Mission Ridge Ski Expansion and Utility Corridor project “may effect, but is not likely to adversely effect” spotted owls and their habitat.

There is no designated critical habitat for the northern spotted owl in the Utility Corridor project area or in the assessment area. Therefore, a determination of “no effect” to spotted owl critical habitat has been made.

Gray Wolf - Endangered

The gray wolf is federally listed as an Endangered species in the western two thirds of Washington State (USFWS 2003). Recovery regulations require consideration of potential impacts to known denning habitat or rendezvous sites (USFWS 2003).

Gray wolves historically occurred throughout much of the state of Washington but were nearly extirpated by the 1940s through aggressive predator control efforts (Laufer and Jenkins 1989, Gaines et al. 2000). In the early 1990s, wolves started to be documented again in the Cascade Mountains (Fritts 1992, Gaines et al. 1995) and have sense recolonized the northeastern portion of the state and much of the North Cascades with at least 260 wolves in 42 packs and 25 breeding pairs (WDFW et al. 2024). The closest pack to the assessment area is the Naneum Pack which now only has one wolf maintaining a territory (WDFW et al. 2024). Wolves have been documented to occur in the upper Stemilt and Squilchuck Basins and may occasionally move through the project area (see remote camera results in Gaines et al. 2022). However, there are no known den or rendezvous sites.

Wolf packs are generally comprised of breeding pairs and older offspring that help in the feeding and care of current-year pups. Wolf activity during pup rearing is centered on den and rendezvous sites that are used throughout the spring until mid-summer (Mech 1970, USFWS 2003). Gray wolves are considered to be vulnerable to human disturbance while at den and rendezvous sites (Mech et al. 1991, Frame et al. 2007).

The gray wolf is dependent upon an adequate supply of prey, primarily deer and elk (Messier 1995, Vales and Peek 1995, WDFW 2011). Mule deer and elk occur in the project area (see Deer and Elk below). Elk habitat quality was assessed using the approach described in Gaines et al. (2019).

The effects of the Utility Corridor project will be assessed on gray wolves and their habitats using the following indicators: potential for disturbance during the pup-rearing period, effects to security habitat, and effects to their primary prey.

<u>Direct and Indirect Effects</u>

At this time, the Naneum wolf pack is not a known breeding pair, meaning there are no known den or rendezvous sites associated with this pack. Pack monitoring by the Washington Department of Fish and Wildlife occurs during the late-winter and if a den or rendezvous sites are discovered, mitigation measures would be applied to protect these sites and reduce human disturbance. The potential for disturbance to gray wolves during the pup-rearing period from the Utility Corridor project is very low.

The implementation of the Utility Corridor project would not change the availability of security habitat for wolves.

The Utility Corridor project would have limited impacts to deer and elk habitat (see Deer and Elk below).

Cumulative Effects

Within the assessment area, the proposed Mission Ridge expansion activities would reduce security habitat for wolves on private lands by 2.5 acres. Existing activities within the assessment area already reduces security habitat on private lands. Cumulatively, the existing security habitat for wolves would be reduced by less than 1% across all land ownerships. This is largely due to the existing high levels of human activities that precludes security habitat.

Within the assessment area elk habitat quality would change but only to a limited degree. The amount of area rated as low quality elk habitat would increase from 50 to 52% of the assessment area, the amount rated as moderate would be reduced from 44 to 42% of the assessment area, and the amount of high quality habitat would remain at 6% of the assessment area. While disturbance from Mission Ridge Ski Area expansion and Utility Corridor project may alter elk movement patterns and displace within portions of the project area, elk are highly mobile and capable to finding alternative routes between summer and winter ranges. The activities would not alter the availability of elk as a food resource for wolves.

Summary of Effects

The direct, indirect, and cumulative effects associated with the Utility Corridor project "may effect but is not likely to adversely effect" gray wolves and their habitat. This determination is made based on the following: 1) no know denning or rendezvous sites and mitigations to protect sites if discovered, 2) no effects to security habitat in the Utility Corridor project area and limited effects to security habitat within the assessment area, and 3) limited effects to prey species within the Utility Corridor project area and within the assessment area.

State Candidate and PHS Species
Northern Goshawk-Candidate, Pileated Woodpecker-Candidate

Northern goshawks and pileated woodpeckers are associated with forested areas with older forests mixed conifer forests with high canopy closure. Northern goshawks select mature conifer forests for nesting (Lewis and Azerrad, 2003, USFS, 2012). We mapped approximately 13.5 acres of potential northern goshawk and pileated woodpecker habitat within the Utility Corridor project area, all on private land. There are approximately 4,200 acres of potential habitat within the assessment area.

Direct and Indirect Effects

Vegetation clearing associated with the Utility Corridor project would remove approximately 4.5 acres of potential goshawk and pileated woodpecker habitat, all on private lands.

Cumulative Effects
There are ongoing projects in the assessment area, not associated with the Mission Ridge Expansion, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce habitat for goshawks and pileated woodpeckers by 489 acres. The cumulative effects of the activities across all land ownerships would reduce the amount of habitat by 630 acres (15%) within the Assessment Area.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion Project and Utility Corridor, habitat for northern goshawk and pileated woodpecker would be reduced but remaining habitat (approximately 3,570 acres) would most likely be adequate to maintain their viability (Gaines et al. 2017).

Townsends Big-eared Bat-Candidate

Roosting habitat for Townsend's big-eared bat may occur in large trees or large snags (Woodruff and Ferguson, Hayes and Wiles 2013). Bat roosts are often located within human created structures such as old barns and buildings. There are approximately 15 acres of forested area within the Utility Corridor project area that could provide large tree and/or large snag habitat for bats.

Direct and Indirect Effects
Vegetation clearing associated with the Utility Corridor project would remove up to 5 acres of potential roosting habitat for big-eared bats, 1 acre on federal land and 4 acres on private lands.

Cumulative Effects
Tree removal associated with the Mission Ridge Expansion project would result in loss of some snag habitat on 58 acres of federal lands and 16 acres of state lands in the Project Area.

There are ongoing projects, not associated with the Mission Ridge Expansion Project, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce forest canopy, restore spatial pattern, and manage for restoration of large trees on 489 acres within the Assessment Area. These treatments would retain large snags and promote the development of large trees that may benefit bats but would reduce the amount of small snag habitat.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, the project would not likely effect the viability of the Townsend's big-eared bat. The activities within the assessment area reduce snag and large tree habitat, but only on a small portion (<4%) of the habitat available in the assessment area.

Columbia Spotted Frog and Western Toad-Candidates

The Columbia spotted frog is associated with riparian habitat along permanent bodies of water and wetlands (Leonard et al., 1993). Potential habitat for the Columbia spotted frog and Western toad may occur within the riparian habitat of Squilchuck Creek (approximately 20 acres) and in the wetland (0.5 acres) that occurs in the Utility Corridor project area and 2,650 acres of riparian and wetland habitats within the assessment area.

The western toad is a medium to large sized toad that is found throughout Washington. Although local populations may be healthy, populations across the range have declined. Western toads occur in a variety of terrestrial habitats including prairies, forests, canyon grasslands and ponderosa pine-Oregon oak habitat. Adult toads are primarily terrestrial, but often occur near permanent water bodies, especially in drier climates and during breeding (Hallock and McAllister, 2005).

Direct and Indirect Effects

Approximately 20 acres of riparian and wetland habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 3.5 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects

There are approximately 2,650 acres of riparian and wetland habitats within the assessment area. Approximately 7.5 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted as a result of the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects

The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would not likely affect the viability of Columbia spotted frog or western toad. All riparian and wetland habitats within the project area and assessment area would be protected by federal, state, or county regulations.

Pacific Marten (PHS)

Pacific marten are generally found in mature and older forests with large snags and fallen trees at mid to high-elevations (Munzing and Gaines 2008). There are

approximately 5 acres (all on private land) of potential habitat within the Utility Corridor project area and 5,100 acres within the assessment area.

Direct and Indirect Effects
Vegetation clearing associated with the Utility Corridor project would remove approximately 2 acres of potential habitat for the American marten, all on private lands.

Cumulative Effects
There are ongoing projects, not associated with the Mission Ridge Expansion, on county lands and WDNR lands for forest thinning and fuel reduction treatments that could reduce American marten habitat by 489 acres. The cumulative effects of the activities across all land ownerships would reduce the amount of American marten habitat by 630 acres (12%) within the Assessment Area.

Summary of Effects
Based on the direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion Project and Utility Corridor, habitat for the American marten would be reduced but remaining habitat 4,470 acres) would likely be adequate to maintain their viability (Gaines et al. 2017).

Mountain Sucker-Candidate

Mountain sucker are found in high elevation mountainous areas in western North America. In Washington, Mountain sucker are only found in the Columbia River basin, east of the Cascade mountain range, in the Columbia River and its tributaries including the Cowlitz, Yakima, Wenatchee, and Palouse River basins (Wydoski and Whitney, 2003). Mountain sucker inhabit small mountain streams, generally less than 40 feet wide with summer water temperatures ranging from 12 to 21°C. They are small fish reaching up to nine inches in length and can live up to nine years. Preferred substrates are comprised of sand, gravel, and boulders. They can also be found in large rivers and lakes and reservoirs. In early to mid-summer, mountain sucker generally spawn in riffles below pools. Mountain sucker feed primarily on algae and diatoms and invertebrate larvae. They may provide a food source for other fish species such as trout and aquatic birds. In 1998, mountain sucker was listed as a state candidate species by WDFW because of lack of information on its distribution and status in Washington (Wydoski and Whitney, 2003).

There are approximately 20 acres of stream associated riparian habitats that occur within the Utility Corridor project area and 2,650 acres in the assessment area.

Direct and Indirect Effect
Approximately 7.5 acres of riparian habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 3.5 acres of stream riparian habitats occur on private lands and would be subject to riparian mitigations associated with county regulations.

Cumulative Effects
There are approximately 2,650 acres of riparian habitats within the assessment area. Approximately 7.5 acres of riparian habitats would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian will be impacted from the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects
The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project is unlikely to affect the viability of the Mountain Sucker. All riparian habitats within the project area and assessment area would be protected by federal, state, or county regulations.

Dusky and Sooty Grouse-PHS

Dusky grouse and sooty grouse (previously known as blue grouse) are found in mountainous areas with open coniferous forests. The grouse in the Utility Corridor project area are most likely dusky grouse or a hybrid of the two subspecies (Schroeder 2006) and have been observed on the site. They are closely associated with streams, springs, and meadows (Ware et al. 2008). There are approximately ? acres of riparian habitat and wetland habitat in the Utility Corridor project area, and 2,650 acres of riparian and wetland habitats within the assessment area.

Direct and Indirect Effects
Approximately 8 acres of habitat for dusky and sooty grouse occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 4 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects
There are approximately 2,650 acres of riparian area and wetlands that provide habitat for dusky and sooty grouse within the assessment area. Approximately 8 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted from the Mission Ridge Expansion project. Impacts to riparian and wetland habitats in the assessment area would be mitigated by federal, state and county riparian/wetland regulations.

Summary of Effects
The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would have some limited impacts habitat for dusky and sooty grouse. However, most impacts to riparian and wetland habitats within the project area and assessment area would be mitigated by federal, state, or county regulations.

Rocky Mountain Elk and Mule Deer-PHS

Elk are a state-listed Priority Species and a Federal Management Indicator Species. Elk are often seen in the vicinity of the project area (Gaines et al. 2022). These elk are part of the Colockum Elk Herd and use the Stemilt and Squilchuck watershed area as summer range and the Stemilt portion of the assessment area as calving habitat. The project area is used as summer range and elk likely migrate through the project area as they move from summer to winter ranges. Elk calving in Washington is generally from mid-May to mid-July.

Recent research has highlighted the importance of forage quality and quantity on elk summer range, particularly in late summer and early fall, and how nutrition influences elk body condition, productivity, calf growth, and survival (Cook et al. 2004, 2013, 2018). Recently developed methods used to assess elk habitat better account for elk nutrition (Rowland et al. 2018) and to better assess how proposed projects may influence elk forage or elk access to high value forage areas, in addition to other factors that influence elk habitat use (i.e. roads) (Rowland et al. 2018, Wisdom et al. 2018). Therefore, to assess elk habitat within the project area, key indicators that were used included elk forage, cover, security habitat, and terrain to assess habitat quality (see Gaines et al. 2019 for a detailed description).

Mule deer are a state-listed Priority Species and a Federal Management Indicator Species. Deer are common within the project area. The Stemilt and Squilchuck watersheds are used by mule deer for summer range and at the lower elevations as winter range. The project area is used by mule deer as summer range and is adjacent to winter range. Mule deer often use riparian areas with dense vegetative cover for fawning during May through July in eastern Washington (WDFW 2016). Habitat quality, in particular forage quality and quantity, can influence mule deer habitat use, productivity, and survival (Forrester and Wittmer 2013). The key indicators used to assess habitat quality for mule deer included forage, cover, and habitat security (Table 2).

Table 2. A comparison of pre- and post-project habitat quality indices for deer and elk in the Utility Corridor project area.

Pre-Post Project	**Habitat Quality Acres (%)**			
	Low	**Moderate**	**High**	**Very High**
Pre Project	25 (35%)	36 (51%)	10 (14%)	0
Post Project	32 (45%)	32 (45%)	7 (10%)	0

Direct and Indirect Effects

Implementation of the Utility Corridor project would reduce 3 acres of high quality habitat and 4 acres of moderate quality habitat to low quality habitat as a result of

vegetation removal and disturbance associated with construction activities (Table 2).

Cumulative Effects

The proposed Mission Ridge Expansion activities on private lands reduces elk and deer habitat quality on 524 acres from activities associated with the human development (houses, condos, road, etc.). While elk and deer may continue to use these areas, they would be subject to relatively high levels of human disturbance.

Within the assessment area and across all landownerships, elk and deer habitat quality would change but only to a limited degree. The amount of area rated as low quality habitat would increase from 50 to 52% of the assessment area, the amount rated as moderate would be reduced from 44 to 42% of the assessment area, and the amount of high quality habitat would remain at 6% of the assessment area.

Summary of Effects

While disturbance from Mission Ridge Ski Area expansion and the Utility Corridor project may alter elk and deer movement patterns and displace them from portions of the assessment area, elk and deer are highly mobile and capable of finding alternative routes between summer and winter ranges.

Priority Habitats - Wetlands and Riparian Habitats

Wetlands are important landscape features that provide habitat for many plants and animals such as water lilies, sedges, amphibians and reptiles, as well as waterfowl, migrating birds, fish, and mammals (EPA 2004). Wetlands function to absorb floodwaters, nutrients, sediments and pollutants before they reach other waterbodies.

One wetland was assessed and delineated within the Project Area by qualified professional wetland biologists (Ecosystems Northwest 2024). It was determined that the wetlands fit the Class III category. Category III wetlands are wetlands with a moderate level of functions and can often be adequately replaced with a well-planned mitigation project (Hruby 2014).

There are approximately 20 acres of riparian habitat and 0.5 acres of wetland habitat in the Utility Corridor project area, and 2,650 acres of riparian and wetland habitats within the assessment area.

Direct and Indirect Effect

Approximately 8 acres of riparian and wetland habitats occur within the vegetation clearing limits of the Utility Corridor project. Approximately 4 acres occurs on federal lands and would be required to meet the mitigation standards and guidelines for Riparian Reserves. Approximately 4 acres (3.5 acres of stream riparian and 0.5 acre wetland) occurs on private lands and would be subject to riparian and wetland mitigations associated with County Regulations (CCC 11.80, CCC 11.78.040).

Cumulative Effects

There are approximately 2,650 acres of riparian and wetland habitats within the assessment area. Approximately 8 acres of riparian and wetland habitats that would be impacted by the Utility Corridor and approximately 7 acres of stream-riparian impacted from the Mission Ridge Expansion project. Impacts to riparian habitats in the assessment area would be mitigated by federal, state and county riparian/ wetland regulations.

Summary of Effects

The direct, indirect, and cumulative effects associated with the proposed Mission Ridge Expansion and the Utility Corridor project, would have some limited impacts on riparian and wetland habitats. All riparian and wetland habitats within the project area and assessment area would be protected by federal, state, or county regulations.

Old-Growth Forest Habitat

There are approximately 2 acres of old growth forest habitat identified in the project area (old growth maps based on Davis et al. 2015), all on federal lands.

Direct and Indirect Effects

The vegetation clearing associated with the Utility Corridor could potentially remove 0.2 acres of old growth habitat on federal lands.

Cumulative Effects

There are approximately 3,765 acres of old growth forest identified within the assessment area. The Utility Corridor project would have minimal impacts to old growth forest habitats.

Literature Cited

Buchanan, J.B., L.L. Irwin, and E.L. McCutchen. 1995. Within-stand nest site selection by spotted owls in the eastern Washington Cascades. Journal of Wildlife Management 59: 301-310.

Cook, J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. DelCurto, L.D. Bryant, and L.L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monograph 155: 1-61.

Cook, R.C., J.G. Cook, D.J. Vales, B.K. Johnson, SM. McCorquodale, LA. Shipley, RA. Riggs, LL. Irwin, SL. Murphie, BL. Murphie, KA. Schoenecker, F. Geyer, P. Briggs Hall, RD. Spencer, DA. Immell, DH. Jackson, BL. Tiller, PJ. Miller, and L, Schmitz. 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. J. Wildlife Management 184(1):1-45.

Cook, J.G., R.C. Cook, R.W. Davis [and others]. 2018. Development and evaluation of a landscape nutrition model for elk in western Oregon and Washington. Wildlife Monograph 199: 13-30.

Davis, R.J., J.L. Ohmann, R.E. Kennedy, W.B. Cohen, M.J. Gregory, Z. Yang, H.M. Roberts, A.N. Gray, and T.A. Spies. 2015. Northwest Forest Plan-The first20 years (1994-2013): Status and trends of late-successional and old growth forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-911.

Ecosystems Northwest. 2024. Wetland delineation and stream typing report for Mission Ridge. Ecosystems Northwest, Mount Shasta, CA.

Forrester, T.D., and H.U. Wittmer. 2013. A review of the population dynamics of mule deer and black-tailed deer *Odocoileus hemionus* in North America. Mammal Review 43(4): https://doi.org/10.1111mam.12002.

Forsman, E.D., I.A. Otto, S.G. Sovern, M. Taylor, D.W. Hays, H. Allen, S.L. Roberts, and D.E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. Journal of Raptor Research, 35(2): 141-150.

Forsman, E.D., R.G. Anthony, E.C. Meslow and C.J. Zabel. 2004. Diets and foraging behavior of northern spotted owls in Oregon. Journal of Raptor Research 38: 214-230.

Frame, P.F., H.D. Cluff, and D.S. Hik. 2007. Response of wolves to experimental disturbance at homesites. Journal of Wildlife Management 71(2):316-320.
Fritts, S.H. 1992. Wolf recovery in the state of Washington. International Wolf (Winter):19-20.

Gaines, W.L., G.K. Neale, and R.H. Naney. 1995. Response of coyotes and gray wolves to simulated howling in Northcentral Washington. Northwest Science, 69(3):217-222.

Gaines, W.L., P. Singleton, and A.L. Gold. 2000. Conservation of rare carnivores in the North Cascades Ecosystem, western North America. Natural Areas Journal, 20:366-375.

Gaines, W.L., P.H. Singleton, and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-586.

Gaines, W.L., M. Haggard, J.F. Lehmkuhl, A.L. Lyons, and R.J. Harrod. 2007. Short-term response of land birds to ponderosa pine restoration. Restoration Ecology 15(4): 670-678.

Gaines, W., M. Haggard, J. Begley, J. Lehmkuhl, and A. Lyons. 2010. Short-term effects of thinning and burning restoration treatments on avian community composition, density, and nest survival in the eastern Cascades dry forests, Washington. Forest Science 56(1): 88-99.

Gaines, W.L., J.B. Buchanan, J.F. Lehmkuhl, K. Halupka, and P.H. Singleton. 2015. Chapter 3: Northern spotted owl issues and objectives. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-915.

Gaines, W.L., B.C. Wales, L.H. Suring, J.S. Begley, K. Mellen-McLean and S. Mohoric. 2017. Terrestrial species viability assessments for National Forests in northeastern Washington. General Technical Report PNW-GTR-907. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. 324 pp.

Gaines, W.L., J.S. Begley, D. Churchill, and R.J. Harrod. 2019b. Stemilt-Squilchuck Landscape Evaluation. Final Report to the Chelan County Natural Resources Department, Wenatchee, Wa. June 2019.

Gaines, W.L., A.L. Lyons, J.S. Begley, and E. McKay. 2022. Stemilt-Squilchuck Elk Camera Study: elk movements, calving, and time of use. Final Report to the Chelan County Natural Resources Department, Wenatchee, Wa.

Hays, D.W. and E.A. Rodrick. 2004. Flammulated owl. Pages 24-1 – 24-4 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Herter, D.R. L.L. Hicks, H.C. Stabins, J.J. Millspaugh, A.J. Stabins, and L.D. Melampy. 2002. Roost side characteristics of northern spotted owls during the nonbreeding season in central Washington. Forest Science 48: 437-444.

Hruby, T. 2014. Washington State Wetland Rating System for Eastern Washington: 2014 update. Publication No. 14-06-030. Washington Department of Ecology, Olympia, WA.

Irwin, L.L., D.F. Rock, and G.P. Miller. 2000. Stand structures used by northern spotted owls in managed forests. Journal of Raptor Research 34: 175-186.

Irwin, L.L., L.A. Clark, D.C. Rock, and S.L. Rock. 2007. Modeling foraging habitat of California spotted owls. Journal of Wildlife Management 71: 1183-1191.

Laufer, J.R. and P.T. Jenkins. 1989. Historical and present status of the gray wolf in the Cascades Mountains of Washington. Northwest Environmental Journal, 5:313-327.

Lehmkuhl, J.F., K.D. Kistler, and J.S. Begley. 2006a. Bushy-tailed woodrat abundance in dry forests of Eastern Washington. Journal of Mammalogy. 87(2):371-379.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006b. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Lewis, J.C. and J.M. Azerrad. 2004. Pileated woodpecker. Pages 29-1 – 29-9 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA

Loehle, C., L. Irwin, J. Beebe, and T. Fleming. 2011. Factors influencing the distribution of northern spotted owls in the eastern Cascades, Washington. Northwestern Naturalist 92: 19-36.

Marshall, K., M. Mamone, and R. Barclay. 2003. A survey of Douglas-fir dwarf mistletoe brooms used for nests by northern spotted owls on the Applegate Ranger District and Ashland Resource Area in southwest Oregon. Western Journal of Applied Forestry 18(2): 115-117.

Mech, L.D. 1970. The wolf: the ecology and behavior of an endangered species. Doubleday Publishing Co., New York.

Mech, L.D., T.J. Meier, and J.W. Burch. 1991. Denali Park wolf studies: implications for Yellowstone. Transactions of the North American Wildlife and Natural Resources Conference, 56:86-90.

Messier, F. 1995. On the functional and numeric responses of wolves to changing prey density. In Carbyn, L.N., S.H. Fritts, and D.R. Seip (eds). Ecology and conservation of wolves in a changing world: 187-198. Edmonton, AB: Canadian Circumpolar Institute.

Munzing, D., and W.L. Gaines. 2008. Monitoring American marten on the east-side of the North Cascades of Washington. Northwestern Naturalist 89: 67-75.

Rowland, M.M., R.M. Nielson, M.J. Wisdom [and others]. 2018. Linking nutrition with landscape features in a regional habitat-use model for elk in western Oregon and Washington. Wildlife Monograph 199: 31-49.

Schroeder, M. 2006. Blue grouse divided by two equals Dusky and Sooty Grouse. Washington Birder: 14(3): 3pp. Washington Department of Fish and Wildlife, Bridgeport, WA

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl; Final Rule. *Federal Register* 55(123):26114-26194. June 26, 1990.

U.S. Fish and Wildlife Service (USFWS). 2003. Endangered and threatened wildlife and plants; final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; Final and Proposed Rules. *Federal Register* 68(62):15803-15875. April 1, 2003.

U.S. Fish and Wildlife Service (USFWS). 2011. *Revised Final Recovery Plan for the Northern Spotted Owl - Strix occidentalis caurina.* US Fish and Wildlife Service (USFWS). Portland, Oregon. xvi + 258 pp. Available online at http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Recovery/.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Register* 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12- 04/pdf/2012-28714.pdf

Vales, D. J. and J. M. Peek. 1995. Projecting the potential effects of wolf predation on elk and mule deer in the east front portion of the northwest Montana wolf recovery area. Pages 211-222 in L. N. Carbyn, S. H. Fritts, and D. R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, Edmonton, Alberta, Canada.

Ware, D. 2008. Management recommendations for Blue Grouse (Ducky and Sooty grouse). Washington Department of Fish and Wildlife, Olympia, WA.

