

GOLDENDALE ENERGY STORAGE HYDROELECTRIC PROJECT

Federal Energy Regulatory Commission Project No. 14861

Klickitat County, Washington

FINAL LICENSE APPLICATION Appendix C: Botanical Survey Report

For:

FFP Project 101, LLC



June 2020

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Acronyms and Abbreviations

amsl	above mean sea level
Applicant	FFP Project 101, LLC
CGA	Columbia Gorge Aluminum
ERM	ERM-West, Inc.
GPS	Geographic Positioning System
PHS	Priority Habitat and Species
RPH	rare plant habitat
WDFW	Washington Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program
WSU	Washington State University

1.0 INTRODUCTION

Presented herein are findings from the botanical field survey conducted within the Goldendale Pumped Storage Project Boundary located at the former Columbia Gorge Aluminum (CGA) smelter property near Goldendale, Washington (the study area). ERM-West, Inc. (ERM) prepared this report on behalf of FFP Project 101, LLC (the Applicant).

The objectives of the work were to determine whether and where plant species of concern or their habitats exist within the study area (Figure 2.1-1), to confirm or modify Washington Department of Fish and Wildlife's (WDFW) Priority Habitat and Species (PHS) Mapping, and to survey for noxious weeds.

This report documents the presence and geographic extent of PHS and rare plant habitat (RPH), describes survey methods, and characterizes RPHs and PHS identified within the study area.

2.0 SURVEYS

2.1 Rare Plant Survey

In Klickitat County there are 68 special status plant species with documented occurrences, of which eight are listed as state endangered, 30 are listed as state threatened, and 25 are listed as state sensitive (Washington Natural Heritage Program [WNHP] 2018). The remaining five are listed as extirpated from Washington State.

The Applicant performed an analysis of suitable habitat and known occurrences for federally and state-listed species in Klickitat County and determined that 14 of the Klickitat County species have the potential to occur in the Project vicinity (Table 2.1-1). No federally listed species are on this list.

Table 2.1-1 provides details on the 14 listed endangered, threatened, and sensitive species with the potential to occur in the vicinity of the study area. Of these, Wormskiold's northern wormwood (*Artemisia campestris* var. *wormskioldii*), California broomrape (*Orobanche californica* ssp. *grayana*), and obscure buttercup (*Ranunculus tritermatus*) are listed as state endangered; few-flowered collinsia (*Collinsia sparsiflora* var. *bruceae*), inch-high rush (*Juncus uncialis*), Douglas' draba (*Cusickiella douglasii*), smooth desert-parsley (*Lomatium laevigatum*), smooth goldfields (*Lasthenia glaberrima*), and hot-rock penstemon (*Penstemon deustus* var. *variabilis*) are listed as state threatened; and common bluecup (*Githopsis specularioides*), Baker's linanthus (*Leptosiphon bolanderi*), Nuttall's quillwort (*Isoetes nuttallii*), Suksdorf's desert-parsley (*Lomatium suksdorfii*), and western ladies' tresses (*Spiranthes porrifolia*) are listed as state sensitive.

Within 3 miles of the study area, the WNHP has recorded two occurrences of smooth desert-parsley. The plants are located on steep, rocky talus slopes to the west of the study area and will

not be impacted by potential Project activities. Botanical surveys conducted in 2015 for a previous version of the project confirmed the presence of these plants. Since these plants are located outside of the current Project Boundary, they were not surveyed in 2019.

Table 2.1-1: Klickitat County Sensitive Plant Species Surveyed within the Study Area

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Survey Results
Baker's linanthus	<i>Leptosiphon bolanderi</i>	--	Sensitive	Dry, rocky, partially vegetated slopes, scattered basalt rocks, bare mineral soil; elevations 850 to 1,800 feet amsl; associated with Oregon white oak	Not observed; not expected to occur within the study area due to absence of Oregon white oak
California broomrape	<i>Orobanche californica ssp. grayana</i>	--	Endangered	Vernally moist meadows and lower montane meadows, parasitic on sagebrush, WA; elevation can be sea level to 1,500 feet amsl, but most commonly 3,900 to 5,900 feet amsl	Not observed; suitable habitat exists within study area
Common bluecup	<i>Githopsis specularioides</i>	--	Sensitive	Dry, open, thin soils over bedrock outcrops, grassy balds, talus slopes, and gravelly prairies at low elevations; adjacent to forest	Not observed; suitable habitat exists within the study area
Douglas' draba	<i>Cusickiella douglasii</i>	--	Threatened	Open rocky ridges on thin, sandy to gravelly soil over basalt, elevations 2,600 to 2,800 feet amsl	Not observed; suitable habitat exists within study area
Few-flowered collinsia	<i>Collinsia sparsiflora var. bruceae</i>	--	Threatened	Thin soils over basalt on south-facing slopes; moist in spring, dry in summer; elevations 200 to 1,200 feet amsl	Not observed; suitable habitat exists within study area
Hot-rock penstemon	<i>Penstemon deustus var. variabilis</i>	--	Threatened	Dry foothills and lowlands, open dry thin soils over basalt, elevations 1,800 to 3,200 feet amsl	Not observed; suitable habitat exists within study area
Inch-high rush	<i>Juncus uncialis</i>	--	Threatened	Vernal pools and pond edges, channeled scablands, and biscuit-swale topography elevations 300 to 2,500 feet amsl	Not observed; not expected to occur within study area due to strong association with well-developed vernal pools and ponds absent in study area
Nuttall's quillwort	<i>Isoetes nuttallii</i>	--	Sensitive	Seasonally wet ground, seepages, temporary streams, mud near vernal pools; elevations 200 to 345 feet amsl	Not observed; suitable habitat exists within study area
Obscure buttercup	<i>Ranunculus triternatus</i>	--	Endangered	Meadow steppe, north-facing slopes, and basalt ridges in loess deposited soil;	Not observed; not expected to occur within study area due to affinity for north facing