Washington Conservation Science Institute (WCSI). 2018. Mission Ridge Expansion Project. Supplemental SEPA Checklist. Aquatics, Wildlife and Botany Resources Report. Report on File, Washingtion Conservation Science Institute, P.O. Box, Leavenworth, WA. 98826.

Washington Department of Fish and Wildlife (WDFW). 2011. Washington Gray Wolf Conservation and Management Plan. Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2016. Washington State Mule Deer Management Plan, Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 144 p.

Washington Department of Fish and Wildlife, Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, Yakama Nation, Swinomish Indian Tribal Community, and U.S. Fish and Wildlife Service. 2024. Washington gray wolf conservation and management 2023 annual report. Washington Department of Fish and Wildlife, Ellensburg, WA, USA.

Wisdom, M.J., M.M. Rowland, R.M. Nielson [and others]. 2018. Modeling to evaluate elk habitat: contemporary approaches for western Oregon and Washington. Wildlife Monograph 199: 8-12.

Woodruff, K., and H. Ferguson. 2008. Management recommendations for Townsend's big-eared bat. Washington Department of Fish and Wildlife, Olympia, WA.

Wydoski, R.S., and R.R. Whitney. 2003. Inland Fishes of Washington. University of Washington Press, Seattle.

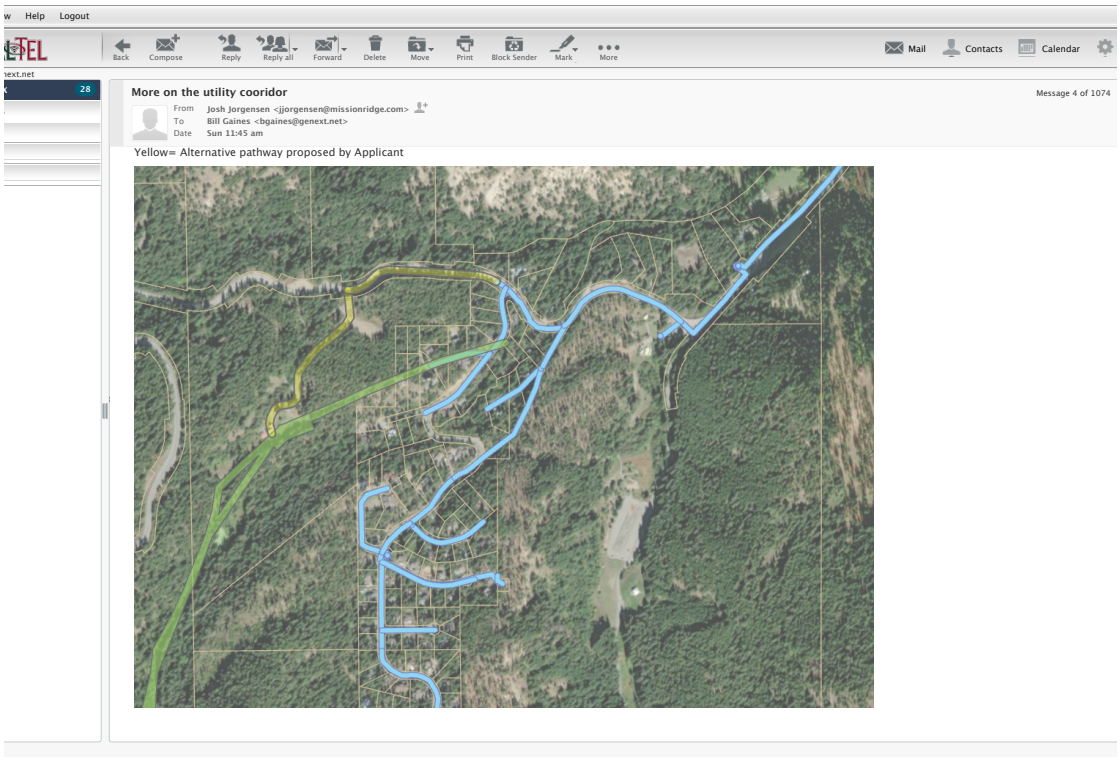


Figure 1a. Aerial view of the revised proposed utility corridor. The corridor in yellow shows the revise corridor location evaluated in this report amendment.

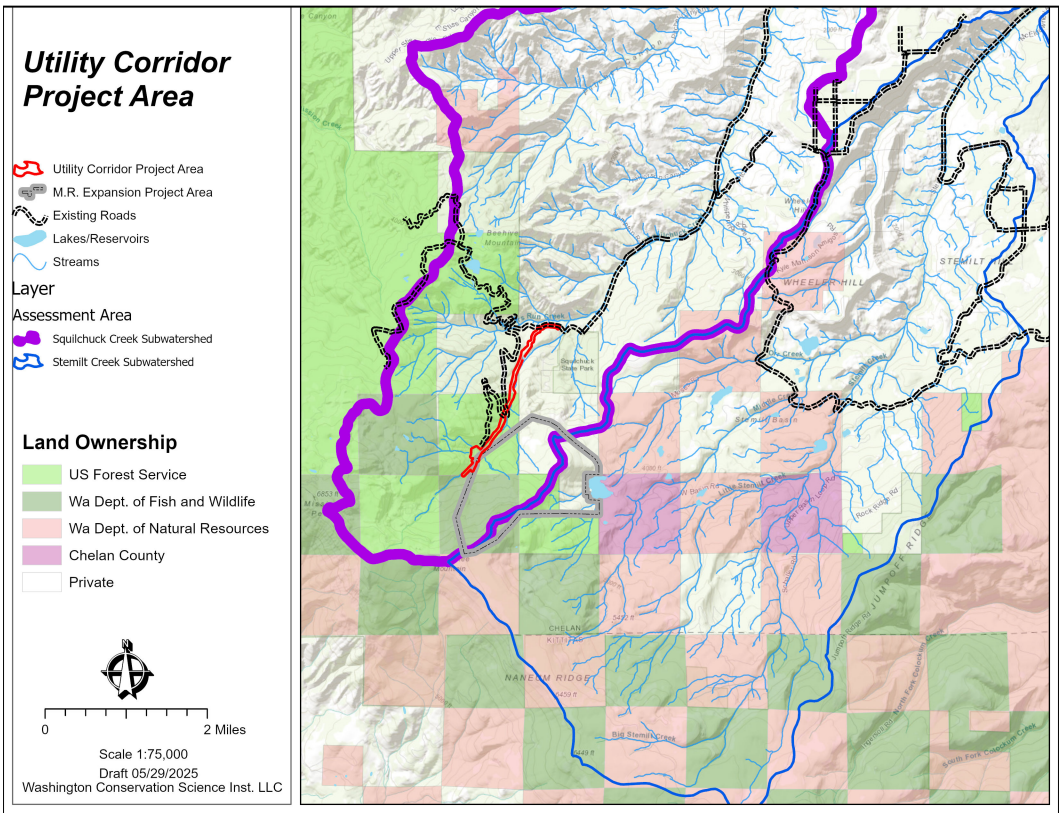


Figure 2a. Map showing the location of the revised proposed utility corridor project area.

Appendix A.
Species not likely to occur in the Utility Corridor Project area.

Species	**Status**	**Status in Project Area**
Golden Eagle	State Candidate	Not Likely present due to lack of habitat
Cascade Red Fox	Federal Threatened, State Candidate	Not likely present due to lack of habitat
Grizzly Bear	Federal Threatened, State Endangered	Not likely present
Canada Lynx	Federal Threatened, State Endangered	Not likely present due to lack of habitat
Wolverine	Federal Threatened, State Candidate	Not likely present due to lack of habitat
White-headed Woodpecker	State Candidate	Habitat not present
Flammulated Owl	State Candidate	Habitat not present
Spring Chinook Salmon	Federal Endangered, State Candidate	Not likely to be present due to lack of habitat and passage barriers
Bull Trout	Federal Threatened, State Candidate	Not likely to be present to due lack of habitat and other natural limiting factors
Steelhead	Federal Threatened, State Candidate	Not likely to be present due to passage barriers
Leopard Dace	State Candidate	Not likely to be present due to lack of habitat
Pygmy Whitefish	State Candidate	Not likely to be present due to lack of habitat
Umatilla Dace	State Candidate	Not likely to be present due to lack of habitat
Whitebark Pine	Federal Threatened	Not likely to be present, too low in elevation

Smoky Mountain Sedge	Federal Sensitive, State Threatened	Not likely to be present, too low in elevation
Brewer's Cliff Brake	Federal Sensitive, State Sensitive	Not likely to be present, too low in elevation
Pasque Flower	State Threatened	Not likely to be present, too low in elevation
Aspen	PHS habitat	Not present
Shrub Steppe	PHS habitat	Not present

APPENDIX G

Plants and Animals Reports

2025 Mission Ridge Plants and Animals Resource Report (Anchor QEA)

Table of Contents

1 **Introduction F-1**
1.1 Information Sources F-2
1.2 Plants and Animals Overview F-3
2 **Existing Conditions F-4**
2.1 Terrestrial Habitats and Species F-5
2.1.1 Special Status Habitats F-6
2.1.2 Terrestrial Plants F-9
2.1.3 Terrestrial Animals F-13
2.2 Aquatic Habitats and Species F-25
2.2.1 Aquatic Habitats F-25
2.2.2 Aquatic Plants F-28
2.2.3 Aquatic Animals F-28
3 **How Impacts Were Analyzed F-29**
4 **Findings for the Proposed Project F-29**
4.1 Impacts from Construction F-29
4.1.1 Terrestrial Habitats and Species F-30
4.1.2 Aquatic Habitats and Species F-45
4.2 Impacts from Operation F-47
4.2.1 Terrestrial Habitats and Species F-48
4.2.2 Aquatic Habitats and Species F-55
5 **Proposed Mitigation Measures F-56**

1 INTRODUCTION

This resource report prepared by Anchor QEA, Inc. (Anchor) summarizes the potential effects of the proposed Mission Ridge Ski and Snowboard Resort (Mission Ridge) expansion project (Proposed Project) on plant and animal resources, including both specific species and their supporting habitats. It describes the existing plants, animals, and habitats that occur, or have the potential to occur, in both the project area and in areas where connected actions would be performed and discusses how those resources could be affected by the Proposed Project. This report also describes how the applicant for the Proposed Project, Tamarack Saddle, LLC (Applicant), intends to mitigate for project impacts on plants and animals and the rationale for the proposed mitigation.

Throughout this report, the term "study area" includes both the project area and those areas where connected actions would occur. The "project area" is the area where the proposed ski resort expansion activities would occur, including those related to the construction of new recreational facilities (e.g., alpine ski runs, ski lifts, a Nordic trail system, snow tubing area, hiking/biking trails), short-term visitor accommodations (e.g., hotel/lodge, seasonal rental units), residential housing (e.g., condominiums, townhouses, duplexes, single-family homes, employee housing), commercial development, internal roadways, parking facilities, open space areas, and onsite utility infrastructure. The project area totals 1,090 acres and includes 436 acres of privately-owned lands, 287 acres of adjacent U.S. Forest Service (USFS) lands, and 365 acres of adjacent Washington Department of Fish and Wildlife (WDFW) lands (Figure 1).

In addition to the project area, the study area also includes areas where connected actions would occur. These include areas located outside of the project area where infrastructure improvements needed between the existing Mission Ridge facilities, the City of Wenatchee (City), and portions of Chelan County (County) would be performed. They include improvements to county and city road systems, including intersection improvements in the City of Wenatchee[1]; utility improvements to Chelan Public Utility District's (PUD's) special easement area for initial power supply; improvements to the Chelan PUD fiberoptic system for internet service; potential improvements to the Chelan PUD public water system; and work on the existing Mission Ridge parking lot related to the proposed new County-managed access road. Of these, the proposed location for initial power supply, fiber optic, and public water utility improvements includes a 150-foot wide corridor centered on Chelan PUD's existing power line easement that extends between the Forest Ridge neighborhood and the existing Mission Ridge parking lot (Chelan PUD utility corridor).

Potential plant and animal impacts from Chelan PUD's future transmission corridor and substation improvements are discussed in this section at a programmatic-level and would

[1] Based on the June 2023 Traffic Impact Analysis: Mission Ridge (Kimley Horn 2023), proposed intersection improvements to support the Proposed Project are expected to be needed at the Okanogan Avenue and Crawford Avenue and at South Miller Avenue and Crawford Avenue intersections.

be subject to later assessment under a project-level SEPA analysis completed by Chelan PUD.

In addition to the study and project areas, some of the sources used for this report, including the 2020 USFS draft EA and several of the WCSI natural resource reports, reference an "assessment area". The assessment area is used to assess cumulative effects and includes the entire Squilchuck Creek and Stemilt Creek subwatersheds, which are estimated cover 28 square miles and 33 square miles, respectively (WCSI 2024).

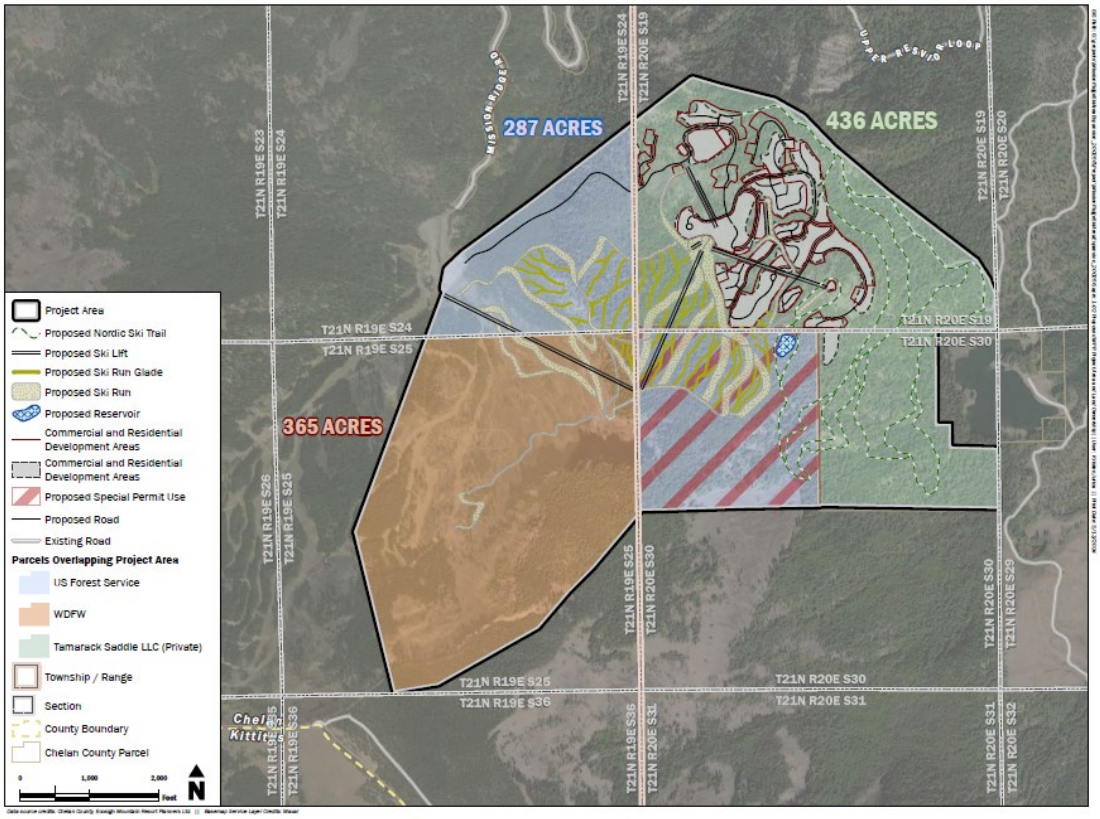


Figure 1: Project Area and Land Ownership

1.1 Information Sources

The information presented in this report is based on wildlife studies, field surveys, fish and wildlife impact analyses, wetland and stream boundary delineations/determinations, and other studies conducted by Chelan County, the Applicant's consultants, and the USFS. The following primary sources were used to prepare the existing conditions discussion and the project impact analyses:

- 1986 *Final Environmental Impact Statement – Mission Ridge/Constellation Ridge Ski/Summer Resort Master Plan* (CCPD 1986)

- 2017 *Mission Ridge Wetland Delineation Report* (Beich and Tomassi 2017)
- 2018 *Mission Ridge Expansion Project: Supplement to SEPA Checklist: Aquatics, Wildlife, and Botany Resources Report, Final Report* (2018 Resources Report – Final Report; WCSI 2018)
- 2020 *Supplement to SEPA Checklist – Aquatics, Wildlife, and Botany Resources Report* (2020 Resources Report Supplement; WCSI 2020)
- 2020 *Mission Ridge Expansion Project: Draft Environmental Analysis* (USFS EA; USFS 2020)
- 2022 *Revised Master Planned Resort Overlay and Development Agreement Application and SEPA Checklist* (2022 SEPA Checklist; LDC 2022)
- 2022 *Stemilt-Squilchuck Elk Camera Study: Elk Movements, Calving, and Time of Use* (WCSI 2022)
- 2022 *Mission Ridge SEPA: Botany & Invasives Existing Condition* (Rossman 2022)
- 2024 *Cascade Red Fox – Supplement to the SEPA Wildlife Report* (WCSI 2024)
- 2024 *Wetland Delineation and Stream Typing Report for Mission Ridge* (Ecosystems North West 2024)
- 2024 *Utility Corridor: Supplement to the SEPA Fish and Wildlife Report* (WCSI 2024).

As previously noted, the study area for the plants and animals impact analysis encompasses the project area, areas immediately adjacent to the project area, and any other connected areas that have the potential to be affected by construction or operation of the proposed expanded ski resort. At the time this report was prepared, habitat investigations had only been performed for the Chelan PUD utility corridor, which would contain the proposed initial power supply for the Proposed Project as well as the proposed improvements to the Chelan PUD public water system and fiber optic network needed to support the initial phases of the expanded facility.

1.2 Plants and Animals Overview

In this report, "plants and animals" are divided into two general types of habitats and species: 1) terrestrial habitats and species, and 2) aquatic habitats and species. Wetlands and riparian areas are also discussed due to the habitats that they provide to terrestrial and aquatic species. For more information on wetlands and riparian areas, refer to Section 5.3, Surface Water of the Mission Ridge EIS.

Terrestrial habitats are the places where animals and plants live that occur on lands where surface water is typically absent. Terrestrial habitats include forests, grasslands, deserts, shorelines, and underground habitats like caves and burrow systems. Terrestrial species are the animals and plants that live in those habitats and use them for the majority of their lifecycles (such as mammals, birds including waterfowl, reptiles, insects, spiders, and other invertebrates). For the purposes of this report, amphibians are included in the assessment of terrestrial species, although many amphibians also require

aquatic habitats for at least the initial portion of their lifecycles and for breeding before transitioning to the use of both aquatic and terrestrial habitats. Typical amphibians include frogs, toads, newts, and salamanders.

Aquatic habitats are areas that contain varying amounts and types of surface waters that provide habitat for aquatic plant and animal species. Surface water in such areas may be rain/snow dependent (ephemeral), seasonally intermittent (present during certain times of the year), or year-round (perennial). Aquatic plants are those that grow in water, either rooted in the substrate or floating under or on the water surface. Aquatic animals are those that live in the water including fish, mollusks, aquatic invertebrates, and other organisms that depend on aquatic habitats for the duration of their lifecycle.

Wetlands and riparian areas are specific types of habitats that often occur in transitional areas between terrestrial and aquatic systems. Both wetlands and riparian areas provide habitat elements used by terrestrial and aquatic species. This report includes a discussion on the types of plants and animals that occur, or have the potential to occur, in wetlands and riparian areas and the types of habitats that those areas provide.

In addition to addressing the potential effects of the Proposed Project on relatively common plant and animal habitats and species, this report also discusses the potential effects of the Proposed Project on special status species or habitats. For this report, special status habitats and species include the following:

- Plants and animals listed as endangered, threatened, or proposed for listing under the Endangered Species Act (ESA)
- Plant, animals, and habitats identified as Priority Habitats and Species (PHS) by the Washington department of Fish and Wildlife (WDFW)
- Plants, animals, and habitats identified as heritage species under the Washington Department of Natural Resources (DNR) Natural Heritage Program
- Plants and animals identified in the Chelan County Code (CCC) or associated ordinances as species of local importance

2 EXISTING CONDITIONS

The study area is primarily located in the Yakima Plateau and Slopes subregion of the Eastern Cascades Slope and Foothills ecoregion, which occurs in the rain shadow of the Cascades Range. That subregion includes an unglaciated region characterized by plateaus, buttes, and canyons, a dry continental climate, and land cover dominated by open woodlands (Bryce and Woods 2000). While these ecoregions, are generally characterized by vegetation adapted to a dry, continental climate, and frequent fire (e.g., ponderosa pine [*Pinus ponderosa*]), the northerly aspect and topographic location of the study area result in more mesic and subalpine variations in the plant community and a different historical fire regime (USFS 2020).

Although the majority of the Chelan PUD utility corridor also occurs in the Yakima Plateau and Slopes subregion, its northern third extends into the Chiwaukum Hills and Lowlands subregion of the North Cascades ecoregion. That ecoregion is generally characterized by high, rugged mountains underlain by sedimentary and metamorphic rock with variable climate conditions depending on location within the state. In this location, North Cascades ecoregion is characterized by a dry continental climate (Bryce and Woods 2000). Landforms in the Chiwaukum Hills and Lowlands subregion typically include low mountains, hills, and cuestas (ridges with a gentle slope on one side and a steep slope on the other) that can be highly erodible and unstable (Bryce and Woods 2000).

2.1 Terrestrial Habitats and Species

Terrestrial habitats in the study area are similar to those within the existing Mission Ridge site with a mix of the following habitat types (WCIS 2018):

- Alpine meadows
- Subalpine forest
- Basalt rock outcrops
- Talus

Within the 1,090-acre project area, the USFS determined that approximately 73% is occupied by cold forest[2] in mid-successional condition and 27% is occupied by talus on ridges, slopes, and drainages (USFS 2020). USFS also noted that much of the project area had been affected by prior timber harvest activities in the mid-20th century.

Other terrestrial habitat types that are different from the forest and talus areas that dominate the study area include a central ridge, multiple rock outcrops, aspen stands, and riparian zones (USFS 2020). The sandy ridge running near the center of the study area differs in plant community and soil characteristics from the surrounding forest and talus. Overstory trees are sparse along the ridgeline, resulting in a largely open canopy. The open canopy, combined with the decomposing sandstone parent material with a nearly absent organic layer, results in a plant community adapted to shallow soils and drought conditions. Twenty rock outcrops of exposed basalt bedrock were also documented found along the central ridge and scattered on forested slopes (USFS 2020). Riparian zones surrounding streams are also present throughout the study area.

Terrestrial habitats in the Chelan PUD utility corridor includes dense, mid-age, conifer-dominated forest and the shrub-dominated riparian zone of Squilchuck Creek (Ecosystems North West 2024). Some old growth forest habitat is also present (WCSI 2024). Aside from a section of Squilchuck at the south end of the corridor that is located in a steep-sided ravine, the remainder of the corridor occurs on a slope that trends downward toward the northeast with elevations ranging from 4,600 feet to 3,300 feet. Vegetation in the portions of the corridor that are part of the Chelan PUD special easement has been modified by past clearing and ongoing management activities

[2] The term “cold forest” is defined by USFS as, “High elevation forests dominated by subalpine fir, whitebark pine, spruce, and sometimes lodgepole pine” (USFS 2010).

required to maintain the easement and protect the existing utility lines that run through it, which include sections of overhead and underground power line and an underground water line and associated pump stations.

2.1.1 Special Status Habitats

Special status habitats present in the study area include those identified as priority habitats under WDFW's PHS program, habitats identified for conservation under Washington's Natural Heritage Program, and locally important habitats identified by Chelan County.

2.1.1.1 WDFW Priority Habitats and Features

WDFW's PHS program identifies habitats and species considered to be priorities for conservation and management in the state (WDFW 2008). PHS resources require protective measures for their continued survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. The primary purpose of the PHS program is to conserve species for recreational and cultural use (WDFW 2015).

Aspen Stands

As reported by WCSI in their 2018 Resources Report – Final Report (WCSI 2018), aspen stands, a PHS-listed habitat, occur in portions of the study area. Stands of aspen (*Populus tremuloides*) provide habitat for a wide variety of wildlife, including hare, moose, black bear, elk, deer, grouse, migratory birds, and a variety of smaller animals (WCSI 2018). Aspen stands greater than 1 acre in size are considered priority habitats by WDFW (WDFW 2008). A small (less than 1 acre) aspen stand with scattered trees was identified on a talus slope in the north-central portion of project area during the 2017 wetland delineation (Beich and Tomassi 2017). At the time it was identified, that stand was mapped as being less than 1 acre in size and did not meet the definition of a priority habitat (WCSI 2018). However, it was determined to provide a unique habitat feature on the landscape (WCSI 2018). During a subsequent botanical survey in 2022, that aspen stand was mapped as being approximately 1.5 acre in size and a second, smaller aspen stand of approximately 0.2 acre was identified on a forested ridge in the northeast portion of the privately-owned portion of the study area during a 2022 botanical survey (Rossman 2022). Due to its size, the larger stand would now be considered a priority habitat.

No aspen stands were identified in the Chelan PUD utility corridor (WCSI 2024).

Riparian

Riparian habitats are terrestrial areas that occur adjacent to flowing or standing freshwater aquatic systems in the area between the ordinary high water mark and the landward edge of the terrestrial landscape that is influenced by or directly influences the aquatic ecosystem (WDFW 2008). Nearly all of the components of riparian habitats, including the vegetation, soils, microclimate, and wildlife are influenced by flowing or standing water. Due to the limited occurrence of streams in the project area, riparian habitats across much of the study area are limited. However, WCSI has identified approximately 20 acres of riparian habitat adjacent to Squilchuck Creek in the Chelan PUD utility corridor (WCSI 2024).

Old Growth – Mature Forest

In their November 2024 *Utility Corridor: Supplement to the SEPA Fish and Wildlife Report*, WCSI noted that the Chelan PUD utility corridor contains approximately 2 acres of Old Growth Forest habitat. For areas east of the Cascade crest, WDFW defines the Old Growth Forest-Mature Forest habitat type as having highly variable tree species composition and structural character, including single to multiple canopy layers, due to the influence of fire, climate, and soils (WDFW 2008). Trees in such habitats are typically greater than 150 years old and larger than 21 inches diameter at breast height (dbh). Snags between 12 and 14 inches dbh are typically present and downed logs may vary from abundant to absent.

Outside of the Chelan PUD utility corridor, other areas of Old Growth Forest are known to exist in the larger assessment area, however, no Old Growth Forest habitats have been identified in the project area.

Shrub-Steppe

In their wetland delineation and stream typing report for the Chelan PUD utility corridor, Ecosystems North West noted that WDFW's PHS database includes records of Shrub-Steppe habitat occurrences in the areas around the existing Mission Ridge ski resort including the Scout-A-Vista Camp property (Ecosystems North West 2024). Shrub-Steppe habitats are non-forested vegetation communities composed of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs including such species as big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), threetip sagebrush (*Artemesia tripartita*), scabland sagebrush (*Artemesia rigida*), and dwarf sagebrush (*Artemesia cana*) (WDFW 2008). No such habitats were found within the Chelan PUD utility corridor during the June 2024 site survey.

Priority Habitat Features

In addition to specific habitats, WDFW also recognizes priority habitats based on the presence of certain Priority Habitat Features (WDFW 2008). Priority Habitat Features that occur within the study area include the following:

Talus

Talus habitat is the accumulation of broken rocks and gravel, often at the base of cliffs. Talus habitat is usually open with little (less than 10 percent) vegetation cover. Talus has been shown to be habitat for larch mountain (*Plethodon larselli*) and Van Dyke's (*P. vandykei*) salamanders as well as the American pika (*Ochotona princeps*) (WCSI 2018). The study area contains a substantial amount of talus, as does the adjoining existing Mission Ridge area. More than 250 acres within the project area are open, rolling, talus fields with little vegetation (WCSI 2018). According to USFS, of the 250 acres of talus habitat in the project area, about 22 acres are on federal lands, 188 acres are on state lands, and 40 acres are on private lands (USFS 2020). Talus is not present in the Chelan PUD utility corridor portion of the larger study area.

Snags and Logs

Snags are standing dead or dying trees that exhibit decaying areas that wildlife can excavate for nesting or foraging (WDFW 2008). Snags provide important habitat for numerous cavity nesting birds (e.g., woodpeckers, nuthatches), mammals (e.g., squirrels, bears), and various other wildlife (Brown 2002). Logs, or downed wood, are generally found on the ground and arise from fallen trees, large branches, and snags that have

fallen over. Log habitat often serves a function similar to snags and provide decaying wood that can be used for nesting, denning, and foraging habitat, hiding cover, and shelter from inclement weather for a variety of species including insects, spiders, other invertebrates, small mammals, reptiles, amphibians, and birds. According to the WDFW PHS List (WDFW 2008), priority snags are those that range from greater than 12 inches diameter and breast height (DBH) in eastern Washington to 20 inches DBH in western Washington with heights of 6.5 feet or greater and priority logs that are those that are greater than 12 inches DBH at the largest end and 20 feet long.

According to the 2018 WSCI Resources Report, snag habitat, and particularly large snags, is limited in the study area as a result of past timber harvest activities. Significant wind events have created a substantial amount of downed wood in some areas including the central portion of the study area where much of the log habitat is located (WCSI 2018). Abundant downed trees and woody debris are also present in the proposed Chelan PUD utility corridor including at least one large snag associated with a ponded wetland on the Scout-A-Vista Camp property (Ecosystems North West 2024).

2.1.1.2 Washington Natural Heritage Program

DNR uses the Ecological Systems Classification system developed by NatureServe to classify upland and wetland ecosystems in the state as part of their Natural Heritage Program (DNR 2023). Ecological Systems classes include recurring groups of terrestrial plant communities that are found in similar climatic and physical environments, are influenced by similar dynamic ecological processes (e.g. fire, flooding), and/or that share similar substrates and/or environmental gradients (Rocchio and Crawford 2015).

Ecological System classes that occur within the study area include the following terrestrial ecosystems (WCSI 2018):

- Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
- Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
- Northern Rocky Mountain Ponderosa Pine Woodland and Savanna

Under the Washington Natural Heritage Program, a state-level conservation status rank is assigned to each Ecological Systems class to indicate the rarity and risk of elimination of elements of biodiversity in those ecosystems (Rocchio and Crawford 2015). Of the ecosystem classes identified in the study area, the conservation status ranges from *Imperiled* for the Northern Rocky Mountain Ponderosa Pine Woodland and Savanna class; *Vulnerable* for the Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest class, *Apparently Secure* for the Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland class; and *Secure* for the Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland class (Rocchio and Crawford 2015).

The vulnerable Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest class is mapped in only scattered locations across the site and the imperiled Northern Rocky Mountain Ponderosa Pine Woodland and Savanna class occurs in the vicinity of the site.

2.1.1.3 Chelan County Habitats of Local Importance

Per Chelan County Code (CCC) Section 11.78.010(B), mule deer and winter elk range and migration corridors currently identified as habitat of local importance by the County.

As further discussed under Terrestrial Animals, the study area provides summer range for both elk (*Cervus elaphus*) from the Colockum herd and mule deer (*Odocoileus hemionus;* WCSI 2018, USFS 2020). Elk are also known to use portions of the study area in the Stemilt Watershed for calving. Elk likely migrate through the study area including portions of the study area when moving from summer to winter ranges (WCSI 2018, USFS 2020). It is also likely that they may migrate across the Chelan PUD utility corridor. Neither the project area nor Chelan PUD utility corridor are within winter range for either species (CCPD 1986, WCSI 2018, USFS 2020). Winter range for both elk and mule deer occurs at lower elevations than those of the study area.

The closest area of elk winter range identified by the Okanogan-Wenatchee National Forest is over 3.5 miles northwest (and outside) of the study area and the closest winter range for mule deer is over 2 miles to the north (and outside) of the study area in the Squilchuck Watershed (WCSI 2018). As previously noted, elk calving grounds are mapped in the southeastern portion of the study area on the private parcel, as well as approximately half a mile to the southwest of the study area. Those areas currently exhibit a low level of disturbance and heavy cover and include riparian vegetation away from more heavily travelled roads. Mule deer use similar habitat conditions for fawning.

2.1.2 Terrestrial Plants

The study area is located within an area of high botanical diversity known as the Wenatchee Mountains (USFS 2020). The Wenatchee Mountains contain many species common to the state of Washington and is of particular interest to botanists and conservationists. The following sections summarize the commonly occurring, special status, and invasive plant species present in the study area and in other portions of the larger study area. Comprehensive lists of the rare plants that have the potential to occur in the study area and all plant species recorded during the botanical surveys can be found in the appendices of the 2018 Resource Report (WCSI 2018), USFS EA (USFS 2020), 2022 rare and invasive plant survey for the privately-owned parcel (Rossman 2022), and 2024 wetland delineation and stream typing report for the Chelan PUD utility corridor (Ecosystems North West 2024).

2.1.2.1 Commonly Occurring Species

Terrestrial vegetation in the study area is primarily even-aged, closed-canopy, single-story forest stands dominated by Douglas-fir (*Pseudotsuga menziesii*) with a mixed conifer component consisting of grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*) and larch (*Larix occidentalis*) (WCSI 2018). Overstory species and characteristic are primary driven by aspect and elevation with northeast to northwest facing areas typically dominated by Douglas fir and larch in the upper elevations with the presence of lodgepole pine increasing at lower elevations (USFS 2020).

Forested areas in the study area typically include a mix of very dense stands with little understory vegetation to more open canopy woodlands (WCSI 2018). When present,

understory vegetation is primarily comprised of upland understory trees, shrubs, and herbs including pine grass (*Calamagrostis rubescens*), serviceberry (*Amelanchier alnifolia*), twinflower (*Linnaea borealis*), kinnikinnick (*Arctostaphylos uva-ursi*), pipsissewa (*Chimaphila umbellata*), oceanspray (*Holodiscus discolor*), and vine maple (*Acer circinatum*) (WCSI 2018). Bitterbrush (*Purshia tridentata*) and yarrow (*Achillea millefolium*) can be found in the drier parts of the study area.

Talus areas within the study area are mostly unvegetated, however, there are numerous small pockets of vegetation growing in talus areas (USFS 2020). Vegetation in those areas typically includes subalpine fir, bitterbrush (*Purshia tridentata*), sticky cinquefoil (*Potentilla glandulosa*), and mountain arnica (*Arnica latifolia*). As previously noted, there is also a known aspen stand growing in talus on the privately-owned portion of the study area (Rossman 2022).

Throughout the study area, stream drainages, rock outcrops, and ridges add variation to the dominant plant communities that cover the site (USFS 2020). Typical vegetation growing in riparian areas near streams includes elderberry (*Sambucus* spp.), bead lily (*Clintonia borealis*), sedges (*Carex* spp.) and mosses (WCSI 2018). Other riparian areas support prickly currant (*Ribes lacustre*), brook saxifrage (*Saxifraga odontoloma*), and willows (*Salix* sp.) (USFS 2020). An exposed ridge running northeast through the study area supports plant species adapted to dry, open conditions with shallow, sandy soils, that are very different from those found in the forest or on talus.

Common vegetation present along Squilchuck Creek and associated areas in the proposed Chelan PUD utility corridor includes the same tree species found in other portions of the study area but with a dense understory (Ecosystems North West 2024). Understory vegetation typically includes native shrubs including vine maple, mountain ash (*Sorbus* sp.), Scouler's willow (*Salix scouleriana*), and serviceberry. Areas of the utility corridor previously cleared to install the existing below-ground power line are dominated by dense shrub and herbaceous vegetation including thimbleberry (*Rubus parviflorus*), oceanspray, mountain-lover (*Paxistima* sp.), giant red Indian paintbrush (*Castilleja miniate*), and angelica (*Angelica* sp.).

2.1.2.2 Special Status Species

Special status plant species include those listed as endangered, threatened, or proposed for listing under ESA, plant species identified as rare plants (e.g., species of conservation concern) under the DNR's Natural Heritage Program, unique plant habitats, large trees, and traditional plants of concern.

ESA-Listed Species

Only one special status terrestrial plant species, whitebark pine (*Pinus albicaulis*), was found in the study area during botanical field surveys conducted on USFS- and WDFW-owned lands (USFS 2020), the privately-owned portion of the study area (Rossman 2022), and the Chelan PUD utility corridor (Ecosystems North West 2024). Whitebark pine is listed as threatened under the ESA[3] and as a USFS sensitive species. It is also identified as

[3] On December 15, 2022, the U.S. Fish and Wildlife Service (USFWS) published a final rule in the Federal Register (87 FR 76882) to list whitebark pine as a threatened species under the ESA (USFWS 2022). At the time the 2018 Resource Report (WCSI 2018) and 2020 USFS EA were prepared, whitebark pine was identified as a "candidate" species for listing.

a state sensitive species and a species of conservation concern under the Washington Natural Heritage Program (WDNR 2024). Whitebark pine is in decline throughout its range in high-elevation ecosystems in western North America, including in the Washington Cascades due to white pine blister rust infection and mountain pine beetle outbreaks, with fire exclusion and a warming climate exacerbating the problem (Fryer 2002).

Surveyors identified 73 individual whitebark pine stems on USFS lands, 88 on adjacent WDFW land (USFS 2020), and 6 on the privately-owned parcel in the area where development is proposed to occur (Rossman 2022). No whitebark pine individuals were observed in the Chelan PUD utility corridor (Ecosystems North West 2024, Gaines 2024). On USFS and WDFW lands, whitebark pine were found on an exposed ridge, on rock outcrops in forested areas, and on talus (USFS 2020). On the private parcel, whitebark pine were found on smaller ridges among talus and on a micro ridge near a stream (Rossman 2022). Individuals included seedlings, saplings, and trees and ranged in size up to 19.1 inches DBH (USFS 2020, Rossman 2022). None of the observed individuals had female cones present at the time they were identified. Some of these individuals, including two of the six observed on the private parcel, showed sign of blister rust infections including cankers, flagging, and dead tops. Rossman (2022) speculated that fewer individuals were found on the privately-owned property than the USFS and WDFW-owned parcels because it is warmer and drier than those parcels. Rossman (2022) observed that while whitebark pine seeds have dispersed and germinated on the private parcel, they are not thriving. As the climate warms and blister rust persists, it is unlikely that the existing individuals will reproduce or survive for long, nor will the area provide high-quality habitat for the species (Rossman 2022).

Natural Heritage Program Rare Plants

In the 2018 Resource Report, WCSI noted previous observations of two rare plant species in the vicinity of the study area. Those occurrences included an observation of Wenatchee larkspur (*Delphinium viridescens*; ranked as imperiled in the state) from 1996 and an observation of pasqueflower (*Anemone patens* var. *multifida*; ranked as critically imperiled in the state) from 2004 approximately 3 miles to the west and southwest of the study area. In a later report, WCSI also noted that Smoky Mountain sedge (*Carex proposita*; ranked as threatened in the state) and Brewer's cliff brake (*Pellanea breweri*; ranked as sensitive in the state) were also likely to be present in the project area but were unlikely to occur in the Chelan PUD utility corridor because lower elevation of that portion of the study area (WCSI 2024). None of these rare plant species were observed during the most recent botanical surveys.

Although no individuals were identified, Rossman (2022) noted that potentially suitable habitat for several rare plants including tall agoseris (*Agoseris elata*), Thompson's chaenactis (*Chaenactis thompsonii*), strawberry saxifrage (*Saxifragopsis fragarioides*), Seely's catchfly (*Silene seelyi*), and western ladies' tresses (*Spiranthes porriolia*) was present in the areas of the private parcel proposed for conservation (i.e., open space). The state sensitivity ranking for those species varies from imperiled to vulnerable. None of these species were observed in the Chelan PUD utility corridor portion of the study area during the June 2024 field survey (Ecosystems North West 2024).

Other Special Status Plant Species

In addition to rare species, the USFS also surveyed the federal- and state-owned lands of the study area for unique plant habitats, large trees, and traditional plants of concern.[4]

Unique habitats identified in the study area include a central sandy ridge, multiple rock outcrops and other ridges, emergent wetlands, aspen stands, and riparian zones (USFS 2020). These areas are of interest because they tend to support unique plant communities that differ from the dense forest and talus areas that dominate the majority of the study area and because they contribute to biodiversity.

Seven trees (6 ponderosa pine and 1 western larch) with a DBH of greater than 32 inches were identified and mapped in the western portion of the project area, with the largest tree observed being over 43 inches DBH (USFS 2020). Other trees greater than 32 inches DBH were also observed in the eastern part of the USFS portion of the study area but were not specifically mapped. Several more trees with DBHs greater than 20 inches were also observed on both the central ridge and nose slopes. Large trees are considered important because they contribute to the ecosystem in their resistance to fire and role in post-fire forest recover, provide insect and wildlife habitat as live trees and snags, and exhibit of unique attributes related to bark thickness, crown structure, and heartwood content (USFS 2010)

Eight species of traditional plants of concern were observed during the field surveys and an additional nine are fairly likely to occur in the study area (USFS 2020). Most species occur sporadically although some such as rattlesnake plantain (*Goodyera oblongifolia*) and low blueberry (*Vaccinium myrtillus*) being more widespread in certain areas.

No unique habitats, large trees, or traditional plant species of concern were noted in the Chelan PUD utility corridor portion of the study area during the June 2024 field survey (Ecosystems North West 2024).

2.1.2.3 Invasive Species

In addition to rare plants, the study area was also surveyed for invasive plant species. Overall, most invasive plant infestations and non-native species were found in disturbed areas such as along the existing Mission Ridge parking lot, highway, and other existing roads. In their 2020 EA, USFS reports that the most common invasive species observed was diffuse knapweed (*Centaurea diffusa*), a Class B noxious weed (WSNWCB 2023), which occurred in a nearly continuous, sparse to moderately dense population around the perimeter of the existing Mission Ridge parking area, among the existing Mission Ridge buildings, and along Mission Ridge Road (Chelan County Road 711) (USFS 2020). Occasional individuals of diffuse knapweed were also found in existing ski runs near the base area.

Canada thistle (*Cirsium arvense*), a Class C noxious weed (WSNWCB 2023), was also relatively common, with small to large patches found around the parking area perimeter (USFS 2020). An infestation of musk thistle (*Carduus nutans*) was also observed near a campsite and off-road vehicle use area on the private parcel (Rossman 2022).

[4] Traditional plants of concern are plants that have been traditionally used by Native American Indian tribes for medicinal, ceremonial, or other cultural purposes.

Other non-native plant species that are not considered invasive were observed on existing ski runs, sometimes in abundance. Examples include smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). Scattered common dandelion (*Taraxacum officinale*) and clover (*Trifolium* spp.) are also present in those areas. Away from the Mission Ridge base area, the intact, closed canopy forests within the study area that are minimally disturbed and see little recreation activity were found to contain few non-native plants and little habitat that favors invasive species.

Although scattered occurrences are likely present, no infestations of invasive plant species were noted in the Chelan PUD utility corridor portion of the study area during the June 2024 field survey (Ecosystems North West 2024).

2.1.3 Terrestrial Animals

The study area contains a variety of wildlife habitats that support an array of terrestrial animals including commonly occurring species and those that have special status at the federal, state, and local level. Some of the smaller species are residents in the study area and surrounding lands while others, including many of the larger mammals and birds, have ranges that extend well beyond the study area boundaries.

2.1.3.1 Commonly Occurring Species

The study area provides habitat for a number of commonly occurring native and non-native terrestrial animals including the following:

- Mammals including ungulates such as elk and deer; tree- and ground-dwelling mammals including mice, rats, squirrels, chipmunks, shrews, voles, rabbits, pikas, marmot, raccoon, and porcupine; wider-ranging carnivores such as black bear, wolf, bobcat, cougar, wolverine, lynx, marten, fisher, weasels, and fox; and bats.
- Birds including multiple species of songbirds, woodpeckers, ground-nesting birds, and raptors
- Reptiles including various snakes, lizards, and turtles
- Amphibians including frogs, toads, and salamanders
- Invertebrates including various type of insects, spiders, worms, and other invertebrates

Many of these animals are included on a list of species that have the potential to occur on and in the study area that was provided in Appendix G of the 1986 SEPA EIS for Mission Ridge/Constellation Ridge (CCPD 1986).

2.1.3.2 Special Status Species

In addition to commonly occurring animals, there are several special status species that are either known to occur or have the potential to occur within the study area (Table 1). Special status species include those that meet one or more of the following conditions:

- Animals listed as threatened or endangered under the federal ESA
- Animals listed as threatened or endangered by in the state of Washington under Washington Administrative Code (WAC) 220-610-010

- Animals identified by WDFW as PHS species
- Animals identified as Species of Greatest Conservation Need by WDFW's SWAP
- Animals identified as heritage species under DNR's Natural Heritage Program
- Migratory birds protected under the Migratory Bird Treaty Act

Although species designated as being candidates for listing, species of concern, or sensitive species area listed in Table 1, they are not specifically addressed in the impact analysis. Impacts to those species are considered in the analysis of impacts on commonly occurring species.

Table 1: Special Status Terrestrial Wildlife Species that Potentially Occur in the Study Area

Animal Group	Common Name	Scientific Name	Federal Status	State Status	PHS Priority Area
Mammals	Townsend's big-eared bat	*Corynorhinus townsendii*	Species of Concern	Candidate	Any occurrence
	Roosting concentrations of big-brown bat, myotis bats, pallid bat		None	None	Regular concentrations in naturally occurring breeding areas and other communal roosts
	Cascade red fox	*Vulpes vulpes cascadens*	None	Endangered	Any occurrence
	Gray wolf	*Canis lupus*	Endangered	Endangered	Regular occurrences
	Grizzly bear	*Ursus arctos*	Threatened	Endangered	Any occurrence
	Canada lynx	*Lynx canadensis*	Threatened	Endangered	Any occurrence
	American marten	*Martes americana*	None	None	Regular occurrences
	Elk	*Cervus elaphus*	None	None	Calving areas, migration corridors, regular concentrations in winter and in foraging areas along coastal waters
	Rocky Mountain mule deer	*Odocoileus hemionus hemionus*	None	None	Breeding areas, migration corridors, regular

					concentrations in winter
Birds	Golden eagle	*Aquila chrysaetos*	None	Candidate	Breeding areas, foraging areas
	Northern goshawk	*Accipiter gentilis*	Species of Concern	Candidate	Breeding areas including alternative nest sites, post-fledging foraging areas
	Dusky grouse	*Dendragapus obscurus*	None	None	Breeding areas, regular concentrations
	Sooty grouse	*Dendragapus fuliginosus*	None	None	Breeding areas, regular concentrations
	Flammulated owl	*Otus flammeolus*	None	Candidate	Breeding areas, regular occurrences
	Northern spotted owl	*Strix occidentalis*	Threatened	Endangered	Any occurrence
	Pileated woodpecker	*Dryocopus pileatu*	None	Candidate	Breeding areas
	White-headed woodpecker	*Picoides albolarvatus*	Sensitive	Candidate	Breeding areas, regular occurrences
	Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	Endangered	Any occurrence
Amphibians	Columbia spotted frog	*Rana luteiventris*	None	Candidate	Any occurrence
	Western toad	*Anaxyrus boreas*	None	Candidate	Any occurrence
Insects	Monarch butterfly	*Danaus plexippus*	Candidate	Candidate	Breeding habitat areas

Notes:
Sources: USFWS, 2024. IPaC Resource List: Mission Ridge Utility Corridor. Accessed August 14, 2024. Available at: https://ipac.ecosphere.fws.gov/., Washington Department of Fish and Wildlife State Listed Species (WDFW 2023); and Priority Habitat and Species List (WDFW 2008).
Adapted from Table 4 of *Mission Ridge Expansion Project: Supplement to SEPA Checklist, Aquatics, Wildlife and Botany Resources Report – Final Report* (WCSI 2018).

The following sections provide an overview of the special status species that have the potential to occur within the study area. Several of those species occur in multiple special status categories. In those instances, those species are addressed in the first category in which they occur.

ESA Listed Species

Four wildlife species that are currently protected under the ESA have potential to occur on or in the vicinity of the study area (WCSI 2018):

- Gray wolf (*Canis lupus*)
- Canada lynx (*Lynx canadensis*)
- Grizzly bear (*Ursus arctos*)
- Northern spotted owl (*Strix occidentalis*)

All four of these species are also identified as state endangered under WAC 220-610. The following sections provide a summary of the potential presence of these species in the study area.

Gray Wolf

The gray wolf is federally listed as an Endangered species in the western two thirds of Washington State (USFWS 2003). Wolves in Washington are also managed under the state's *Wolf Conservation and Management Plan of Washington State* (Wiles et al. 2011).

Although gray wolves historically occurred throughout Washington, wolves were nearly extirpated in the state by the 1940s through aggressive predator control (Laufer and Jenkins 1989; Gaines et al. 2000). In the early 1990s, wolves started to be documented again in the Cascade Mountains (Fritts 1992, Gaines et al. 1995) and have since recolonized the northeastern portion of the state and much of the North Cascades with at least 126 known wolves in 27 known packs and 15 breeding pairs (WDFW et al. 2019).

Wolf packs are generally comprised of breeding pairs and older off-spring that help in the feeding and care of current-year pups. Wolf activity during pup rearing is centered on den and rendezvous sites that are used throughout the spring until mid-summer (Mech 1970, USFWS 2003). Wolves generally den between April and June, then move pups to a series of rendezvous sites for the remainder of the summer. They are believed to be sensitive to disturbance during this time (Mech et al., 1991), particularly early in the denning period when pups are more vulnerable (Frame et al., 2007).

Reduction of wolf security habitat and disruptions of its prey base are also considered to have effects on wolf habitat and behavior. Security habitat for wolves is defined as areas with open road and motorized trail densities less than one mile per square mile of habitat (WCSI 2018). The USFS has identified approximately 954 acres of security habitat in Squilchuck and Stemilt subwatersheds, 35 acres of which occur in the project area (USFS 2020). In terms of prey, the gray wolf is primarily dependent upon an adequate supply of deer and elk (Messier 1995, Vales and Peek 1995, WDFW 2011). Both mule deer and elk are common in the Squilchuck and Stemilt subwatersheds and known to use the study area.

The closest gray wolf pack to the study area is the Naneum Pack, which had a minimum of two individuals as of December 2018 (WDFW et al. 2019) and has experienced at least one human caused mortality (WCSI 2018). The Naneum Pack has been documented to occur in Squilchuck and Stemilt subwatersheds and, given the presence of security habitat and prey, likely uses the wider study area and possibly areas within the study area (WCSI 2018). The Naneum pack has not been confirmed as a breeding pair, meaning that

there are no currently known den or rendezvous sites associated with the pack (WCSI 2018, 2024). In their wetlands and stream resources report for the Chelan PUD utility corridor, Ecosystems North West noted that one or more PHS occurrence records for gray wolf are listed for the township/range/sections that include the utility corridor (Ecosystems North West 2024). The specific locations of those occurrences are unknown.

Canada Lynx

The Canada lynx was listed as a Washington State threatened species in 1993 and was added as a Threatened species under the ESA in April 2000 (USFWS 2000). USFWS designated revised critical habitat for lynx in 2014 (USFWS 2014a); however, no critical habitat was designated in the Squilchuck or Stemilt subwatersheds or within the study area (USFS 2020). WDFW up-listed lynx to Endangered in December 2016 (WCSI 2018).

To date, no federal recovery plan has been developed for the Canada lynx. The conservation and recovery of lynx on federal lands is guided by two primary documents: 1) Canada Lynx Interagency Agreement (ILBT 2013), and 2) US Fish and Wildlife Service's Recovery Outline (USFWS 2005). The lynx recovery outline stratified lynx habitat into three categories: core, secondary, and peripheral (unoccupied) [5] habitats (USFWS, 2005). The study area is located within peripheral habitat. Lynx guidance also established Lynx Analysis Units (LAU) across core, secondary, and peripheral lynx habitats. Although USFWS no longer requires identification of LAUs for secondary/peripheral areas, the study area occurs in the Table Mountain LAU, which was established in the early 1990s. There are no federal requirements to manage for lynx in unoccupied habitats

State management guidance for Canada lynx was originally provided in the *Washington State Recovery Plan for the Lynx* (Stinson 2001) and included designated Lynx Management Zones (LMZ). No state designated LMZs occur within the study area.

Canada lynx are closely associated with moist boreal forests located in areas that experience cold, snowy winters. The forest vegetation types consist of predominantly Engelmann spruce, subalpine fir and lodgepole pine (von Kienast 2003; Maletzke 2004; Koehler et al. 2008). Lynx use a variety of forest successional stages to meet their life history needs and thus require a mosaic of forest structures across the landscape to provide habitat for their primary prey, snowshoe hares (early-successional forest), habitat to facilitate movement (travel, mid-successional forest) and habitat for denning (and foraging, late successional forest) in which to raise kittens (USFS 2020). Foraging habitat consists of habitats that supports snowshoe hare, which primarily includes mixed coniferous/deciduous forests that support dense horizontal understory to provide food, cover and security for hares. Denning habitat consists of coarse woody debris, such as downed logs and windfalls, that provide security and thermal cover for lynx kittens (McCord and Cardoza, 1982; Koehler, 1990; Slough, 1999; Squires and Laurion, 2000).

The USFS has identified approximately 9,225 acres of potential lynx habitat in the Squilchuck and Stemilt subwatersheds, included about 806 acres within the project area

[5] Per USFWS (2005), "In peripheral areas, the majority of historical lynx records is sporadic and generally corresponds to periods following cyclic lynx population highs in Canada. There is no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx. However, some of these peripheral areas may provide habitat enabling the successful dispersal of lynx between populations or subpopulations."

(USFS 2020). Within the portion of the project area that is in the Table Mountain LAU, there are approximately 705 acres of potential lynx habitat (USFS 2020).

Lynx presence has not been documented on the Wenatchee River Ranger District or in the study area during past surveys conducted between 1988 and 2003 or during more recent surveys conducted between 2017 and 2019 (WCSI 2018, USFS 2020). However, because of their wide-ranging nature and the present of potential habitat in the wider study area, Canada lynx is included in the impact analysis.

Grizzly Bear

The grizzly bear is listed as a Threatened species, with a determination of "warranted for endangered status" in the North Cascades (USFWS 1975, 1998). Although grizzly bears once occurred throughout the North Cascades, their population has declined due to intensive historical trapping, hunting, predator control, and habitat loss (USFWS 1997, 2011). In 1997, the North Cascades was designated as a recovery area for grizzly bears and a recovery chapter (added to the overall recovery plan) was completed (USFWS 1997). The federal lands within the study area are included in the North Cascades Recovery Area; however, the study area is not part of a Grizzly Bear Management Unit (GBMU). The closest GBMUs are the Peshastin GBMU, which is 1.5 miles to the east of the study area, and the Swauk GBMU, which is 1.5 miles to the north of the study area.

The impacts of roads and human access on grizzly bears are well documented and include such effects as increased potential for poaching, collisions with vehicles, food conditioning because of access to human foods and garbage, and displacement of bears from important habitats due to disturbance from vehicle traffic (Gaines et al. 2003). As a result of these interactions, the management of human use levels through access management is one of the primary approaches used to balance the needs of grizzly bears and humans (IGBC 1998). Approximately 75 acres of the project area was identified as supporting core areas for grizzly bear (USFS 2020).

In the US portion of the North Cascades Grizzly Bear Recovery Area, there have not been enough verified sightings of grizzly bears, in particular females with cubs, in the past 5 years to meet the definition of a "population" (USFWS 2000, Lyons et al. 2018). To date, there have been no verified sightings of grizzly bears in the study area, in part a result of the extremely low numbers of grizzly bears that are left in the North Cascades. The most recent evidence of grizzly bears near the study area was a confirmed track on Wedge Mountain in 1991, approximately 20 miles to the northwest. However, because federal lands within the study area occur in the recovery area, the effects to grizzly bears were not assessed.

Northern Spotted Owl and Associated Critical Habitat

Northern spotted owl was listed as Threatened under the ESA on June 26, 1990 (USFWS, 1990). A revised recovery plan was signed on June 28, 2011 (USFWS, 2011) and revised critical habitat was designated in 2012 (USFWS 2012). The spotted owl was listed as a state endangered species in Washington in 1988. In 1994, the Northwest Forest Plan amended the Okanogan-Wenatchee Land and Resource Management Plan to include designation of a system of reserves to provide for the conservation and recovery of wildlife species, such as the northern spotted owl, that are associated with late-successional forests (USDA and USDI 1994). The study area does not include any designated critical habitat for the northern spotted owl, nor does it include any of the

federal reserves that were designated under the Northwest Forest Plan. Outside of reserves or critical habitat, the management of spotted owls focuses on the protection of suitable nesting, roosting, and foraging habitat and dispersal habitat types around spotted owl activity centers (WCSI 2018).

Spotted owls begin nesting in early March and extend through August and September until juveniles disperse from the nesting area. Monitoring of spotted owl nests in the eastern Cascades has shown that spotted owl young are generally mobile enough to move away from disturbance by the end of July. Dispersal habitat is used by spotted owls to move between patches of nesting/roosting and foraging habitats. Dispersal habitat is composed of single or multi-layered forests with moderate sized trees, and canopy closure greater than 40%. Limited information is available concerning the habitats used by spotted owls during dispersal.

The study area does not fall within designated spotted owl critical habitat or spotted owl emphasis areas. Designated spotted owl critical habitat is located two miles northwest of the study area. WDNR has designated spotted owl special emphasis areas (SOSEA) to provide for demographic and/or dispersal support as necessary to complement the northern spotted owl protection strategies on federal land within or adjacent to the SOSEA (Washington State's Forest Practices Rules, WAC 222-16-086). The study area is approximately 6 miles southwest of the nearest SOSEA.

Surveys for northern spotted owls were conducted throughout the Squilchuck and Stemilt subwatersheds from the late 1980s through 2006, and again during 2018. A single spotted owl was located within the that assessment area in 1996 and a resident single spotted owl was identified within that area in 1998. Neither of those occurrences were within the study area. PHS records indicate that one or more spotted owl occurrence records were noted in the greater area that contains the Chelan PUD utility corridor, however, no specific occurrence locations are provided (Ecosystems North West 2024).

Overall, no suitable habitat for northern spotted owl occurs in the project area. Approximately 5 acres of suitable spotted owl habitat was identified in the Chelan PUD utility corridor, of which approximately 3 acres occur on private lands and 2 acres occur on federal lands (WCSI 2024).

State Listed Species

Cascade Red Fox

Of the species identified in Table 1, there is only one state-listed endangered species that is not listed under the ESA: Cascade red fox (*Vulpes vulpes cascadens*; WDFW 2023). Cascade red fox, a subspecies of red fox, was classified as Endangered in the state of Washington by WDFW on September 23, 2022 (Lewis et al. 2022). It is also considered a priority species by WDFW (WDFW 2008).

Cascade red fox historically occurred in subalpine meadow, parkland, upper montane forest, and alpine habitats of the Cascade Range in Washington and southern British Columbia, however, lack of detections in British Columbia in recent decades suggest that this species is now limited to Washington (Lewis et al. 2022). In Washington, this subspecies appears to be limited to the South Cascades and specifically to the south of the Interstate 90 (I-90) corridor, which occurs approximately 25 miles to the southwest of

the study area (WCSI 2024). Because of these known range limitations, Cascade red foxes are not expected to occur in the study area even though suitable habitat may be present,

The Cascade red fox occurs year-round in subalpine meadow, parkland, upper montane forest and alpine habitats near the crest of the Cascade Range (Lewis et al. 2021). It prefers open-forest habitats, more typically found on the eastern slope of the Cascade Range and typically remains at high elevations (generally >4,000 feet) throughout the year Aubry 1984, Akins 2017). Habitat connectivity for Cascade red fox is most often influenced by land cover types, with subalpine parkland and upper montane forest habitats facilitating connectivity by mid-elevation forests limiting connectivity; the presence of roads and rivers do not appear to have much of an effect on connectivity (Atkins 2017).

Environmental factors known to influence Cascade red fox survival and viability include climate change, the loss of persistent snowpack, competition from coyotes and non-native fox species, and habituation to human foods and garbage (WCSI 2024). Of these, the latter is the primary concern associated with ski areas and other high altitude human developments. Such conditions increase the risk of conflicts between foxes and people and domestic pets, as well as increased fox mortality from vehicle collisions. Historically, conflicts between foxes and human have not occurred at the existing Mission Ridge ski area, presumably due to the absence of Cascade red foxes in the area (WCSI 2024).

The study area and surrounding lands primarily include mid-successional forests with high canopy closure comprised of Douglas fir and lodgepole pine with minimal understory vegetation (WCSI 2024). Other areas include more open coniferous forests dominated by Douglas fir and ponderosa pine interspersed with areas of unvegetated talus. Neither of these forest types are typically associated with Cascade red fox. The privately-owned lands within the study area also typically lack the high elevation habitats preferred by the subspecies, however, there are portions of the existing ski area on adjacent state and national forest lands that do include both subalpine and alpine areas (WCSI 2024). WCSI estimates that there are approximately 706 acres of potential Cascade red fox habitat in the project area (WCSI 2024). USFS, which includes Cascade red fox in their Habitat Generalist habitat group, estimates that there are approximately 35 acres of potential security habitat for that group in the national forest portions of the project area (USFS 2020).

Although portions of the study area have the potential to support Cascade red fox, recent camera surveys conducted between 2019 and 2021 as part of an elk survey, failed to detect any Cascade red foxes in those areas even though other carnivores including black bear, cougar, bobcats, coyotes, and wolves were identified (WCSI 2024). Such results suggest that there is a low probability that Cascade red foxes currently inhabit the study area.

WDFW Terrestrial Priority Species Likely to Occur in Study Area

The following species from WDFW's PHS species list were determined to have a high likelihood of occurrence in the study area (WCSI 2018):

- Elk (*Cervus elaphus*)
- Rocky Mountain mule deer (*Odocoileus hemionus hemionus*)
- Western toad (*Anaxyrus boreas*)

- Dusky grouse (*Dendragapus obscurus*)
- Sooty grouse (*Dendragapus fuliginosus*)
- Northern goshawk (*Accipiter gentilis*)

Elk

Elk are included as a PHS species by WDFW because they are a species of recreational, commercial, and Tribal importance (WDFW 2008). Priority areas identified for elk by WDFW include calving areas, migration corridors, regular concentrations in winter, and foraging areas along coastal waters. Elk are also a species of management interest and a management indicator species for the USFS (USFS 2020).

Elk are an important resource and have substantial influence on ecosystems in the eastern Cascades of Washington. For example, elk can influence plant community composition (Opperman and Merenlender 2000, Riggs et al. 2000, Alldredge et al. 2001, Rooney 2001, Baker et al. 2005, Beschta 2005, Wisdom et al. 2006), nutrient cycling (Frank 1998, Evens and Belnap 1999, Schoenecker et al. 2004), disturbance regimes (Hobbs 1996, Vavra et al. 2004), and songbird community composition (Berger et al. 2001, Fuller 2001, Bailey and Whitham 2003). In addition, elk are an important economic and cultural resource (WDFW 2018).

Elk are often seen in the Squilchuck and Stemilt subwatershed including on lands within the study area. These elk are a subhead of the Colockum Elk Herd and use the both the Squilchuck and Stemilt subwatersheds as summer range and portions of the Stemilt subwatershed as calving habitat. The study area is used as summer range and elk likely migrate through the site as they move from summer to winter ranges. Elk calving in Washington is generally from mid-May to mid-July. The Colockum Elk Herd is estimated to be approximately 6,018 individuals, and the herd population management objective is 4,050 to 4,950 individuals (WDFW 2014). The limiting factors for Colockum Herd include habitat, hunting, and lethal removals related to agricultural damage (WDFW 2014).

Recent research has highlighted the importance of forage quality and quantity on elk summer range, particularly in the late-summer and early fall, and how nutrition influences elk body condition, productivity, calf growth, and survival (Cook et al. 2004, 2013, 2018). Recently developed methods used to assess elk habitat better account for elk nutrition (Rowland et al. 2018) and better assess how the Proposed Project may influence elk forage or elk access to high value forage areas, in addition to other factors that influence elk habitat use (i.e. roads) (Rowland et al. 2018, Wisdom et al. 2018). USFS assessed elk habitat within the study area using elk forage, cover, security habitat, and terrain as key indicators. The results of that assessment indicate that the project area contains approximately 507 acres (10%) low quality elk habitat, 555 acres (51%) moderate quality elk habitat, and 34 acres (3%) high quality elk habitat (USFS 2020). WCSI's elk camera study for the Squilchuck and Stemilt subwatersheds (from spring 2020 until fall 2021) provided additional information on elk movements, calving, and time of use (WCSI 2022).

During a 2024 survey, WCSI also identified approximately 25 acres of low quality habitat, 36 acres of moderate quality habitat, and 10 acres of high quality habitat for elk in the Chelan PUD utility corridor (WCSI 2024).

Rocky Mountain Mule Deer

Rocky Mountain mule deer are included as a PHS species by WDFW because they are a species of recreational, commercial, and Tribal importance (WDFW 2008). Priority areas identified for mule deer by WDFW include breeding areas, migration corridors, and regular concentrations in winter. Mule deer are also a species of management interest and a management indicator species for USFW (USFS 2020).

Mule deer populations in north-central and eastern Washington are stable to increasing (WDFW 2016a). Mule deer commonly occur within the Squilchuck and Stemilt subwatersheds. Higher elevations in both the Squilchuck and Stemilt subwatersheds, including those in the study area, are used by mule deer for summer range. Winter range is limited to areas of lower elevations in these subwatersheds but is not typically present in the study area due to higher elevations and increased snow cover. Mule deer often use riparian areas with dense vegetative cover for fawning during May through July in eastern Washington (WDFW 2016a).

Habitat quality, in particular forage quality and quantity, can influence mule deer habitat use, productivity, and survival (Forrester and Wittmer 2013). USFS assessed mule deer habitat quality in the Squilchuck and Stemilt subwatershed and the study area using forage, cover, and habitat security as the key indicators. The results of that assessment were identical to the elk habitat quality assessment (USFS 2020).

Evidence of deer use was observed in the Chelan PUD utility corridor during the June 2024 wetland delineation and stream typing survey of that area (Ecosystems North West 2024). WCSI later identified approximately 25 acres of low quality habitat, 36 acres of moderate quality habitat, and 10 acres of high quality habitat for mule deer in the Chelan PUD utility corridor (WCSI 2024).

Western Toad

The western toad is a medium to large sized toad that is found throughout Washington in a variety of terrestrial habitats including prairies, forests, canyon grasslands and ponderosa pine-Oregon Oak habitat (WCSI 2018). Adult toads are primarily terrestrial, but often occur near permanent water bodies, especially in drier climates and during breeding (Hallock and McAllister, 2005). Western toads have the potential to occur in the study area and adjacent areas where permanent water sources exist and could be found in riparian areas around perennial streams and wetlands, including those that occur in the Chelan PUD utility corridor,

Dusky and Sooty Grouse

Dusky grouse and sooty grouse (previously known as blue grouse) are identified as PHS species by WDFW because of their recreational, commercial, and Tribal importance (WDFW 2008). Priority areas identified for these species include breeding areas and regular concentrations.

Both dusky and sooty grouse are found in mountainous areas with open coniferous forests. The grouse in the study area are most likely Dusky grouse or a hybrid of the two subspecies (Schroeder 2006) and have been observed using the study area. They are closely associated with true fir (*Abies* spp.) and Douglas fir (*Pseudotsuga menziesii*) forests that provide streams, springs and meadows. Nesting habitat covers a range of types and includes shrub-steppe, mountain shrub, open coniferous forest, clearcuts, old growth forest, and alpine tundra (Schroeder 2006). Approximately 20 acres of suitable habitat for

these species is also present in the Chelan PUD utility corridor portion of the study area (WCSI 2024).

Northern Goshawk
Northern goshawk is a PHS species because it is identified as a candidate for state-listing (WDFW 2008). Priority area include breeding areas, alternate nest sites, and post-fledging foraging areas.

Northern goshawks are generally associated with forested areas with a large and old tree component. Northern goshawks select for mature conifer forests for nesting (USFS, 2012). WCSI mapped approximately 110 acres of potential northern goshawk habitat within the project area, with less than one acre located on the private parcel (WCSI 2018). This habitat is considered lower quality because it does not provide the large and old forest structure northern goshawk use for nesting. Goshawk surveys were conducted within the existing Mission Ridge Ski Area in the late 1990's and no goshawk were located. Approximately 8 acres of potential northern goshawk habitat was identified in the Chelan PUD utility corridor by WCS, all of which occurs on private lands (WCSI 2024).

Other PHS Species that Could Occur in the Study Area

Although none of the following species were observed in the study area during previous field surveys, potential suitable habitat for them has been identified in the study area:

- Townsend Big-Eared Bat (*Corynorhinus townsendii*)
- American Marten (*Martes americana*)
- Columbia Spotted Frog (*Rana luteiventris*)

Townsend's Big-Eared Bat
Roosting habitat for Townsend's big-eared bat may possibly be located in large trees or large snags (Woodruff and Ferguson 2008, Hayes and Wiles 2013). Bat roosts are often located within human created structures such as old barns and buildings. Suitable habitat for this species is limited across much of the study area, however, WCSI identified approximately 10 acres of forested area within the Chelan PUD utility corridor project area that could provide large tree and/or large snag habitat for this and other bat species (WCSI 2024).

American Marten
American marten is generally found in mature and older undisturbed coniferous mixed forests with large snags and fallen trees at mid to high elevations (Munzing and Gaines 2008). This species also selects for sites with coarse woody debris that provides shelter and foraging areas between the ground and snowpack in winter (Halfpenny et al., 1995). Much of the project area is located on private land that was previously harvested for timber and is now largely composed of single-aged stands of trees that are less than 100 years old (WCSI 2018). In addition, many of the larger trees and snags have also been removed by past harvest operations. As such, suitable habitat for marten is limited in much of the study area. WCSI has identified approximately 8 acres of potentially suitable marten habitat in the Chelan PUD utility corridor, all of which is located on private land (WCSI 2018).

Columbia Spotted Frog
The Columbia spotted frog is associated with riparian habitat along permanent bodies of water and wetlands (WCSI 2018). Although it is possible that the Columbia spotted frog may occur within the riparian habitat along the perennial creeks and in the depressional wetlands when they hold water, the Project Area is likely too high in elevation. They are not likely to be residents of the wetland habitat in the project area due to the ephemeral nature of the wetlands. However, WCSI did identify approximately 20 acres of potential Columbia spotted frog habitat in Squilchuck Creek and its tributaries, and 0.5 acres of potential habitat in the wetlands located in the Chelan PUD utility corridor (WCSI 2024).

PHS Species Unlikely to Occur in the Study Area
Terrestrial PHS species not already discussed in previous sections that have a low likelihood of occurrence in the study area include the following:

- Golden eagle (*Aquila chrysaetos*)
- Flammulated owl (*Otus flammeolus*)
- White-headed woodpecker (*Picoides albolarvatus*)
- Roosting concentrations of bat species including Townsend's big-eared bat (*Corynorhinus townsendii*)
- White-tailed jackrabbit (*Lepus townsendii*)
- Wolverine (*Gulo gulo*)
- Monarch butterfly (*Danaus Plexippus)*

These determinations were primarily based on a lack of suitable habitats for these species in or in the project area or because the project area is outside of the known range for certain species. Additional information on these determinations is provided in the 2018 *Mission Ridge Expansion Project: Supplement to SEPA Checklist – Aquatics, Wildlife, and Botany Resources Report* (WCSI 2018).

Chelan County Species of Local Importance
Chelan County defined "species of local importance" are those species that are of local concern due to their population status or their sensitivity to habitat alteration or that are game species. Chelan County does not define any species of local importance in their code. However, as previously noted, mule deer and winter elk range and migration corridors are currently identified as habitats of local importance by the County.

Migratory Birds
Migratory birds are of great ecological and economic value and contribute considerably to biological diversity. They are also regulated under the Migratory Bird Treaty Act (MBTA). Typically, 30 to 50% of the native bird community in eastern Washington forests is comprised of neotropical migratory birds (Gaines et al. 2007, 2010). Migratory birds occur over a wide range of habitats in the Squilchuck and Stemilt subwatersheds. According to the USFS EA (2020), the primary habitats include late-successional forest habitats (approximately 162 acres in project area), open canopied dry forest habitats (0 acres in project area), and riparian and wetland habitats (approximately 90 acres in the

project area). An undetermined amount habitat for migratory birds is also present in the Chelan PUD utility corridor portion of the study area.

All portions of the study area are located within the Pacific Flyway and Bird Conservation Region 9 – Great Basin. Of the 28 species listed for the Great Basin, WCSI determined that only the golden eagle (*Aquila chrysaetos*) and calliope hummingbird (*Selasphorus calliope*) potentially occur in the study area (WCSI 2018). White-headed woodpecker (*Picoides albolarvatus*) and peregrine falcon (*Falco peregrinus*) are also on the list, but nesting habitat associations limit the likelihood of resident populations in the study area. Golden eagle nesting habitat would be limited in the study area as well and no raptor nest sites have been located within the study area to date (WCSI 2018). The calliope hummingbird is fairly common but vulnerable to habitat loss. The remaining species on the Region 9 list prefer more open grasslands and pine forests, mudflats, large marsh, large hardwood riparian, or waterfall habitat and do not have habitat within the study area.

2.2 Aquatic Habitats and Species

Aquatic resources within the study area are relatively limited. Two non-fish bearing perennial streams, and two wetlands (Wetlands 1 and 2) are located on the privately-owned land in the project area, and one wetland (Wetland 3) was documented near the headwater of an unnamed stream on adjacent USFS land (Figure 5.3-2; WCSI 2018, USFS 2020). In addition, portions of Squilchuck Creek, an unnamed non-fish bearing perennial stream, and one wetland (Wetland 4) were identified in the Chelan PUD utility corridor (Ecosystems North West 2024; Figure 5.4-8).

In addition to these streams and wetlands, the existing Mission Ridge facility includes an 18 million gallon human-created reservoir located on the upper mountain outside of the study area to the west (Figure 5.3-2). That reservoir, which is fed by water pumped from Squilchuck Creek at the base area, supplies water used for snowmaking at the existing Mission Ridge facility (USFS 2020). As part of the Proposed Project, water from that reservoir would be pumped to a new reservoir that would be constructed on USFS-owned land in the proposed Special Permit Use portion of the study area. Water from the new reservoir would be used for snowmaking in the expanded ski areas proposed under the project.

Although unmapped seasonal streams likely occur in the study area and on surrounding lands during the spring runoff season, those waterbodies are unlikely to provide habitat for fish due to high gradients, ephemeral flow, and human-created barriers to fish passage. However, such streams could provide seasonal habitat for amphibians. A new proposed reservoir within the project area to be used for snowmaking could also provide additional aquatic habitat, although it is also not likely to support fish due to a lack of connection to fish-bearing waters.

2.2.1 Aquatic Habitats

Aquatic habitats identified in the study area are shown on Figure 5.3-1, Figure 5.3-2, Figure 5.3-3, and Figure 5.4-8 and described in the following sections.

2.2.1.1 Streams

The perennial streams identified in the study area drain to Squilchuck Creek, a fish bearing perennial stream with headwaters within the existing ski area and just outside the study area. Squilchuck Creek drains directly to the Columbia River approximately 9 miles downstream of the study area. The southeast portion of the study area drains off-site to Upper Wheeler Reservoir and Orr Creek, which flows to Stemilt Creek. Stemilt Creek drains directly into the Columbia River approximately 8 miles downstream of the study area. The Columbia River provides rearing, foraging, spawning and adult habitat for numerous resident fish, shellfish, plants, and wildlife species unique to the Pacific Northwest, as well as migratory habitat for anadromous fish moving to upstream areas.

Squilchuck Creek flows from Mission Ridge Ski Area through culverts routed under the Mission Ridge parking lot, through mountainous forested areas, shrub-steppe areas, orchards and other agricultural, residential, and small industrial areas, and the larger developed City of Wenatchee before its confluence with the Columbia River. Within the project area, Squilchuck Creek receives flow from Lake Creek, which is also routed through culverts under the Mission Ridge parking lot. Squilchuck Creek is characterized as a naturally low surface water producer with arid geology (WCSI 2018). A culvert under the Mission ridge ski area parking lot is the upstream extent of what are considered fish bearing reaches of Squilchuck Creek. The upper extent of Squilchuck Creek habitat is limited by natural and human-created fish passage barriers, steep gradients, stream channel size, and insufficient flows. Other habitat limiting factors for aquatic species in Squilchuck Creek include roads, floodplain and riparian buffer conversion to agriculture and residential development, water diversion for irrigation, reduced large wood recruitment and instream habitat complexity, flood control practices such as berms disconnecting floodplain habitat from the stream channel, and stream channelization. Compacted fines and gravel and high turbidity found throughout the 9 miles of the system further limit habitat.

Downstream of the parking lot, the Chelan PUD utility corridor parallels Squilchuck Creek to the west extending to Squilchuck Road. Although existing maps show at least two crossings of Squilchuck Creek by the existing corridor, a spring 2024 walkthrough by the Applicant confirmed that the existing corridor does not cross the creek and is located at least 150 feet away from the creek channel throughout its length (Jorgenson 2024). This was further verified during a September 2024 wetland delineation conducted by Ecosystems North West when the western ordinary high water boundary of Squilchuck Creek as identified and mapped (Ecosystems North West 2024). The section of Squilchuck Creek the parallels the utility corridor runs within a steep-sided ravine that supports dense riparian vegetation and abundant downed trees and woody debris.

Squilchuck Creek has numerous human constructed culverts and water diversions that impair fish passage, particularly in the lower elevations of the watershed. Major barriers include the BNSF Railway culvert at RM 0.1, a partial fish passage barrier, and the Wenatchee Avenue culvert at river mile 0.3, a full fish passage barrier for Chinook salmon (WCC, 2001), and a natural barrier at approximately RM 1.2 that limits migration for adult Chinook and coho salmon (WDFW, 2006). In high water events, steelhead trout may be able to migrate past these barriers, but seasonal low flows and severely degraded habitat limits their productivity (WCC, 2001).

The September 2024 delineation also identified an unnamed perennial stream that runs between Mission Ridge Road and Squilchuck Creek (Figure 5.4-8). That stream occurs between the proposed location for Booster Pump 2 and the northern end of the Chelan PUD utility corridor. It originates from a hillside seep and runs toward the northeast for approximately 2,400 feet before draining into the ponded wetland on the Scout-A-Vista Camp property (see Section 2.2.1.2). The stream channel splits right before entering the wetland. The channel of that stream has an average width of 3 feet and is classified as non-fish bearing.

2.2.1.2 Wetlands

Freshwater wetlands are important landscape features that provide habitat for many plants and animals. Wetlands perform many ecological functions including the absorption of floodwaters, nutrients, sediments, and pollutants before they reach other waterbodies. Both freshwater and instream wetlands are considered aquatic priority habitats by WDFW (WDFW 2008).

Wetlands 1 and 2 are located on the private parcel and were documented in September 2017. They consist of small (0.23 acre and 0.06 acre, respectively) palustrine emergent wetlands located in shallow depressions in the northeastern portion of the project site (Beich and Tomassi 2017). Both wetlands are dominated by sedges *(Carex* spp.) and exhibit seasonal saturation and ponding that is primarily supplied by groundwater. They are both surrounded by ponderosa pine forest with an herbaceous understory. Both wetlands were rated as Category III wetlands under *The Washington Wetland Rating System for Eastern Washington* (Hruby 2014). Category III wetlands are those which have a moderate level of function and can often be adequately replaced with mitigation (Hruby 2014).

Wetland 3 is a 0.21 acre palustrine emergent wetland located near the center of the study area on USFS land (USFS 2020). It was identified during botanical field surveys conducted by USFS in 2019. Wetland 3 exists in a broad depression around an unnamed intermittent stream that flows down a north-facing, forested slope and eventually connects to Squilchuck Creek. The majority of the wetland is dominated by herbaceous vegetation including field horsetail (*Equisetum arvense*), arrowleaf ragwort (*Senecio triangularis*), and white shootingstar (*Dodecatheon dentatum*). Woody species are present at a lower abundance and include Cascade azalea (*Rhododendron albiflorum*), prickly currant (*Ribes lacustre*), and willow (*Salix* sp.). Two orchid species, scentbottle (*Platanthera dilatata* var. *dilatata*) and slender bog orchid (*Platanthera stricta*) were also observed in Wetland 3. Wetland 3 was not rated by USFS because it was not formally delineated during the field survey.

Wetland 4 was identified in the Chelan PUD utility corridor in June 2024 (Ecosystems North West 2024). That wetland is located in the northern portion of the corridor on the Scout-A-Vista Camp property (Figure 5.4-8). It consists of a permanently flooded/ponded wetland that supports a mix of aquatic, emergent, and woody vegetation. Plant species present include duckweed (*Lemna minor*), common spikerush (*Eleocharis palustris*), cattail (*Typha latifolia*), panicled bulrush (*Scirpus microcarpus*), and coyote willow (*Salix exigua*). The wetland is fed by the unnamed perennial stream previously noted in Section 2.2.1.1. Wetland 4 was estimated to be approximately 0.5 acre. It was not assigned a wetland rating.

2.2.2 Aquatic Plants

Due to the limited extent of aquatic habitat, there are little to no aquatic plants present in the project area. Semi-aquatic plants occur in one of the two small wetlands located on the privately-owned land and include common emergent species such as common spikerush (*Eleocharis palustris*) and various types of sedges (*Carex* spp.). Those species were found growing in an area of seasonal ponding. Both aquatic and semi-aquatic herbaceous plants were observed in the ponded wetland identified in and adjacent to the Chelan PUD utility corridor on the Scout-A-Vista Camp property. Species present in that wetland include panicled bulrush (*Scirpus microcarpus*), duckweed (*Lemna minor*), cattail (*Typha latifolia*), and common spike rush No special status aquatic plants are known occur within the study area or in the Chelan PUD utility corridor.

2.2.3 Aquatic Animals

Squilchuck Creek drains directly to the Columbia River approximately 9 miles downstream of the study area. The Columbia River provides rearing, foraging, spawning and adult habitat for numerous resident fish, shellfish, plants, and wildlife species unique to the Pacific Northwest, as well as migratory habitat for anadromous fish moving to upstream areas. The Columbia River at the confluence of Squilchuck Creek is a migration corridor for ESA listed Upper Columbia spring-run Chinook Salmon (*Oncorhynchus tshawytscha*), Upper Columbia Steelhead Trout (*Oncorhynchus mykiss*), and Columbia Basin Bull Trout (*Salvelinus confluentus*), as well as two federal Species of Concern, Pacific lamprey (*Lampetra tridentata*) and Pygmy Whitefish (*Prosopium coulteri*). It also provides habitat for the following State Candidate and Sensitive Species: leopard dace (*Rhinichthys falcatus*), mountain sucker (*Catostomus platyrhynchus*), pygmy whitefish (*Prosopium coulteri*), and Umatilla dace (*Rhinichthys umatilla*).

Although Chinook salmon, coho salmon, and steelhead trout are expected to use the lowest reaches Squilchuck Creek near the confluence of the Columbia River, those species are not documented in the portions of Squilchuck Creek that flow near the study area or in the perennial or seasonal streams that occur in the study area. This is largely due to the presence of multiple natural and human-created fish barriers in Squilchuck Creek, the steep gradients of the perennial streams that occur in the study area, and the limited amount of flow in the seasonals streams that cross the study area. Because of these limiting factors, bull trout (*Salvelinus confluentus*) are also not expected to be found in Squilchuck Creek. (WCSI 2018).

Native fish species that are State Priority Species and likely use the mainstem of Squilchuck Creek include resident rainbow trout (*Oncorhynchus mykiss*) and west slope cutthroat trout *Oncorhynchus clarkii lewisi*). Mountain sucker may occur in the upper reaches, however, their presence is not confirmed. WCSI noted that mountain sucker may be assumed to occur in aquatic habitats in the Chelan PUD utility corridor because they are found in high elevation mountain streams that are generally less than 40 feet wide (WCSI 2024). Habitat degradation has occurred to the extent that exotic species may now be dominant in Squilchuck Creek. Native species are typically not present in sustainable numbers due to population isolation and habitat limitations.

3 HOW IMPACTS WERE ANALYZED

Potential impacts from the construction and operation of the Proposed Project were determined by reviewing information sources provided throughout this section, and from consultation with Ecology during a consulting agency meeting (Aspect 2022). The impact analyses completed by WCSI in the 2018 and 2020 resource reports (WCSI 2018, 2020) and by USFS for their 2020 EA for the project (USFS 2020) were heavily relied upon. Impacts identified in the 2022 SEPA Checklist (LDC 2022) were also included. No additional data collection or modeling was conducted as part of this impact analysis.

Direct and indirect impacts were qualitatively assessed based on their potential to change baseline conditions or conflict with regulatory requirements. It is noted that the impact summaries provided by both the Applicant and USFS report did not typically differentiate between direct and indirect impacts; rather, direct and indirect impacts are called out collectively. Since those summaries were the primary sources for this DEIS, potential direct and indirect impacts on plants and animals were also combined. Factors considered in this evaluation included the following:

- **Terrestrial animal and plant impacts:** direct or indirect impacts on terrestrial animals, plant species and their habitats including potential impacts on special status communities.
- **Aquatic animal and plant impacts:** direct or indirect impacts on aquatic animals, plant species and their habitats including potential impacts on special status communities.

4 FINDINGS FOR THE PROPOSED PROJECT

4.1 Impacts from Construction

Construction of the Proposed Project will occur in phases over a proposed 20-year period. Construction activities will include vegetation removal, excavation, soil grading, topographic contouring, fill placement, soil compaction, concrete and asphalt paving, foundation construction, infrastructure installation (e.g., new ski lift towers, utility lines, pump stations), stream crossing construction (e.g., culvert installation), existing road improvement and new road construction, existing reservoir enlargement and new reservoir construction, material and equipment storage and stockpiling, burning on nonmerchantable tree and coarse woody debris, and other related activities. Such actions

will disturb and permanently alter the existing vegetation, contours, and soils of the Proposed Project site and some offsite construction areas, which will in turn affect existing habitats and wildlife use of portions of the Proposed Project site. In many instances, these actions will convert existing natural areas that are relatively undisturbed to developed areas with moderate to high levels of disturbance. It will also convert pervious surfaces to impervious surfaces, decreasing infiltration and increasing stormwater runoff and erosion potential, during the construction periods. Construction activities will also both temporarily and permanently alter existing drainage patterns and potentially change snow accumulation patterns within the study area.

Construction work will be performed using a variety of diesel- and gasoline-powered, construction equipment including but not limited to, excavators, backhoes, bulldozers, scrapers, loaders, dump trucks, compactors, rollers, cranes, light-duty work trucks, equipment service vehicles, mobile concrete batch plants; helicopters (for transport and placement of concrete and structural components for ski lift towers); manual and powered hand tools (e.g., chainsaws, brush cutters), portable generators, and portable lighting. Use of this equipment will produce dust, noise, vibration, and artificial light disturbances that are not currently occurring in the project area or adjacent areas. It will also involve the increased presence of humans, associated human activities, and daily vehicular traffic on existing roads and trails both on and in the vicinity of the project area during the construction period.

Potential impacts on plants and animals from construction activities and the use of construction equipment include the following:

- Direct injury and mortality of plants and animals (e.g., cutting, crushing)
- Conversion, degradation, and loss of existing habitat
- Conversion of vegetation communities (e.g., conversion of forested areas to herbaceous/shrub-dominated in areas proposed for new ski runs)
- Disruption of animal behaviors (e.g., nesting, breeding, denning, foraging, migration)
- Conversion of natural areas to developed areas
- Increased risk of soil and water contamination from leaks and spills of fuel and other vehicle fluids and chemical used during construction (e.g., paints, solvents)
- Increased risk of human and wildlife interactions during construction activities
- Increased risk of construction vehicle collisions with wildlife
- Increased risk of invasive plant species spread and infestation

4.1.1 Terrestrial Habitats and Species

The following sections discuss the potential impacts of Proposed Project construction on terrestrial habitats and plant and animal species.

4.1.1.1 Special Status Habitats

Special status terrestrial habitats that could be affected by the Proposed Project include aspen stands and old growth forest, which are both considered a Priority Habitat by WDFW. In addition, two Priority Habitat Features—talus and snags and logs—could also be affected by construction activities. Potential impacts on this habitat type and features are described in the following sections.

Aspen Stands

The two aspen stands identified in the study area are both located in the proposed development footprint and could be affected by construction activities such as vegetation removal, excavation, and grading. The Applicant has indicated that impacts on those habitat types would be minimized to the extent possible through site design (WCSI 2018).

Therefore, with proper construction-related mitigating conditions, including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on aspen stand habitats from the Proposed Project.

Riparian

Approximately 7.5 acres of riparian and wetland habitats in the Chelan PUD utility corridor occur within the vegetation clearing limits for the proposed utility and booster pump installation work (WCSI 2024). Of those area, approximately 4 acres occur on federal lands and would be required to meet the USFS mitigation standards and guidelines for Riparian Reserves. The remaining 3.5 acres on private lands would be subject to riparian mitigation requirements associated with Chelan County regulations. Assuming that all required mitigation is completed, these impacts would be minimal.

Therefore, with proper construction-related mitigating conditions, including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on riparian habitats from the Proposed Project.

Old Growth Forest

Based on WCSI's analysis, approximately 0.2 acre of old growth forest habitat is within the proposed vegetation clearing limits in the Chelan PUD utility corridor. Those areas would likely be completely removed by utility installation work to support the proposed project. This area represents approximately 10% of the 2 acres of old growth forest habitat present in the study area and less than 0.01% of the estimated 3,765 acres of old growth forest identified in the larger assessment area. The Applicant has indicated that impacts on those habitat types would be minimized to the extent possible through site design.

Therefore, with proper construction-related mitigating conditions, including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on old growth forest habitats from the Proposed Project.

Talus

None of the habitat on federal lands and about 10 acres of talus on state lands would be affected by lift tower installation and road construction approximately 30 acres of talus areas will potentially be impacted within the project area (USFS 2020). The level of impact will vary, from designation as a new ski run with no changes to the talus, to ground

disturbance and talus redistribution as part of resort development. The study area is outside of the range of both Larch Mountain and Van Dyke's salamanders (*Plethodon larselli* and *P. vandykei*), so no impacts on those sensitive species are expected. The study area is on the margin of American pika (*Ochotona princeps*) range and is likely too low in elevation for pika. Due to the extent of talus habitat present in the study area and the lack of impacts expected on wildlife species associated with talus, overall impacts are expected to be minor.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on talus habitat features from the Proposed Project.

Snags and Logs

Tree removal associated with ski run, ski lifts, roads, and Nordic ski trails would result in loss of some snag and log habitat on 45 acres of federal lands, 15 acres of state lands, and 124 acres of private lands in the project area (USFS 2020). In addition, glading would occur on 1 acre of state lands and 13 acres of federal lands and could result in loss of snag and log habitat. Snags larger than 20 inches would be retained unless they pose a safety hazard.

Snag habitat is limited on the private lands is limited due to past timber harvesting activity (WCSI 2018, USFS 2020). On private lands, design standards would be incorporated to limit large snag removal where it is safe to do so.

Past significant wind events have created a substantial amount of downed wood in portions of the study area. As such, log habitat is not limited. Much of the log habitat would not be affected by development (WCSI 2018, USFS 2020).

Downed wood and logs are abundant in the Chelan PUD utility corridor and at least one large snag is present. Some this material may need to be removed to install the proposed underground utilities and the access paths for the proposed pump stations. Overall, however, much of the existing material can likely be left in place or selectively replaced in certain areas.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on snags and log habitat features from the Proposed Project.

4.1.1.2 Terrestrial Plants

Construction of the Proposed Project will require varying levels of vegetation removal within approximately 232 acres of primarily mixed-conifer forest (conifers and associated understory). Of that area, approximately 158 acres occurs on private land and the remaining 72 acres on public lands outside of the Master Planned Resort boundary (WCSI 2018, LDC 2022). Canopy cover across the study area currently varies from 0 up to 70 percent. Vegetation removal will vary depending on construction activities. Construction of roads, parking areas and buildings will require nearly complete removal of vegetation; construction of ski runs and trails will require considerably less removal.

The overall goal is to keep the area as natural as possible with a combination of natural vegetation and infrastructure design (LDC 2022). There is a relatively high amount of vegetation onsite that is currently diseased or dying (LDC 2022). As part of construction, the Applicant will be consulting arborists to ensure retained vegetation is healthy. Restoration requirements, where applicable, will meet CCC 11.77 – 11.80 requirements for revegetation. In addition, the landscaping requirements contained within CCC 11.89.050 and CCC 15.50 will also be met.

The total Proposed Project includes 779 acres of proposed development. However, 621.7 acres of that development are dedicated to open space including ski runs (37.2 acres), undesignated open space (45.1 acres), dedicated conservation areas (531.4 acres), and managed open space (8.0 acres) (LDC 2022). This means that over 80% of the site is dedicated as open space. This vastly exceeds the requirements in CCC 11.89.050(2), which requires 40% of the site be left as open space. Leaving 80% of the site in open space also translates to permanent preservation of existing vegetation.

Commonly Occurring Plant Species

The majority of the vegetation that would be removed during construction consists of relatively common native trees, shrubs, and herbs, which are abundant on other portions of the study area and surrounding lands. Commonly occurring non-native and invasive species are also likely to be affected by clearing and grubbing activities. In addition to direct removal of vegetation for site development activities, plants that remain in work areas could exhibit increased mortality and stunted growth from incidental damages caused by construction activities (e.g., crushing/breakage, burial, soil compaction), Such impacts could be reduced via implementation of standard construction BMPs.

Special Status Plant Species

Expected impacts of the Proposed Project on special status plant species including ESA-listed species, Natural Heritage Program rare plants, unique plan communities, large trees, and traditional plants of concern are discussed in the following sections.

ESA-Listed Species

The Proposed Project would also have long-term adverse impacts on whitebark pine, a species that is listed as threatened under the ESA and as a USFS sensitive species. The proposed footprint of construction activities would potentially be in conflict with 45 of the 167 (27%) documented whitebark pine stems in the project area (USFS 2020). Those individuals include 16 trees with a DBH greater and 3 inches and 29 seedlings and saplings. The trees range in size from 3.7 to 15.9 inches DBH; 11of the 45 whitebark pine are healthy with the remaining being moderately healthy to unhealthy due to damage from blister rust (USFS 2020). All of those individuals would be removed during construction of alpine ski runs, chairlifts, and the access road. Construction would also disturb the soil, harming seeds and likely negatively impacting future seed germination potential. These activities, and future maintenance actions (see Impacts from Operation section) would permanently impact roughly 40% (1.9 acres of 4.9 acres) of the growing area of whitebark pine on the central ridge and nine rock outcrops near the access road where whitebark pine could potentially grow.

The Applicant has made efforts to promote the conservation of whitebark pine including adjusting the footprint of soil contouring for alpine ski runs to protect documented whitebark pine trees. Additionally, project implementation would require compensatory

planting to mitigate for both construction and operations impacts on existing whitebark pine. Following the completion of construction of the roads, lifts and ski runs, whitebark pine seedlings would be planted at rates based on the sizes of the removed trees. This would result in up to 1,305 seedlings being planted. On-site planting in the project area would be favored, though locations have not yet been determined. Seedlings would be grown from parent trees in the Mission Ridge vicinity. To maximize seedling survival at Mission Ridge, recently published planting guidelines by McCaughey (2009) would be followed. Seedling survivorship would be monitored for five years, and if survivorship falls below 25% in this time, additional seedlings would be planted. The collection, growing, and planting of seedlings would occur in collaboration with the USFS.

Overall, construction impacts on the entire local population of whitebark pine would be minor, which is based on this analysis and consistent with the 2020 EA prepared for the project (USFS 2020). The Mission Ridge population of whitebark pine includes both the documented stems in the project area and those known in the 1,300-acre habitat on the plateau above the existing ski area. The effects of the Proposed Project on this population, including cutting up to 28% of the documented stems, loss of 40% of potential ridge habitat, and mitigation outplanting of up to 1,305 seedlings, would likely result in a minor loss of genetic variation and a negligible effect on the long-term viability of the population as a whole. However, it is important to note that while project activities may not have a large, direct impact on the long-term viability of the Mission Ridge whitebark pine population, climate change and other threats would continue to contribute to its long-term decline (USFS 2020).

Natural Heritage Program Rare Plants

Aside from the potential impacts on whitebark pine discussed in the previous section, no specific impacts on rare plant species from the Proposed Project are expected. This is primarily because no other rare plant species have been identified in the study area.

Other Special Status Plant Species

Unique plant communities associated with the central ridge and rock outcrops would be impacted by project construction, with permanent loss or compositional change of vegetation on 58% of the ridge and half the rock outcrops due to ski run contouring (USFS 2020). Approximately 1.4 acres of another ridge in the eastern portion of the National Forest lands would be converted to a reservoir to provide water for snowmaking. Much of the aspen stand on the private parcel would be eliminated. Potential benefits to unique plant communities from the Proposed Project include the clearing and/or thinning of dense forest for alpine ski runs or glades, which is likely to result in an increase in understory plant diversity (USFS 2020).

Several of the greater than 32 inches DBH trees that were mapped on federal lands, along with other trees that are greater than 20 inched DBH, are likely to be removed during construction of the new alpine ski runs and other project features (USFS 2020). The Applicant has redesigned some runs and glades to avoid large trees and has agreed to leave logs of cut trees on site where possible.

Minor adverse impacts on traditional plants of concern are expected from vegetation clearing during construction. Protective design features being considered include minimizing riparian disturbance, avoiding pile burning woody debris on top of traditional plants, salvaging topsoil, and conserving whitebark pine where possible. Some traditional

plants of concern are expected to benefit from forest thinning for gladed skiing (USFS 2020).

Invasive Plant Species

Invasive plant species are currently limited to areas of previous development including the existing Misson Ridge facilities including around the parking lot, access roads, buildings, and in some areas of existing ski runs. The Proposed Project would likely increase the number of invasive plant infestations in the study area and surrounding areas. Road construction, alpine and Nordic ski run re-contouring, chairlift construction, and installation of underground water piping and electrical conduit would disturb approximately 182 acres of forest, displacing native plants and creating habitat for disturbance-adapted invasive species (USFS 2020). Re-seeding re-contoured ski runs with non-native species, a common practice and used previously in the existing Mission Ridge ski area, leads to significantly higher non-native plant cover (Van Ommeren 2001, Burt and Rice 2009). Design features for the Proposed Project would require that the seeding on federal and state lands to be locally sourced, genetically appropriate native species. Re-seeding of disturbed private lands with native species will also likely be required. Additional design measures, such as reinstating topsoil and cleaning equipment, would also aid in reducing new infestations in disturbed areas.

Some alpine ski runs would not require contouring. Clearing tall vegetation and woody debris in these ski runs as part of project construction is likely have a negligible effect on invasive infestations, as supported by a study that found that cleared ski runs have very low abundances and cover of non-native species, similar to un-impacted forest (Burt and Rice 2009). Cleared runs would cover 22.2 acres in total (USFS 2020).

Thinning trees and clearing woody debris in gladed areas between ski runs would increase light availability and germination space for all plants. In addition to native species, it is possible that some non-native species would also benefit. Glading would occur on approximately 18 acres of forest (USFS 2020).

Construction of the project would likely increase the number of invasive plant infestations in the wider study area. Road construction, alpine and Nordic ski run re-contouring, chairlift construction, and installation of underground water piping and electrical conduit would disturb 182 acres of forest, displacing native plants and creating habitat for disturbance-adapted invasive species (USFS 2020). Thinning trees and clearing woody debris in gladed areas between ski runs would increase light availability and germination space for all plants, potentially opening up areas for invasive plant establishment. Re-seeding re-contoured ski runs with non-native species, a practice that was previously used at Mission Ridge, has been shown to result in significantly higher non-native plant cover (Van Ommeren 2001, Burt and Rice 2009). However, project design features would require that any re-seeding on National Forest lands, and likely on state or private lands as well, be locally sourced, genetically appropriate native species. Additional design measures, such as reinstating topsoil and regularly cleaning construction equipment, would also aid in reducing new infestations in disturbed areas. Construction BMPs would also be implemented to reduce the potential for invasive species introduction and spread during construction.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant

adverse construction-related impacts on terrestrial plants, including special status species and invasive and non-native species, from the Proposed Project.

4.1.1.3 Terrestrial Animals

Construction of the Proposed Project could result in varying level of impact on terrestrial animals including those that are commonly occurring and those that have special status under federal, state regulatory programs.

Commonly Occurring Species

Construction impacts on commonly occurring animal species would vary by animal type. Larger mammals (e.g., elk, deer, bear, cougar, coyote, fox) are the least likely to be directly affected by construction activities due their ability to move quickly and travel sufficient distances away from the disturbance. Smaller mammals such as bats, squirrels, chipmunks, rabbits, raccoons, and mustelids (e.g., fisher, marten, mink, otter) may experience slightly higher direct impacts from construction activities because they are somewhat dependent on ground burrowing, rock crevices, trees, and organic structures (e.g., snags and downed logs) for cover. Construction activities such as tree and other vegetation removal, excavation, ground compaction, and fill placement may result in impacts including harassment, temporary to permanent displacement, and possibly mortality. Mammals such as gophers, moles, voles, shrews, and mice may experience a higher degree of direct impacts from construction activities because they depend more on ground burrowing and rock crevices for cover and may experience direct harassment, injury, or mortality resulting from construction equipment use, excavation, ground compaction, fill placement, and the construction of project foundations and infrastructure including roads and utility corridors.

Mammals in the vicinity of construction activities could also be directly affected from dust and artificial lighting during construction that may disrupt behaviors such as foraging, breeding, or rearing, as well as altering behavior patterns. The presence of construction equipment and human activity may also trigger stress induced physiological changes in some mammals that are less capable of fleeing the area. Larger mammals may relocate to adjacent unaffected habitats, resulting in potentially increased competition for resources. These adjacent lands contain potentially suitable habitat and migration corridors (e.g., riparian corridors) that are similar to habitats in the study area. Mammals that remain in the construction area would also experience changes to their habitats that may result in a decrease in available resources (e.g., food, prey, cover) and an increase in competition for the remaining resources. However, relatively abundant supporting habitat will remain in adjacent areas.

Non-nesting, post-fledged, and adult resident and migratory birds are the least likely to be directly affected by construction activities due to their ability to fly away from the areas where those activities are occurring. Impacts on these birds would include harassment and temporary to permanent displacement to adjacent unaffected habitats that may result in an increase in competition for resources. The habitats adjacent to the proposed construction areas are similar and relatively abundant, so appropriate supporting habitat for displaced birds is readily available. Breeding and pre-fledged birds are more likely to be directly affected by tree removal and other construction activities, which could result in elimination of nesting and perching sites and a decrease in available remaining resources. Similar to mammals, birds in the vicinity of construction activities

could be directly affected from dust and artificial lighting that may disrupt normal behaviors, including nesting.

Snakes and lizards may be killed or injured during construction activities. Typical habitat for ectotherms (species that use their environment to regulate their body temperatures) includes exposed rocky areas and talus, which are relatively abundant throughout the study area. Other exposed areas that may be used by these animals include existing and proposed roads, future equipment and material laydown yards, and other similar areas. Construction activities that could result in impacts on reptiles and their habitats include tree removal, construction equipment operation, excavation, ground compaction, and fill placement. Similar to mammals and birds, snakes, lizards, and other reptiles that live or use the study area and surrounding lands would be exposed to dust, noise, vibration, and artificial lighting generated during construction periods, which may lead to disruptions in behaviors and behavior patterns. Daytime construction disturbance may constrain heat-seeking behaviors essential for ectotherms because that preferred habitat is along exposed surfaces in open areas. Such disturbances could affect the normal foraging and breeding behavior of reptiles.

Amphibians are closely associated with aquatic habitat and therefore are most affected by impacts to wetlands and stream channels. Because the study area contains limited aquatic habitat, the Proposed Project is likely to have fewer impacts on amphibians relative to other animal groups. Impacts on amphibians would most likely result from vegetation removal and ground disturbance activities, especially those that would affect riparian areas, downed wood, or talus. Some amphibians may be able to relocate away from construction activities whereas others would likely be killed. Amphibian larvae may be directly affected by exposure to accidental spills and releases of pollutants into waterways from construction materials and equipment. Changes to their habitat may also limit the amount and distribution of suitable instream breeding habitat.

Insects, spiders, and other invertebrates could be injured or killed during construction activities. Similar to the other animal groups, invertebrates could be directly affected from dust and artificial lighting that may lead to disruptions in behaviors and behavior patterns. 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. Due to their small size and adaptability, many invertebrates will likely continue to use the construction areas.

Overall, construction impacts on commonly occurring terrestrial animal species are expected to occur. However, as noted previously, many animals will leave the construction area to avoid the disturbance and occupy similar adjacent habitats, which are relatively abundant in the study area and surrounding lands.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on commonly occurring terrestrial animal species from the Proposed Project.

Special Status Species

Special status species that could be affected by the Proposed Project include four federal and state listed species, one state-listed endangered species, and multiple PHS species. Migratory birds could also be affected by project construction.

ESA-Listed Species

Species listed as threatened or endangered under ESA that could be affected by the Proposed Project include gray wolf, Canada lynx, grizzly bear, and northern spotted owl and its associated designated critical habitat. All of these species are also listed as threatened or endangered by the state of Washington.

Gray Wolf

The potential effects of the Proposed Project on gray wolves and their habitats were assessed using the following indicators: potential for disturbance during the pup-rearing period, potential changes to wolf security habitat, and potential project effects on elk and mule deer, their primary prey base (USFS 2020).

Wolves generally den between April and June, then move pups to a series of rendezvous sites for the remainder of the summer. They are believed to be sensitive to disturbance during this time (Mech et al., 1991), particularly early in the denning period when pups are more vulnerable (Frame et al., 2007). The Naneum wolf pack, which is known to use portions of the study area, is not currently identified as a breeding pair, meaning there are no known den or rendezvous sites associated with this pack (WDFW et al. 2019). Pack monitoring by the WDFW occurs during the late-winter and if a den or rendezvous sites were discovered within the study area, mitigation measures would be applied to protect these sites and reduce human disturbance. The existing level of human activity at Mission Ridge may preclude wolves from denning in the area.

Roads and trails can increase human access to wolf habitat and increase opportunities for the illegal killing of wolves (USFS 2020). Therefore, security habitat for wolves includes areas with low road and trail densities to provide wolves with areas that are relatively free from human presence (WCSI 2018; USFS 2020). Wolf security habitat is defined as areas with open road and motorized trail densities less than one mile per square mile of habitat. There are currently approximately 35 acres of wolf security habitat within the project area, 26 acres of which occur on federally owned lands with the remaining area on state- and privately-owned lands (USFS 2020). As part of the Proposed Project, 0.7 miles of new road would be constructed on federal lands to provide access to the resort development area on private lands. This road would not affect any of the existing 26 acres of security habitat for gray wolves on federal lands in the project area but would reduce wolf security habitat on approximately 6 acres of state lands and 2.5 acres of private lands (USFS 2020). The current level of human activities on at Mission Ridge (e.g., existing ski area access road, existing roads to access ski lifts, existing roads on adjacent state and private lands) occurring around the new road location precludes it from meeting security habitat criteria. Construction activities associated with the proposed ski area expansion, including road construction, lift line construction, and ski run construction, on federal lands may also cause disturbance to gray wolves using the study area. This would most likely occur in the spring and fall as wolves follow elk migrating between seasonal ranges.

Construction activities for the proposed ski area expansion in the project area would reduce elk habitat quality on approximately 272 acres of federal lands, 295 acres of state lands, and 2.5 acres of private lands (USFS 2020). The reduction in elk habitat quality would be a result of the disturbance (noise, human presence) associated with the construction activities. Once construction activities are completed, habitat quality on 253 acres on federal lands and 110 acres of state lands would improve to a moderate level

because some maintenance activities required for operation of the future ski area would likely disturb elk. Those activities would be timed to reduce impacts during critical time periods such as elk calving and during spring and fall migration.

Installation of proposed utilities in the Chelan PUC utility corridor is not expected to affect gray wolf habitat or the habitat for their prey (WCSI 2024).

Overall, the direct and indirect effects associated with the Proposed Project "may affect but are not likely to adversely affect" gray wolves and their habitat (WCSI 2018, USFS 2020). This determination is based on the following: 1) no known denning or rendezvous sites and mitigations to protect sites if discovered, 2) limited effects to security habitat within the study area and surrounding areas, and 3) limited effects to prey species on lands within the study area and in surrounding areas, and partial mitigation through timing restrictions during critical time periods if needed.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on gray wolf from the Proposed Project.

Canada Lynx

Effects of construction of the Proposed Project on Canada lynx were assessed based on how the project would affect: 1) changes to lynx habitat components, and 2) changes to areas that would be groomed or designated as snow-play areas (e.g., ski runs, groomed Nordic ski trails, and snowmobile routes) (USFS 2020).

There are approximately 255 acres of lynx habitat on federal lands and 151 acres of lynx habitat on state lands in the portion of the project area that occurs in the Table Mountain LAU (WCSI 2018, USFS 2020). Those areas are currently in a mid-successional forest condition that typically supports lynx travel habitat. Approximately 32 acres of lynx habitat on federal lands and 18 acres of lynx habitat on state lands would be converted to an early-successional non-forest condition as a result of new ski run and ski lift construction (glading and Nordic trails would retain lynx habitat forest structure). Those areas would not develop into dense early-successional forest preferred by snowshoe hares, which are known to provide foraging habitat for lynx, because they would be maintained in a non-forest condition as ski runs and planted with native grasses. The combined effects of the proposed developments on state and federal lands would result in a reduction in lynx habitat of 50 acres, which is approximately 0.7% of the lynx habitat on state and federal lands in the portion of the project area that occurs in the Table Mountain LAU (USFS 2020).

There are approximately 43 acres of proposed ski runs, 29 acres on federal lands and 14 acres on state lands. There are 1.1 miles of Nordic ski trails that would be groomed during the winter on federal lands (none on state lands). These areas would result in an increase in the area of snow compaction that could influence access by competitors (e.g., coyotes and bobcats) of the Canada lynx (USFS 2020).

There are approximately 300 acres of lynx habitat on private lands that occur in the project area. About 175 of these acres would be converted to a non-suitable habitat condition by the construction of proposed roads, ski trails, condominiums, houses, and other development associated with the proposed resort (USFS 2020).

In total, approximately 225 acres of lynx habitat across all land ownerships would be converted to a nonhabitat condition, affecting about 5% of the lynx habitat in the portion of the project area that is in an LAU (USFS 2020).

There are approximately 5.4 miles of Nordic trails that would be groomed during the winter on private lands that would increase the area of snow compaction and could influence access by competitors (e.g., coyote and bobcats) of the Canada lynx (USFS 2020).

Installation of proposed utilities in the Chelan PUC utility corridor is not expected to affect Canada lynx habitat.

The direct and indirect effects of the Proposed Project "may affect but will not likely adversely affect" the Canada lynx and its habitat (WCSI 2018, USFS 2020). This determination is made based on the following: 1) an insignificant and discountable reduction in lynx habitat on state and federal lands would result from project construction, 2) the location of the project occurs in an area designated as "peripheral" to the recovery of lynx, 3) the location of the project make it unlikely that lynx reside in this area because it is a considerable distance to known occupied lynx (core) areas, and 4) the project is consistent with the conservation measure for Canada lynx in "peripheral" areas.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on Canada lynx from the Proposed Project.

Grizzly Bear

The indicators used to assess potential impacts on grizzly bear include changes to the availability of core areas within the North Cascades Grizzly Bear Recovery Area (but outside of any GBMU), and the potential for grizzly bears to become habituated to human foods and garbage (USFS 2020).

Construction of the various proposed ski area improvements and associated development within the project area would not occur within the 38 acres of core area located on federal lands that provide a variety of seasonal food resources for grizzly bear. There would be no effect on existing core areas within the recovery area. The proposed ski area developments and road access within the project area would not reduce the 30 acres of core grizzly bear habitat on state lands as those areas are not located within a GBMU or in the recovery area. There would be increased human presence during the construction phase of the project on federal, state, and private lands outside of the core areas within the recovery zone.

Construction of the proposed ski area developments and road access within the project area would not reduce the 7 acres of core area currently identified on private lands. The core areas on private lands are not located within a GBMU or in the recovery area. Installation of proposed utilities in the Chelan PUC utility corridor is not expected to affect the core habitat areas for grizzly bear.

Based on the direct and indirect effects, the proposed Mission Ridge Expansion project "may affect, but is not likely to adversely affect" grizzly bears (WCSI 2018, USFS 2020).

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on grizzly bear from the Proposed Project.

Northern Spotted Owl and Associated Critical Habitat

Based on analyses by both WCSI (2018) and USFS (2020), no suitable spotted owl habitat was identified within the project area. Approximately 2 acres of potential suitable spotted owl habitat is present within the portion of the Chelan PUD utility corridor that would be cleared for the installation of utility lines and booster pumps (WCSI 2024). However, the potential for those area to support nesting habitat is low and timing restrictions could be implemented if needed to minimize potential impacts. Although there are some small patches of forest along the northern boundary of the study area that could be classified as lower quality suitable spotted owl habitat, there is generally an insufficient amount of suitable habitat in this landscape to support resident, territorial pairs (WCSI 2018).

There are, however, approximately 6 acres of suitable spotted owl habitat outside the project area but within 0.25 mile of construction activities (these include use of the existing road by construction equipment and construction of the main access road) that may produce noise above ambient levels during the nesting period. Past and recent surveys have not resulted in the location of nesting spotted owls in those areas (USFS 2020. Additionally, the existing Mission Ridge Road bisects the suitable habitat to the northwest of the study area. The fragmented nature of the existing habitat within the Squilchuck and Stemilt subwatersheds and the location on the extreme eastern edge of the spotted owl range makes it unlikely that a pair or resident territorial spotted owl is present. The potential for noise from construction activities to disturb spotted owl nesting is very small; however, if a nest is located during surveys, timing restrictions would be implemented.

Based on the direct and indirect effects, the USFS determined that the Proposed Project "may affect but is not likely to adversely affect" spotted owls and their habitat (WCSI 2018, USFS 2020). The reasons for this determination include: 1) the activities associated with the Proposed Project do not occur in an area designated to emphasize spotted owl recovery, on either federal or state lands; 2) the study area is located on the eastern edge of the range of the spotted owl; 3) the project would not degrade or downgrade any suitable spotted owl habitat, dispersal habitat, or potential habitat, either within the study area or in the surrounding Squilchuck and Stemilt subwatersheds; and 4) there is a limited potential for disturbance to occur to nesting habitat; however, this potential is low and, surveys and timing restrictions would be implemented if a nest were to be found.

There is no designated critical habitat for the northern spotted owl in the study area. Therefore, a determination of "no effect" to spotted owl critical habitat has been made (WCSI 2018, USFS 2020).

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on northern spotted owl or their designated critical habitat from the Proposed Project.

State-Listed Species

One state-listed species that is not listed under ESA, Cascade red fox, could also be affected by the Proposed Project.

Cascade Red Fox

WCSI has determined that approximately 225 acres of the estimated 706 acres (32%) of potential Cascade red fox habitat present in the project area would be affected by the construction of ski runs, ski trails, ski lifts, roads, and housing developments under the Proposed Project (WCSI 2024). These activities could cause habitat modification and/or loss from vegetation removal, site grading, excavation, and other development-related activities, Overall, construction of the Proposed Project is expected to have minimal to no impacts on Cascade red fox as their current range limitations (i.e., south of the I-90 corridor) and evidence from recent camera surveys both indicate that there is a low probability of Cascade red fox occurring in the study area.

Because it is unlikely to occur in the study area, there would not be probable significant adverse construction-related impacts on Cascade red fox from the Proposed Project.

PHS Species

Elk

Construction activities for the proposed ski area expansion in the project area would reduce elk habitat quality on approximately 272 acres of federal lands, 295 acres of state lands, and 2.5 acres of private lands (USFS 2020). The reduction in elk habitat quality would be a result of the disturbance associated with the construction activities (noise, human presence). Once construction activities are completed, habitat quality on 253 acres on federal lands and 110 acres of state lands would improve to a moderate level because some maintenance activities required for operation of the future ski area would likely disturb elk. Those activities would be timed to reduce impacts during critical time periods such as elk calving and during spring and fall migration.

The removal of forest canopy in ski runs and gladed areas, and subsequent re-seeding of those areas with native species could enhance foraging areas for elk on about 85 acres of federal lands and 20 acres of state lands.

The proposed expansion activities on private lands within the project area would permanently reduce elk habitat quality on 524 acres as a result of activities associated with the Village and residential development (USFS 2020). Proposed construction activities in the Chelan PUD utility corridor would also affect approximately 7 acres of potential elk habitat as a result of vegetation clearing to install utilities and booster pump stations and the establishment of an expanded maintained utility corridor (WCSI 2024). While elk could still continue to use these areas, they would be subject to relatively high levels of human disturbance.

Although elk habitat quality would change in the project area, those changes would be limited. USFS estimates that in the project the amount of area rated as low-quality elk habitat would increase from 50% to 52%, the amount rated as moderate would be reduced from 44% to 42%, and the amount of high-quality habitat would remain at 6% (USFS 2020). Within the Chelan PUD utility corridor, approximately 2 acres of high quality elk habitat and 4 acres of moderate quality elk habitat would be reduced to low quality habitat (WCSI 2024).

Although disturbance from construction of the Proposed Project could alter elk movement patterns and displace elk within portions of the wider study area, elk are

highly mobile and capable of finding alternative routes between summer and winter ranges. There is not expected to be a population level reduction in the number of elk that use the Squilchuck and Stemilt subwatersheds and Colockum Elk herd management objectives could still be met depending on a variety of other factors not related to the Mission Ridge Expansion proposal (e.g., climate change, wildfires, hunting associated mortality, etc.).

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on elk from the Proposed Project.

Mule Deer

The proposed ski area expansion activities within the study area would reduce mule deer habitat quality while construction activities are occurring. The reduction in habitat quality would be a result of the disturbance associated with the construction activities and removal of forest cover (noise, human presence). Once construction activities were completed, habitat quality would improve to a moderate level as some maintenance activities (noise, human presence) that would continue under project operations could still disturb mule deer.

Similar to elk, although, mule deer habitat quality would change within the study area, those changes would be minimal. Disturbance from construction of the Proposed Project could alter mule deer movement patterns and displace deer within portions of the study area, however, mule deer they are highly mobile and capable of finding alternative routes. There is not expected to be a population level reduction in the number of mule deer that use the Squilchuck and Stemilt subwatersheds.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on mule deer from the Proposed Project.

Western Toad

Western toad is mostly likely to be found in riparian areas adjacent to perennial streams or other permanent waterbodies. Such areas include approximately 7 acres in the project area and an additional 8 acres in the Chelan PUD utility corridor (WCSI 2024). Because riparian areas will be protected from construction disturbance, impact on western toad are expected to be minimal.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on western toad from the Proposed Project.

Dusky and sooty grouse

The proposed project would degrade or remove stream and riparian habitats from the study area that potentially provide suitable habitat for dusky and sooty grouse. Those areas include approximately 7 acres in the project area and 8 acres in the Chelan PUD utility corridor (WCSI 2024). Because there is quite a bit of this habitat available within the study area effects to dusky and sooty grouse populations would be minimal.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant

adverse construction-related impacts on dusky or sooty grouse from the Proposed Project.

Northern Goshawk
Project implementation may result in limited habitat impacts on approximately 13 acres of lower quality habitat in the project area for construction of access roads and ski runs. In addition, approximately 3 acres of potential norther goshawk habitat would be removed in the Chelan PUD utility corridor by tree clearing to facilitate utility and booster pump installation. The study area has very little old forest structure and impacts to lower quality goshawk habitat would not negatively impact goshawk populations.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on northern goshawk from the Proposed Project.

Other PHS Species

Townsend's Big-Eared Bat
Tree removal in the project area would result in the loss of existing snag habitat across approximately 74 acres of land that could provide habitat for Townsend's big-eared bat (WCSI 2024). In addition, vegetation clearing in the Chelan PUD utility corridor would remove up to 4 acres of potential roosting habitat for Townsend's big-eared bat (WCSI 2024). Although potential habitat could be reduced as a result of the project, these reductions would represent only a small proportion of the total amount of suitable habitat for Townsend's big-eared bat in the larger assessment area. In addition, minimization measures aimed at retention of snags were possible could help reduce some of these potential impacts.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on Townsend's big-eared bat from the Proposed Project.

American marten
Approximately 3 acres of habitat that is potentially suitable for American marten would be removed from the Chelan PUD utility corridor for installation of utility lines and booster pump stations. All of those areas occur on private lands. Although habitat for American marten would be reduced by the proposed project, those reductions would be relatively minor and are not expected to affect the viability of the species (WCSI 2024).

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on American marten from the Proposed Project.

Columbia spotted frog
Construction of the proposed project would impact stream and riparian areas in the study area that could provide suitable habitat for Columbia spotted frog. Such areas include approximately 7 acres in the project area and an additional 8 acres in the Chelan PUD utility corridor (WCSI 2024). Because all riparian and wetland habitats within the

project area are protected by federal, state, or county regulations, appropriate compensatory mitigation would be required for those impacts.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on Columbia spotted frog from the Proposed Project.

PHS Species Unlikely to Occur in the Study Area
As noted in Section 2.1.3.2, the PHS Species , golden eagle, flammulated owl, white-headed woodpecker, , roosting concentrations of bat species, and wolverine have a low likelihood of occurrence in the study area because the study area is either outside their range or lacks suitable habitat.

Therefore, there would no construction-related impacts on Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed woodpecker, American marten, roosting concentrations of bat species, and wolverine from the Proposed Project.

Migratory Birds
The primary resource indicator used to assess the effects of the Proposed Project on migratory birds is changes to habitat availability. The proposed ski area expansion activities in the study area would slightly reduce the amount migratory bird habitat due to tree removal and habitat conversion of late successional, mesic/moist forested areas for road and ski trail construction. Two small Category III wetlands that may provide habitat for migratory birds would also be filled. Per Chelan County Code (11.80.070), the Applicant will coordinate with Chelan County, WDFW and Washington Department of Ecology to mitigate impacts on migratory bird species from habitat conversion (WCSI 2018).

Based on the direct and indirect effects associated with the Proposed Project, there would not be intentional or unintentional take of migratory birds. The project is consistent with management direction for migratory birds (FR 66(11): 3853-3856) (USFS 2020).

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on migratory birds from the Proposed Project.

4.1.2 Aquatic Habitats and Species

Construction activities that could impact aquatic habitat would primarily occur within the Squilchuck Creek Watershed, which is where the majority of the proposed construction work would occur. Such work would include relatively extensive vegetation clearing, excavation, grading, culvert installation, and the replacement of pervious surfaces with impervious material (e.g., concrete, asphalt) for the construction of utility, transportation, and resort infrastructure. Smaller areas of the Stemilt Creek Watershed would also be affected by a small area of residential development and by Nordic trail construction,

which is likely to involve less intensive construction activities such as selective tree removal, pruning, and minor grading.

4.1.2.1 Streams

Although the Applicant's proposal states that construction in the project area would not occur within 200 feet of the perennial fish-bearing reaches of Squilchuck Creek, the proposed County-maintained access road would need to cross the existing Mission Ridge parking lot, underneath which both Squilchuck and Lake creeks are culverted. The Squilchuck Creek culvert is approximately 650 feet in length and 4 feet in diameter and is upstream of the creek section that is designated as fish bearing; the Lake Creek culvert is approximately 550 feet in length and 4 feet in diameter. No design specifications for these culverts are available and their current condition is unknown.

As described in the Surface Water and Transportation sections of the EIS (Sections 5.3 and 5.6, respectively), the condition of the Squilchuck Creek and Lake Creek culverts would need to be characterized prior to permitting of Phase 1 of the Proposed Project. The County will require the Applicant to inspect the culverts to identify potential issues, such as corrosion, buckling, mechanical instability, erosion, root infestation, and other points of failure. The County will also require the Applicant to provide a hydraulic analysis of the existing condition to determine whether the culverts are properly sized. An engineering report will also be needed to document their current condition, describe the identified deficiencies, and estimate their expected lifespan. If the culverts are found to be in poor condition, undersized, or otherwise recommended for replacement, the County will require the culverts be replaced in a manner consistent with current regulations. Culvert replacement would result in surface water and riparian habitat impacts on Squilchuck Creek. In addition to the construction activities described above, culvert replacement may require use of a cofferdam and temporary stream rerouting during the replacement process. A detailed description of permitting requirements and mitigating conditions related to potential the Squilchuck Creek and Lake Creek stream crossings is provided in Section 5.3 of the EIS.

As described in Section 5.3 of the EIS, in addition to the culverts under the existing parking lot, construction activities in and near streams in the study area may include building road and utility crossings and ski runs or ski lift corridors across streams. Such crossings would primarily impact riparian habitat where construction involves vegetation clearing, grading, fill placement, culvert or bridge footing installation, belowground utility conduit installation, installation of impervious surfaces, channel modifications, increased erosion risk, and increased potential for pollutants to enter surface waters. Some of these activities would result in permanent loss of riparian habitat (i.e., installation of impervious surfaces, filled/graded areas not returned to natural grade, channel modifications), while others would be temporary (e.g., disturbed areas returned to original grade and replanted with native vegetation). Aquatic habitats may also be affected by such activities, primarily though alterations in flows and increased potential for runoff and sediments to enter these drainages. However, because most streams in the study area offer only minimal aquatic habitat, such impacts are expected to be minor and can likely be further minimized through implementation of standard construction BMPs.

Potential aquatic habitat impacts from construction activities occurring outside of the Study area may include electric power infrastructure upgrades, fiber optic cable installation, and a water line extension. These activities are most likely to affect the

unnamed perennial stream that occurs in the Chelan PUD utility. That stream will likely need to be crossed in multiple locations by the new water supply and fiber optic lines. Road and utility construction are sometimes constrained by existing infrastructure or easements, often with little to no room to avoid or minimize impacts. In situations where impacts cannot be avoided or minimized, a range of potential compensatory mitigation options should be considered.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on stream habitats and the aquatic species that use them from the Proposed Project.

4.1.2.2 Wetlands

Potential construction impacts on wetlands, riparian habitat, and conditions pursuant to CCC 11.78 – Fish and Wildlife Habitat Conservation Areas Overlay District from construction are described in Section 5.3 of the EIS. It is anticipated that Wetlands 1 and 2 on the private parcel will need to be completely filled to facilitate project construction and that impacts on Wetland 3 on USFS property and Wetland 4 in Chelan PUD utility corridor can mostly be avoided with the exception of about 0.5 acre of Wetland 4. Impacts on the aquatic and amphibious animals that may use the wetlands that would be filled are likely to be relatively minor given the small size of those wetlands and their isolated condition. A determination on whether avoidance of impacts on Wetlands 1 and 2 is possible while still meeting the project purpose would be made by the regulatory agencies during design plan review. If compensatory mitigation for temporary and/or permanent wetland impacts is necessary, the specific mitigation requirements would be determined at the time of permitting.

Therefore, with proper construction-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse construction-related impacts on wetland habitats and the aquatic species that use them from the Proposed Project.

4.2 Impacts from Operation

Operation of the Proposed Project would include such activities as parking lot and access road use; snow making; ski run/trail grooming; ski lift operation; winter alpine and Nordic ski run use (winter); Nordic trail use (skiing, snowshoeing, and snow-biking in winter; hiking, horseback riding, motorized/non-motorized vehicle[6] use in summer); backcountry (i.e., non-trail) ski-touring; other winter recreation activities (e.g., tubing); ski run/trail, road/parking lot, and building/infrastructure maintenance; invasive plant/noxious weed control; overnight guest accommodation; year-round commercial use (e.g., restaurants/bars, retail shops, office space, outdoor concert venue); year-round residential and vacation home occupancy and use; groundwater pumping; LOSS system

[6] Non-motorized vehicle use primarily includes bicycles and would occur on trails located on federal-, state-, and privately-owned lands. Motorized vehicle use Includes off-road vehicles such as motorcycles and all-terrain vehicles and would only be permitted on privately-owned lands only; no motorized vehicle use on federal or state lands within the study area.

use and maintenance; stormwater management; propane and solar electrical generation; and wildfire suppression and fuel management.

4.2.1 Terrestrial Habitats and Species

The following sections discuss the potential impacts of Proposed Project operation on terrestrial habitats and plant and animal species.

4.2.1.1 Special Status Habitats and Habitat Features

Impacts from operation of the Proposed Project on specials status habitats and special habitat features are expected to vary, with most impacts likely to occur on areas of talus and snag/log habitat features. The Applicant has proposed to minimize impacts on aspen stands through site design and by locating operational activities away from such areas to the maximum extent possible. Because such habitats are fairly scattered within the study area, such avoidance should be feasible. Avoiding impacts to talus and snag and log habitat features, however, will be more difficult as those features are much more widespread in the study area. Areas that exhibit those features could be affected by ski run development and use and routine maintenance and vegetation management activities. The Applicant may consider implementing BMPs to protect such features, especially large snags, which are rather limited in the study area. Overall, because these habitat elements are more abundant within the study area, impacts are expected to be relatively minor.

Impacts on riparian areas and their associated aquatic habitats could also be affected by various project operations activities including ski run development and use, routine maintenance, and vegetation management activities. Stormwater runoff could also affect riparian habitats. Such impacts would be minimized by the establishment of riparian buffer as required by state and local regulations. BMPs for maintenance and vegetation management could also be implemented to reduce potential impacts on riparian habitats.

Old growth forest habitat is limited to the Chelan PUD utility corridor and could be affected by such operations activities and corridor maintenance activities. Such impacts are likely to be minor and minimized through the implementation of BMPs for maintenance and vegetation management work.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on special status habitats or special habitat features from the Proposed Project.

4.2.1.2 Terrestrial Plants

Commonly Occurring Species

Construction of the Proposed Project will require varying levels of vegetation removal within approximately 232 acres of primarily mixed-conifer forest (conifers and associated understory). Of that area, approximately 158 acres occurs on private land and the remaining 72 acres on public lands outside of the Master Planned Resort boundary (WCSI 2018, LDC 2022). Construction of roads, parking areas and buildings, including the addition of three Chelan PUD booster pump stations for the proposed water line in the

Chelan PUD utility corridor, will require nearly complete removal of vegetation; construction of ski runs, trails, and widening of utility corridors will require considerably less removal. The majority of the vegetation that would be removed consists of relatively common native trees, shrubs, and herbs, which are abundant on other portions of the study area and surrounding lands. Non-native and invasive species are also likely to be affected.

An overall goal of the Proposed Project to keep the area as natural as possible with a combination of natural vegetation and infrastructure design (LDC 2022). The total Proposed Project includes 805 acres of proposed development [PLACEHOLDER: Discrepancy in "developed area" layers provided by Applicant. Keep placeholder here for correction to acreage if needed]. However, 621.7 acres of that development are dedicated to open space including ski runs (37.2 acres), undesignated open space (45.1 acres), dedicated conservation areas (531.4 acres), and managed open space (8.0 acres) (LDC 2022). This means that over 75% of the site is dedicated as open space. This vastly exceeds the requirements in CCC 11.89.050(2), which requires 40% of the site be left as open space. Leaving 75% of the site in open space also translates to permanent preservation of existing vegetation.

There is a relatively high amount of vegetation onsite that is currently diseased or dying (LDC 2022). As part of construction, the Applicant would consult arborists to ensure retained vegetation is healthy. Restoration requirements, where applicable, would meet CCC 11.77 – 11.80 requirements for revegetation. In addition, the landscaping requirements contained within CCC 11.89.050 and CCC 15.50 would also be met.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on commonly occurring terrestrial plants from the Proposed Project.

Special Status Species

As noted, whitebark pine was the only special status plant species identified in the study area. In addition to construction impacts on existing whitebark pine from tree removal, soil compaction, and contouring, operation and maintenance of alpine ski runs, chairlifts, and the access road would effectively eliminate the possibility of whitebark pine regeneration in those areas (USFS 2020). Continued maintenance of those area would require the cutting of any stems that do grow. For whitebark pine stems that remain after ski area construction, the likelihood of fire being excluded from their habitat would increase. Controlled fire would not be prescribed, and wildfire would likely be suppressed to protect the ski area infrastructure and nearby private homes. Fire exclusion is detrimental to whitebark pine because it allows succession to shade-tolerant species, stresses mature trees, and limits seedling establishment (Fryer 2002).

The Applicant has made efforts to promote the conservation of whitebark pine. First, by pursuing the Whitebark Pine Friendly Ski Area certification with the Whitebark Pine Ecosystem Foundation. The certification is rigorous and includes education for employees and visitors, conservation planning and monitoring, and actively managing, planting, or studying local whitebark pine. Additionally, during the planning process, the Applicant adjusted the footprint of soil contouring for alpine ski runs to protect whitebark pine

trees documented during recent surveys. These efforts demonstrate the permittee's interest in long-term conservation of the species.

Overall impacts of maintenance impacts on whitebark pine on the entire local population would be minimal. However, it is important to note that while project activities may not have a large, direct impact on the long-term viability of the Mission Ridge whitebark pine population, climate change and other threats would continue to contribute to its long-term decline. Increasing temperature and more frequent summer drought as the result of climate change are generally expected to exacerbate stresses of blister rust infection, fire exclusion, and bark beetle infestation (Fryer 2002). Restoration strategies in light of climate change include planting as many rust-resistant seedlings as possible, while managing fire and mycorrhizae to promote their survival (Keane et al. 2017). The mitigation outplanting of this project, as described later in this section, aligns with this strategy.

Invasive Species

The increased number of visitors that would use the expanded ski resort facilities during the warmer seasons would increase the potential for the transport and spread of non-native and invasive plant species. Major avenues for non-native and invasive plant transport and spread include the existing and proposed parking areas, access roads, and trails. As noted in the current conditions section, there are known infestations of diffuse knapweed and Canada thistle present around the existing parking lot and along the access and administrative roads. Visitors using the parking lot could inadvertently collect and transport weed seeds on their shoes, clothing, and recreational equipment onto the trail system and into other areas of the study area, potentially allowing infestations to develop further away from developed areas to which they are currently limited.

Therefore, with proper operation-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operation-related impacts on terrestrial plants, including special status species and invasive and non-native species, from the Proposed Project.

4.2.1.3 Terrestrial Animals

Commonly Occurring Species

Impacts on commonly occurring animal species from operation of the Proposed Project will primarily be caused by higher levels of human presence and associated disturbances including increases in traffic, noise, vibration, air emissions, and artificial light levels. The current ski resort facility operates primarily in the winter months with the level of human presence and associated disturbances decreasing during late spring and into fall. With the addition of other recreational opportunities and the potential for year round residential use, human presence and related disturbances will have longer durations. Under existing conditions, most of these disturbances occur during limited periods of an animal's lifecycle. Under the proposed project, these types of disturbances will extend through multiple other stages of their lifecycles (e.g., nesting, breeding, foraging). Active management and maintenance of the landscape and resort facilities within the study area will also affect wildlife and their associated habitats.

Potential impacts from operation of the Proposed Project on commonly occurring terrestrial animals include the following:

- Increased disruption of animal behaviors (e.g., foraging, nesting, denning, breeding, migration)
- Increased risk of vehicle collisions with wildlife from visitor, resident, and resort vehicular use
- Increased risk of human and domestic pet interactions with wildlife during use of resort facilities and occupancy of seasonal and year-round commercial and residential areas
- Increase potential for wildlife to become habituated to human food sources and garbage
- Ongoing modification of terrestrial habitats by maintenance activities and increased risk of soil and water contamination from leaks and spills of fuel and other vehicle fluids, herbicide use, commercial/residential chemicals, and domestic pet waste

As discussed in Section 5 of this report, the Applicant has proposed several mitigation measures to reduce such impacts. In addition, the Applicant's proposal to incorporate a considerable amount of open space areas adjacent to and intermingled with the recreational, residential, and commercial elements of the Proposed Project is also expected to reduce wildlife impacts. Open space lands are intended to be preserved and managed to buffer native environments from intensive development or activities, retain native plant communities, provide habitat connections, and minimize risk of fire. Some of the proposed habitat modifications required to support the development may even create new and varied habitats for various species, such the potential for ski run development to increase foraging areas for various species. The condition and level of management of proposed open space areas will vary, with some areas being left in their natural state while others will include maintained landscaping. The latter of these will likely provide habitat for those species with a high tolerance for human activity and will provide a park-like setting within the development area.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on commonly occurring terrestrial animals from the Proposed Project.

Special Status Species

ESA Listed Species

Gray Wolf

As noted under the construction section, the Proposed Project is expected to reduce wolf security habitat in the project area by approximately 6 acres on state lands and 2.5 acres on private lands by the construction of new roads, lift lines, and ski runs (USFS 2020). The proposed expanded road system in those areas and the potential for motorized vehicle use on the trail system of the private parcel would likely create a level of human disturbance that would prevent wolves from using those areas in the future. The additional human presence and associated increases in noise and artificial light that would occur on the developed portions of the study area, are also likely to dissuade wolf use of those areas. However, because operation of the project is not expected to affect

any gray wolf denning habitat or rendezvous sites, overall impacts on gray wolf are expected to be minor.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on gray wolf from the Proposed Project

Canada Lynx

The increased levels of human presence, noise, artificial light, and associated activities could disturb Canda lynx that use the study area and its surroundings. However, because the project occurs in an area designated as peripheral to the recovery of Canada lynx and it is unlikely that lynx reside in this area because it is relatively distance from core habitat area, such impacts are expected to be unlikely and minor in nature (WCSI 2018, USFS 2020).

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on Canada lynx from the Proposed Project

Grizzly Bear

The expanded resort facilities and amenities created by the Proposed Project would bring in more people for participation in both winter and non-winter recreational activities. This is likely to increase human use of the Nordic trail system, including use by both motorized (privately-owned lands) and non-motorized trail users (private-, federal-, and state-owned lands) of the study area and on existing roads and trails down to Squilchuck State Park. Because these activities are likely to occur on existing roads and trails, they would not reduce core grizzly bear habitat and they would occur outside the recovery zone. Some disturbance to bears using those areas could occur and human and bear interactions are likely to increase.

In addition to recreational uses, the proposed commercial and residential developments on private land within the study area would also increase the potential for human and grizzly bear interactions, especially in areas where human food and garbage are stored.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on grizzly bear from the Proposed Project

Northern Spotted Owl

Increased human activity and noise levels associated with operation of the Proposed Project could disturb spotted owls using the study area. However, the likelihood of disturbance would be small, and any impacts would be minimal as the likelihood of resident, territorial spotted owls being present in the study area is extremely low (WCSI 2018). Although there are some small patches of forest along the northern boundary of the project that could be classified as lower quality suitable spotted owl habitat, there is generally an insufficient amount of suitable habitat in this landscape to support resident, territorial pairs. Also, suitable nesting habitat conditions do not occur within the 0.25-mile disturbance buffer proposed the project activities. (WCSI 2018).

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant

adverse operations-related impacts on northern spotted owl from the Proposed Project.

State-Listed Species

Cascade Red Fox

Potential impacts on Cascade red fox from operation of the Proposed Project would primarily be an increased potential for foxes to become habituated to human food sources and garbage (WCSI 2024). Such behavior has been documented at other ski areas located in areas where Cascade red fox is known to occur. The Proposed Project includes the installation of wildlife resistant sanitation facilities that would reduce the potential for animals to access human foods and waste. In addition, current range limitations and results of recent camera surveys suggest there is relatively low probability that Cascade red foxes occur in the study area.

Because it is unlikely to occur in the study area, there would not be probable significant adverse operations-related impacts on Cascade red fox from the Proposed Project.

PHS Species

Elk and Mule Deer

The study area overlays a small portion of the Colockum Elk Herd and East Slope Cascade Mule Deer ranges. Although project implementation and use have the potential to displace those ungulate species and slightly decrease available habitat, the increased forage availability in new ski runs may offset habitat loss. Because elk and mule deer winter range does not occur on the property, wintertime recreation and operational activities at the resort are unlikely to adversely affect elk and mule deer. Summertime activities, however, have a higher potential to affect these species. The increased number of people using the resort area in the summer is likely to increase human use of the Nordic trail system by ATVs, motorcycles (where authorized), and non-motorized trail users and on existing roads and trails down to Squilchuck State Park. Because these activities occur on existing roads and trails, they would not reduce the amount of security habitat but could lead to increased off-trail human use that could displace elk. Although such activities may temporarily displace ungulates from parts of the study area, it is unlikely to have population level effects (WCSI 2020).

A small area in the southeast portion of the study area is considered part of the Colockum Elk Calving Area (USFS 2020). Approximately 70 acres of the Calving Area would be within the project area. Although that area will not be part of the proposed resort development, it is being considered for Nordic skiing and summer activities such as hiking and mountain biking. Because elk reproductive success has been shown to decrease following human disturbance to calving areas (Phillips and Alldredge, 2000), seasonal restrictions on summer hiking or biking on these trails may be necessary to avoid disturbances and impacts to elk and deer during calving and fawning season.

Operation of the Proposed Project could result in an increase in noxious weeds as a result of increased human use. Weeds could compete with forage species, lowering forage habitat quality.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant

adverse operations-related impacts on elk and mule deer from the Proposed Project

Western Toad
The increased human presence and related disturbance associated with year-round use of the expanded resort (e.g., noise, artificial light) has the potential to disturb western toad that may occur in the vicinity of those uses. Western toad are expected to be found in terrestrial areas throughout the study area, especially areas near permanent water bodies (e.g., reservoirs) and riparian areas. Because the existing and proposed reservoir would see little human use in the summer when snowmaking activities are not occurring and riparian areas would be protected by buffers, operation impacts on western toad are expected to me minimal.

Dusky and Sooty Grouse
The increased human presence and related disturbance (e.g., noise, artificial light) associated with year-round use of the expanded resort have the potential to disturb dusky and sooty grouse using habitat in the vicinity of those activities. However, because suitable habitat for those species is prevalent within the study area, those impacts are expected to be minor (WCSI 2018).

Northern Goshawk
The increased human presence and related disturbance (e.g., noise, artificial light) associated with year-round use of the expanded resort has the potential to disturb northern goshawks who may be using the study area. Northern goshawks are primarily sensitive to disturbance at nest sites. Because the study area has very little suitable habitat for northern goshawk nesting, impacts to northern goshawk by project operation are unlikely to negatively impact goshawk populations and are expected to be minimal.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on the PHS species western toad, dusky and sooty grouse, and northern goshawk from the Proposed Project.

Other PHS Species

As noted in Section 2.1.3.2, the PHS Species Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed woodpecker, American marten, roosting concentrations of bat species, and wolverine have a low likelihood of occurrence in the study area because the study area is either outside their range or lacks suitable habitat.

Therefore, there would be no operations-related impacts on Columbia spotted frog, golden eagle, flammulated owl, pileated woodpecker, white-headed woodpecker, American marten, roosting concentrations of bat species, and wolverine from operation of the Proposed Project.

Migratory Birds
Of the 28 species listed for the Great Basin, only the golden eagle and calliope hummingbird potentially occur in the study area. White-headed woodpecker and peregrine falcon are also on the list, but nesting habitat associations limit the likelihood of resident populations. Golden eagle nesting habitat would be limited as well. No raptor

nest sites have been located within the study area. The calliope hummingbird is fairly common but vulnerable to habitat loss. Habitat loss as a result of this project would not likely impact these bird species at a population level. The remaining species prefer more open grasslands and pine forests, mudflats, large marsh, large hardwood riparian, or waterfall habitat and do not have habitat within the study area, so there would be no effect on them from project activities (WCSI 2018).

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on migratory birds from the Proposed Project.

4.2.2 Aquatic Habitats and Species

Potential impacts on streams, wetlands, and riparian resources in the study area are described in EIS Section 5.3 (Surface Waters). The following sections discuss potential operations impacts on aquatic habitats and species.

Streams

Operations-related impacts to aquatic habitats in streams would be associated with human and pet access to riparian areas and their associated stream channels, resulting in potential damage to buffering vegetation, streambed disturbance, flow disturbance, and water quality degradation. During winter operations, cold temperatures and snow cover may naturally deter humans and pets from accessing streams and riparian areas. During summer operations, additional measures to minimize impacts to aquatic habitat may be implemented to exclude access (e.g., fencing), discourage access (e.g., signage, dense native vegetation plantings, directing recreation activities away from sensitive areas), or concentrating access in designated areas (e.g., sanctioned trails).

Impacts on fish species are not likely to occur within the study area from operations because no fish-bearing streams are present. Amphibians and their habitats are more likely to be affected. Downstream of the project area in the Chelan PUD utility corridor, the presence of utilities crossing the unnamed perennial stream and ongoing maintenance of the utility corridor may modify the natural conditions of the unnamed stream by limiting regrowth of riparian trees.

Artificial snowmaking and wastewater return flows may increase base flows in Squilchuck Creek, which could improve habitat connectivity and water temperature creating a small benefit of native fish and other native aquatic species, although this benefit is not easily quantified or monitored. Operation of the Proposed Project introduces a risk of surface water quality degradation due to spills, stormwater runoff, and wastewater discharge which could further degrade habitat downstream.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on stream-based aquatic habitats and species from the Proposed Project.

Wetlands

As noted in the construction impact section of this report, the two wetlands located on the private parcel (Wetlands 1 and 2) would likely need to be filled to facilitation the

Proposed Project. As such, there would be no operations-related impacts on those areas. The wetland area on USFS land (Wetland 3) would not be affected by ski run construction or glading, but it would be subject to off-run skiing (USFS 2020). While design features would require signage to discourage use of this sensitive area, it is possible some off-run skiing would occur through this open area. Skiing would compact snow over the sensitive wetland soils, potentially resulting in reduced growth of early-flowering species, frozen soil killing root structures of perennials, and increased likelihood of disease (Fahey and Wardle 1998). Unless signage protections are highly effective, it is possible that wetland diversity would be reduced.

The ponded wetland located in the Chelan PUD utility corridor (Wetland 4) could be affected by routine maintenance activities required to maintain the utility easement such as occasional vegetation clearing and management. Because such activities would be periodic and would most likely affect upland areas around that wetland, the level of impact is on Wetland 4 would be relatively minor.

In terms of aquatic species, ss with in-stream habitats, most impacts would affect habitat that is potentially used by amphibians, not fish.

Therefore, with proper operations-related mitigating conditions including those described later in Section 5 of this report, there would not be probable significant adverse operations-related impacts on wetland-based aquatic habitat and species from the Proposed Project.

5 PROPOSED MITIGATION MEASURES

This section describes relevant mitigation measures that could avoid and minimize construction- and operation-related impacts from the Proposed Project on plants and animals. Specific mitigation actions will be confirmed during project permitting.

Permit-required mitigation measures: The Proposed Project would need to comply with all applicable local, state, and federal rules and regulations, and would need to obtain all appropriate approvals and permits. These would include the following permit-required mitigation measures.

1. Mitigation for each phase of the Proposed Project would be completed concurrent with construction of said phase; mitigation could not be deferred to a later date or project phase.
2. Mitigation for each phase of the Proposed Project would be designed to be compatible with all phases of construction and would be intended to be permanent unless adaptive management plans allow otherwise.
3. Standard best management practices (BMPs) for construction activities would be implemented during all construction phases of the Proposed Project.

Construction-related BMPs would address such activities as material storage and stockpiling; equipment use, fueling, and maintenance; fuel and chemical storage, erosion control; construction timing; and other measures related to specific construction activities (e.g., woody debris management).

4. Any work below the ordinary high-water mark (OHWM) would be conducted during in-water work windows, and all erosion and pollution control BMPs would be employed. All work conducted below the OHWM will require obtaining appropriate permits such as a Hydraulic Project Approval. Per Chelan County Code (11.80.070) the Applicant will coordinate with Chelan County, WDFW and Washington Department of Ecology (11.80.110) to mitigate impacts to wetland habitats and species. This includes preparation and implementation of an HMMP for plant, fish and wildlife habitat conservation areas as previously mentioned.

5. The Applicant will coordinate with Chelan County Natural Resources and Washington State Department of Ecology to mitigate for impacts to Category III wetlands identified on the private parcel (Section 19) per guidance in "Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1)" (Ecology et al. 2006).

6. In general, to address potential construction impacts on aquatic resources and fish species from the Proposed Project, the following mitigation measures and design criteria would be developed and employed:

a. Riparian areas and streams in the study area will have established riparian buffers per Chelan County Code 11.78.090 and US Forest Service Northwest Forest Plan (USDA and USDI 1994). Fish bearing streams on federal lands will be protected by a 300-foot riparian buffer; fish bearing streams on private land will be protected by a 200-foot buffer; and non-fish bearing streams on private land will be protected by a 150-foot buffer.

b. Stream crossings and ground disturbance will avoid to the extent possible and will not be conducted near any fish bearing streams.

c. Stream crossings or ground disturbance below the OHWM on non-fish bearing streams, will be conducted during in-water work windows, and all erosion and pollution control best management practices (BMPs) will be employed.

d. Sediment will be prevented from entering streams and wetlands through the use of BMPs.

e. Equipment and machinery will be maintained and stored in a manner to prevent spread of aquatic invasive species and to protect riparian buffered habitat from hazardous materials (e.g., fuel and oil leaks)

f. Access to streams and wetlands will be discouraged by physical controls (e.g., fencing, signage, dense native vegetation plantings, directing recreation activities away from sensitive areas), or by concentrating access in designated areas (e.g., sanctioned trails).

7. Per CCC 11.78.060, a HMMP for plant, fish and wildlife habitat conservation areas will also be prepared via a collaborative process between the Applicant, Chelan

County, and WDFW. The HMMP will focus on identifying potential impacts from the Proposed Project on riparian habitat, listed or sensitive plant species, and elk and mule deer habitat and populations in the study area at a project specific scale. The HMMP will also identify any mitigation measures appropriate to the scale of potential impacts. Impact analyses relative to elk will apply the best available science as identified by WDFW, through the elk habitat model and recently completed literature review (Gaines et al. 2020). The HMMP will be completed and approved prior to initiation of Phase 1 of the Proposed Project.

8. To reduce the potential for an increase in noxious weeds and displacement of native forage for elk and deer, project activities would follow design criteria and mitigation measures for prevention of invasive weed spread. Specific mitigation measures for control of invasive species and noxious weeds include the following: cleaning equipment, properly inspecting, removing and disposing of weed seeds and plant parts, using only weed-free straw, mulch, gravel, fill, sand and rock.

9. Control of invasive plants would be managed by the Applicant in the study area and by Chelan PUD in the utility corridor easement and would help reduce new infestations. Increased invasive control efforts by the Applicant would be required. The new Special Use Permit would require on-going monitoring and treatment of invasive plants on federal lands, and design features of this project would require expanding the current Mission Ridge Vegetation Management Program to cover all new facilities and ground disturbance, including those on National Forest and WDFW lands. Permitting through Chelan County would likely require similar invasive plant management on the private land. Areas of particular attention would include roadsides, chairlift terminals, trailheads and trails, and ski runs that have been re-contoured. Management by Mission Ridge has thus far kept invasive infestations relatively contained, so their continued monitoring and treatment would likely limit the number of new infestations to an acceptable level.

10. Use native plant materials as the first choice for re-vegetation, where timely natural regeneration of the native plant community is not likely to occur.

11. Project implementation would also require specific compensatory planting to address project impacts on existing whitebark pine both within the study area. The Applicant would be responsible for impacts that occur in the study area and Chelan PUD would be responsible for any such impacts in the expanded utility corridor. Following the completion of construction of the roads, lifts and ski runs, Whitebark pine seedlings would be planted at specified rates such that up to 1,305 seedlings being planted. On-site planting in the study area would be favored, though locations have not yet been determined. Seedlings would be grown from parent trees in the Mission Ridge vicinity. To maximize seedling survival at Mission Ridge, recently published planting guidelines by McCaughey (2009) would be followed. Seedling survivorship would be monitored for five years, and if survivorship falls below 25% in this time, additional seedlings would be planted. The collection, growing, and planting of seedlings would occur in collaboration with the USFS.

Applicant-proposed mitigation measures:

The following Applicant-proposed plant and animal resources mitigation measures are intended to further reduce potential effects from construction and operation of the Proposed Project.

1. Protect all known special status species sites, and those discovered prior to or during implementation of project activities. Modify implementation activities, if protective measures prove inadequate, listed species are discovered, or new species are listed that could be affected.
2. If an active wolf den or rendezvous site is discovered in the vicinity of the project, modify activities to avoid disturbance while being used during the breeding season.
3. To reduce potential interactions between humans and grizzly bears and Cascade red fox and to help prevent bears and foxes from becoming habituated to human foods and garbage, bear/fox resistant structures and facilities should be incorporated into appropriate areas of the development (e.g., dumpsters, trash cans).
4. To avoid disturbances and impacts on elk and deer during calving and fawning season, the Applicant will coordinate with WDFW to incorporate BMPs including seasonal use restrictions for areas within and adjacent to known elk calving and potential deer fawning areas.
5. Because old growth and mature forests are extremely limited in this area, Applicant would leave trees and snags greater than 21 inches DBH whenever possible.
6. Applicant would incorporate sanitation measures to reduce potential for wildlife-human conflicts during construction and as part of community operations.
7. Mitigation for operational impacts would include implementation of BMPs commonly used by ski resort and outdoor recreation facilities to reduce plant and animal impacts from resort operations. Such BMPs will include long-term erosion management, vegetation management, guidelines for the timing of daily and routine maintenance activities, and periodic run/trail closures during periods when wildlife may be more sensitive to disturbance (e.g., elk calving).
8. Mitigation for potential operational impacts from the proposed residential and commercial development areas on the private parcel would include the development and implementation of standards and guidelines for such issues as vegetation and property management, fertilizer and chemical use, domestic pets, sanitation and garbage management, and lighting. Other similar policies that dictate the management and operation of the various proposed onsite amenities (e.g., snow tubing area, aerial gondolas, outdoor concert venue).

References

Akins, J., 2017. Distribution, genetic structure, and conservation status of the Cascade red fox in southern Washington. Dissertation, University of California, Davis, CA, USA.

Akins, J., 2014. Cascades carnivore project: 2014 spring progress report.

Alldredge, M.W.; Peek, J.M; Wall, W.A., 2001. Alterations of shrub communities in relation to herbivory in northern Idaho. Northwest Science 72(2):137-144.

Aubry, K.B., 1984. The recent history and present distribution of the red fox in Washington. Northwest Science 58:69–79.

Bailey, J.K.; Whitham, T.G., 2003. Interactions among elk, aspen, galling sawflies and insectivorous birds. Oikos 101(1): 127-134.

Baker, B.W.; Ducharme, H.C.; Mitchell, D.C.S.; Stanley, T.R.; Peinetti, H.R., 2005. Interaction of beaver and elk herbivory reduces standing crop of willow. Ecological Applications 15(1): 110-118.

Beich and Tomassi, 2017, Mission Ridge Wetland Delineation Report, September 2017.

Berger, J.; Stacey, P.B.; Bellis L.; Johnson, M.P., 2001. A mammalian predator-prey imbalance: grizzly bear and wolf extinction affect avian neotropical migrants. Ecological Applications 11(4): 947-960.

Beschta, R.L., 2005. Reduced cottonwood recruitment following extirpation of wolves in Yellowstone's northern range. Ecology 86(2): 391-403.

Brown, T.K., 2002. Creating and Maintaining Wildlife, Insect, and Fish Habitat Structures in Dead Wood. In Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests, William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle Technical Coordinators. USDA Forest Service Gen. Tech. Rep. PSW-GTR-181. 2002. pp. 883-892.

Bryce, S.A., and A.J. Woods, 2000. Level III and IV Ecoregion Descriptions for Washington. December 14, 2000; revised by G. Griffith on October 5, 2010. Available at: http://ecologicalregions.info/data/wa/WA_descriptions.pdf.

Burt, J.W. and K.J. Rice, 2009. Not all ski slopes are created equal: Disturbance intensity affects ecosystem properties. Ecological Applications 19(8): 2242-2253.

CCPD (Chelan County Planning Department), 1986, Final EIS Mission Ridge/Constellation Ridge Resort, May 1986.

Cook, J.G., B.K. Johnson, R.C. Cook, R.A. Riggs, T. DelCurto, L.D. Bryant, and L.L. Irwin, 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monograph 155: 1-61.

Cook, R.C., J.G. Cook, D.J. Vales, B.K. Johnson, SM. Mccorquodale, LA. Shipley, RA. Riggs, LL. Irwin, SL. Murphie, BL. Murphie, KA. Schoenecker, F. Geyer, P. Briggs Hall, RD. Spencer, DA. Immell, DH. Jackson, BL. Tiller, PJ. Miller, and L, Schmitz, 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. J. Wildlife Management 184(1):1-45.

Cook, J.G., R.C. Cook, R.W. Davis [and others], 2018. Development and evaluation of a landscape nutrition model for elk in western Oregon and Washington. Wildlife Monograph 199: 13-30.

Ecology (Washington Department of Ecology), USACE (U.S. Army Corps of Engineers Seattle District), and USEPA (U.S. Environmental Protection Agency Region 10), 2021. Wetland Mitigation in Washington State–Part 1: Agency Policies and Guidance (Version 2). Washington State Department of Ecology Publication #21-06-003.

Ecosystems North West, 2024. Wetland Delineation and Stream Typing Report for Mission Ridge. September 2024.

Evans, R.D.; Belnap, J., 1999. Long-term consequences of disturbance on nitrogen dynamics in an arid ecosystem. Ecology 80:150-160.

Fahey, B. and K. Wardle. 1998. Likely impacts of snow grooming and related activities in the West Otago

ski fields. Science for Conservation 85. Department of Conservation, Wellington, N.Z.

Frame, P.F., H.D. Cluff, and D.S. Hik, 2007. Response of wolves to experimental disturbance at homesites. Journal of Wildlife Management 71(2):316-320.

Frank, D.A., 1998. Ungulate regulation of ecosystem processes in Yellowstone National Park: direct and feedback effects. Wildlife Society Bulletin 26:410-418.

Fritts, S.H., 1992. Wolf recovery in the state of Washington. International Wolf (Winter):19-20.

Fryer, Janet L. 2002. *Pinus albicaulis*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: https://www.fs.fed.us/database/feis/plants/tree/pinalb/all.html.

Fuller, R.J., 2001. Responses of woodland birds to increasing numbers of deer: a review of evidence and mechanisms. Forestry 74(3): 289-298.

Gaines, W.L., G.K. Neale, and R.H. Naney, 1995. Response of coyotes and gray wolves to simulated howling in Northcentral Washington. Northwest Science, 69(3):217-222.

Gaines, W.L., P.H. Singleton, and A.L. Gold, 2000. Conservation of rare carnivores in the North Cascades Ecosystem, western North America. Natural Areas Journal, 20:366-375.

Gaines, W.L, P.H. Singleton, and R.C. Ross, 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. General Technical Report, PNW-GTR-586. Portland, OR: Pacific Northwest Research Station, US Forest Service (USFS). 79 pp. Available online at http://www.fs.fed.us/pnw/pubs/gtr586.pdf (October 19, 2006).

Gaines, W.L., M. Haggard, J.F. Lehmkuhl, A.L. Lyons, and R.J. Harrod, 2007. Short-term response of land birds to ponderosa pine restoration. Restoration Ecology 15(4): 670-678.

Gaines, W., M. Haggard, J. Begley, J. Lehmkuhl, and A. Lyons, 2010. Short-term effects of thinning and burning restoration treatments on avian community composition,

density, and nest survival in the eastern Cascades dry forests, Washington. Forest Science 56(1): 88-99.

Halfpenny, J.C., R.W. Thompson, S.C. Morse, T. Holden and P. Rezendes. 1995. Snow tracking. Chapter 5, Pg. 91-124 in Zielinski, W.J.; Kucera, T.E., technical editors. American marten, fisher, lynx, and wolverine: survey methods for their detection. Gen. Tech. Rep. PSW-GTR-157. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 163 p.

Hallock, L.A. and McAllister, K.R. 2005. Western Toad. Washington Herp Atlas. http://wdfw.wa.gov/conservation/herp_atlas/. Accessed 12 November 2017.

Hayes, G. and G.J. Wiles. 2013. Washington bat conservation plan. Washington Department of Fish and Wildlife, Olympia, Washington. 138+viii pp.

Hobbs, N.T., 1996. Modification of ecosystems by ungulates. Journal of Wildlife Management 60(4):695-713.

IGBC (Interagency Grizzly Bear Committee), 1998. Grizzly bear/motorized access management. Interagency Grizzly Bear Committee Taskforce Report. 7 pp.

ILBT (Interagency Lynx Biology Team), 2013. Canada lynx conservation assessment and strategy. 3rd edition. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication R1-13-19, Missoula, MT. 128 pp.

Koehler, G.M., 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. Canadian Journal of Zoology 68(5):845-851.

Koehler, G.M., B.T. Maletzke, J.A. von Kienast, K.B. Aubry, R.B. Wielgus, and R.H. Naney, 2008. Habitat fragmentation and the persistence of lynx populations in Washington State. Journal of Wildlife Management, 72(7):1518-1524.Laufer, J.R. and P.T. Jenkins. 1989. Historical and present status of the gray wolf in the Cascades Mountains of Washington. Northwest Environmental Journal, 5:313-327.

Laufer, J.R. and P.T. Jenkins, 1989. Historical and present status of the gray wolf in the Cascades Mountains of Washington. Northwest Environmental Journal, 5:313-327.

Lewis, J.C., J.R. Akins, and T. Chestnut, 2022. Status Report for the Cascade Red Fox in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. Available at: https://wdfw.wa.gov/sites/default/files/publications/02310/wdfw02310.pdf.

LDC (LDC, Inc.), 2022, Project Proponent Submittal on behalf of Tamarack Saddle - Revised Master Planned Resort Overlay and Development Agreement Application and SEPA checklist, February 1, 2022

Maletzke, B.T., 2004. Winter habitat selection of lynx (Lynx canadensis) in northern Washington. Masters of Science, Natural Resource Sciences. Washington State University. December 2004. 39pp.McCord and Cardoza 1982.

McCaughey, W., Scott, G.L., and K.L. Izlar, 2009. Whitebark Pine Planting Guidelines. Western Journal of Applied Forestry 24(3):163-166.

McCord, C.M. and J.E. Cardoza, 1982. Bobcat and lynx. Pages 728–766 in Wild mammals of North America. Edited by J. A. Chapman and G. A. Feldhamer. The Johns Hopkins University Press, Baltimore, Maryland, USA.

Mech, L.D., 1970. The wolf: the ecology and behavior of an endangered species. Doubleday Publishing Co., New York.

Messier, F. 1995. On the functional and numeric responses of wolves to changing prey density. In Carbyn, L.N., S.H. Fritts, and D.R. Seip (eds). Ecology and conservation of wolves in a changing world: 187-198. Edmonton, AB: Canadian Circumpolar Institute.

Munzing, D., and W.L. Gaines. 2008. Monitoring American marten on the east-side of the North Cascades of Washington. Northwestern Naturalist 89: 67-75.

Opperman, J.J., and A.M. Merenlander, 2000. Deer herbivory as an ecological constraint to restoration of degraded riparian corridors. Restoration Ecology 8(1):41-47.

Phillips, G.E. A.W. Alldredge, 2000. Reproductive success of elk following disturbance by humans during calving season. Journal of Wildlife Management. 64(2): 521–530.

Riggs, R.A.; Tiedemann, A.R.; Cook, J.G. [et al.], 2000. Modification of mixed-conifer forests by ruminant herbivores in the Blue Mountains Ecological Province. Gen. Tech. Rep. RP-PNW-527. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 77 p.

Rocchio, J. and R. Crawford, 2015. Ecological Systems of Washington State: A Guide to Identification. October 19, 2015. Washington Department of Natural Resources, Natural Heritage Program 1111 Washington St. SE, Olympia, WA 98504-7014. 384pp.

Rooney, T.P., 2001. Deer impacts on forest ecosystems: a North American perspective. Forestry 74(3):201- 208.

Rossman, A.R., 2022. Mission Ridge SEPA – Botany & Invasives Existing Condition. September 29, 2022.

Rowland, M.M., R.M. Nielson, M.J. Wisdom [and others], 2018. Linking nutrition with landscape features in a regional habitat-use model for elk in western Oregon and Washington. Wildlife Monograph 199: 31-49.

Schoenecker, K.A., F.J. Singer, L.C. Zeigenfus, D. Binkley, and R.S.C. Menezes, 2004. Effects of elk herbivory on vegetation and nitrogen processes. Journal of Wildlife Management 68(4): 837-849.

Schroeder, M., 2006. Blue grouse divided by two equals Dusky and Sooty Grouse. Washington Birder: 14(3): 3pp. Washington Department of Fish and Wildlife, Bridgeport, WA.

Slough, B.G., 1999. Characteristics of Canada lynx, Lynx canadensis, maternal dens and denning habitat. Canadian Field Naturalist, 113:605-608.

Stinson, D. W., 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

Squires, J.R., and T. Laurion, 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. In: Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squire, eds. Ecology and Conservation of lynx in the United States. University Press of Colorado, Boulder, CO.

USDA (U.S. Department of Agriculture) and USDI (U.S. Department of the Interior), 1994. Record of Decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted owl; Standards and Guidelines for management of habitat of late-successional and old-growth related species within the range of the northern spotted owl (Northwest Forest Plan). USDA Forest Service and USDI Bureau of Land Management. Portland, OR. April 1994. Available online at http://www.reo.gov/general/aboutnwfp.htm.

USFWS (U.S. Fish and Wildlife Service), 1997. North Cascades Ecosystem recovery plan chapter—supplement to the grizzly bear recovery plan. Missoula, Montana, USA.

USFWS, 2000. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx (Lynx canadensis) and Related Rule; Final Rule. Federal Register 65(58):16051-16086. March 24, 2000.

USFWS, 2003. Endangered and threatened wildlife and plants; final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; Final and Proposed Rules. Federal Register 68(62):15803-15875. April 1, 2003

USFWS, 2005. RECOVERY OUTLINE: Contiguous United States Distinct Population Segment of the Canada Lynx. September 14, 2005. 21 pp.

USFWS, 2011. Grizzly bear (*Ursus arctos horribilus*): 5-year review: summary and evaluation. Grizzly Bear Recovery Office, Missoula, Montana. August 2011. 205 pp.

USFWS, 2012. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for the Northern Spotted Owl; Final Rule. *Federal Regist*er 77(233):71876-72068. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-12-04/pdf/2012-28714.pdf.

USFWS, 2014a. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. US Fish and Wildlife Service (USFWS). Federal Register 79(177):54782-54846. September 12, 2014. Available at: https://www.gpo.gov/fdsys/pkg/FR-2014-09-12/pdf/2014-21013.pdf

USFWS, 2022. Whitebark Pine. Available at: https://www.fws.gov/species/whitebark-pine-pinus-albicaulis. Accessed: February 9, 2024.

USFWS, 2024. IPaC Resource List: Mission Ridge Utility Corridor. Accessed August 14, 2024. Available at: https://ipac.ecosphere.fws.gov/.

USFS (U.S. Forest Service), 2010. Glossary and List of Acronyms – Blue Mountains Forests Revised Land and Resource Management Plan Glossary. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5260256.pdf. Accessed: February 9, 2024.

USFS, 2012. The Okanogan-Wenatchee National Forest Restoration Strategy. November 2012. 45 pp. Available online at https://ems-team.usda.gov/sites/fs-r06-owffrs/EMDS%20Practitioners/RestorationStrategyDoc2012.pdf.

USFS, 2020. Mission Ridge Expansion Project: Draft Environmental Analysis. Okanogan Wenatchee National Forest. February 2020. Available at: https://www.fs.usda.gov/project/?project=53981.

USFWS, 2024. IPaC Resource List: Mission Ridge Utility Corridor. Accessed August 14, 2024. Available at: https://ipac.ecosphere.fws.gov/

Vales, D. J. and J. M. Peek, 1995. Projecting the potential effects of wolf predation on elk and mule deer in the east front portion of the northwest Montana wolf recovery area. Pages 211-222 in L. N. Carbyn, S. H. Fritts, and D. R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, Edmonton, Alberta, Canada

Van Ommeren, R.J., 2001. Species composition on reclaimed ski runs compared with unseeded areas. Journal of Range Management 54(3): 307-311.

Vavra, M.; Wisdom, M.J.; Kie, J.G.; Cook, J.G.; Riggs, R.A., 2004. The role of ungulate herbivory and management on ecosystem patterns and processes: Future direction of the Starkey Project. In: The Starkey Project: a Synthesis of Long-Term Studies of Elk and Mule Deer. Reprinted From the 2004 Transactions of North American Wildlife and Natural Resources Conference.

von Kienast, J.A., 2003. Winter habitat selection and food habits of lynx on the Okanogan Plateau, Washington. Thesis, University of Washington, Seattle, USA. Washington Department of Fish and Wildlife (WDFW). 1998. Washington State Salmonid Stock Inventory: Bull Trout/Dolly Varden.

WCC (Washington Conservation Commission), 2001. Salmon, Steelhead and Bull Trout Habitat Limiting Factors Report for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages)., Olympia, WA.

WCSI (Washington Conservation Science Institute), 2018, Mission Ridge Expansion Project Supplement to SEPA Checklist: Aquatics, Wildlife and Botany Resources Report – Final Report, March 2018.

WCSI, 2020. Mission Ridge Expansion Project Supplement to SEPA Checklist: Aquatics, Wildlife and Botany Resources Report – Updated December 2019, January 2020.

WCSI, 2022. Stemilt-Squilchuck Elk Camera Study: Elk Movements, Calving, and Time of Use. July 2022.

WCSI, 2024. Cascade Red Fox – Supplement to the SEPA Wildlife Report. November 2024.

WCSI, 2024. Utility Corridor: Supplemental to the SEPA Fish and Wildlife Report. November 2024.

WDFW (Washington Department of Fish and Wildlife), 2008. State of Washington Priority Habitats and Species List – Updated June 2023. Available at: https://wdfw.wa.gov/sites/default/files/publications/00165/wdfw00165.pdf.

WDFW, 2011. Wolf Conservation and management plan for Washington. Prepared by: Wiles, Gary J., H.L. Allen, and G.E. Hayes. Olympia, Washington. 292 pages. Available at: http://wdfw.wa.gov/publications/00001/wdfw00001.pdf.

WDFW, 2014. Game management plan July 2015 – June 2021. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA. 159 pp.

WDFW, 2015. Washington's State Wildlife Action Plan: 2015 Update. September 2015. Available at: https://wdfw.wa.gov/species-habitats/at-risk/swap.

WDFW, 2016. Washington State Mule Deer Management Plan, Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 144 p.

WDFW, 2018. North Cascades Elk Herd Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA. USA. 35pp.

WDFW, 2023. State Listed Species. May 2023. Available at: https://wdfw.wa.gov/sites/default/files/2022-04/StateListed%26amp%3BCandidateSpecies28Mar2022.pdf. Accessed: February 11, 2024.

WDFW, Confederated Colville Tribes, Spokane Tribe of Indians, USDA-APHIS Wildlife Services, and U.S. Fish and Wildlife Service, 2019. Washington Gray Wolf Conservation and Management: 2018 Annual Report. Washington Department of Fish and Wildlife, Ellensburg, WA.

WDNR (Washington Department of Natural Resources), 2023. Natural Heritage Program, Ecological Systems Classification. Available at: https://www.dnr.wa.gov/NHPecologicalsys. Accessed: February 6, 2024.

WDNR, 2024. 2024 Washington Vascular Plant Species of Conservation Concern. Washington Natural Heritage Program Report Number 2024-07. July 3, 2024. Available at: https://www.dnr.wa.gov/publications/amp_nh_vascular_ets.pdf.

Wiles, Gary J., H.L. Allen, G.E. Hayes, 2011. Wolf Conservation and management plan for Washington. Washington Department of Fish and Wildlife. Olympia, Washington. 292 pages. Available at http://wdfw.wa.gov/publications/00001/wdfw00001.pdf.

Wisdom, M.J.; Vavra, M.; Boyd, J.M.; Hemstrom, M.A.; Ager, A.A.; Johnson, B.K., 2006. Understanding ungulate herbivory-episodic disturbance effects on vegetation dynamics: Knowledge gaps and management needs. Wildlife Society Bulletin 34(2): 283-292.

Wisdom, M.J., M.M. Rowland, R.M. Nielson [and others], 2018. Modeling to evaluate elk habitat: contemporary approaches for western Oregon and Washington. Wildlife Monograph 199: 8-12.

Woodruff, K., and H. Ferguson. 2008. Management recommendations for Townsend's big-eared bat. Washington Department of Fish and Wildlife, Olympia, WA.

WSNWCB (Washington State Noxious Weed Control Board), 2023. 2023 Washington State Noxious Weed List. Available at: https://www.nwcb.wa.gov/pdfs/2023-State-Weed-List_Common_Name-8.5x11.pdf.