Common Name	Scientific Name	Federal Status	State Status	Habitat Requirements	Survey Results
				elevations 1,900 to 4,000 feet amsl	slopes, which are absent within the study area
Smooth goldfields	<i>Lasthenia glaberrima</i>	--	Threatened	Vernal ponds on basalt tablelands where the area is wet in winter and dry by late spring	Not observed; not expected to occur within study area due to strong association with vernal pools and ponds absent in study area
Smooth desert-parsley	<i>Lomatium laevigatum</i>	--	Threatened	Ledges and crevices of basalt cliffs on Columbia River, adjacent rocky slopes of sagebrush steppe; elevations 180 to 960 feet amsl	Not observed; suitable habitat exists within study area
Suksdorf's desert-parsley	<i>Lomatium suksdorfii</i>	--	Sensitive	Open dry rocky hillsides on slopes; elevation 300 to 3,600 feet amsl; associated with Oregon white oak	Not observed; not expected to occur within the study area due to absence of Oregon white oak
Western ladies' tresses	<i>Spiranthes porrifolia</i>	--	Sensitive	Wet meadows, bogs, streams, and seepage slopes; elevations 10 to 6,800 feet amsl	Not observed; suitable habitat exists within study area
Wormskiold's northern wormwood	<i>Artemisia campestris var. wormskioldii</i>	--	Endangered	Arid shrub steppe on basalt, usually flat terrain, floodplain of Columbia River	Not observed; not expected to occur within the study area due to absence of undisturbed habitat within the floodplain of the Columbia River

Source: WNHP 2018; DNR 2014

amsl = above mean sea level

Note:

-- = not listed

2.1.1 Methods

On May 14 and 15, 2019, ERM performed a botanical survey for the 14 state-listed endangered, threatened, and sensitive species with potential to occur within the study area. Weather was cloudy, 55 to 60 degrees Fahrenheit, wind speeds 10 to 20 miles per hour with stronger winds on the first day, and light rain during both survey days. Surveys were conducted in a team of two and covered all accessible areas within the study area. A Trimble Geo 7X handheld Global Positioning System (GPS) unit was used to navigate survey efforts within the study area and record field data.

Due to the irregular shape and restrictive terrain of the study area, the random meander botanical field survey method was selected to maximize coverage of target species habitats (Nelson 1985). This method concentrates survey efforts on suitable habitat within the area of interest by identifying key habitat types and thoroughly searching them for target species. Prior to performing the botanical survey, biological and ecological data was compiled for each species (Arnett 2011; Calflora 2019; Turner and Gustafson 2006; WNHP 2014) and maps of the 2015 vegetation survey were taken into the field. To maximize likelihood of detection and accurate identification the survey was scheduled in mid-May, capturing the largest number of the 14 target species' known temporal flowering ranges in the study area (Table 2-2).

Table 2.1-2: Flowering Times for Target Species

Common Name	Scientific Name	Flowering Time							
		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Baker's linanthus	<i>Leptosiphon bolanderi</i>								
California broomrape	<i>Orobancha californica ssp. grayana</i>								
Common bluecup	<i>Githopsis specularioides</i>								
Douglas' draba	<i>Cusickiella douglasii</i>								
Few-flowered collinsia	<i>Collinsia sparsiflora var. bruceae</i>								
Hot-rock penstemon	<i>Penstemon deustus var. variabilis</i>								
Inch-high rush	<i>Juncus uncialis</i>								
Nuttall's quillwort	<i>Isoetes nuttallii</i>	--	--	--	--	--	--	--	--
Obscure buttercup	<i>Ranunculus tritermatus</i>								
Smooth goldfields	<i>Lasthenia glaberrima</i>								
Smooth desert parsley	<i>Lomatium laevigatum</i>								
Suksdorf's desert parsley	<i>Lomatium suksdorfii</i>								
Western ladies' tresses	<i>Spiranthes porrifolia</i>								
Wormskiold's northern wormwood	<i>Artemisia campestris var. wormskioldii</i>								

Source: Arnett 2011; Calflora 2019; DNR 2014; Turner and Gustafson 2006; WNHP 2014

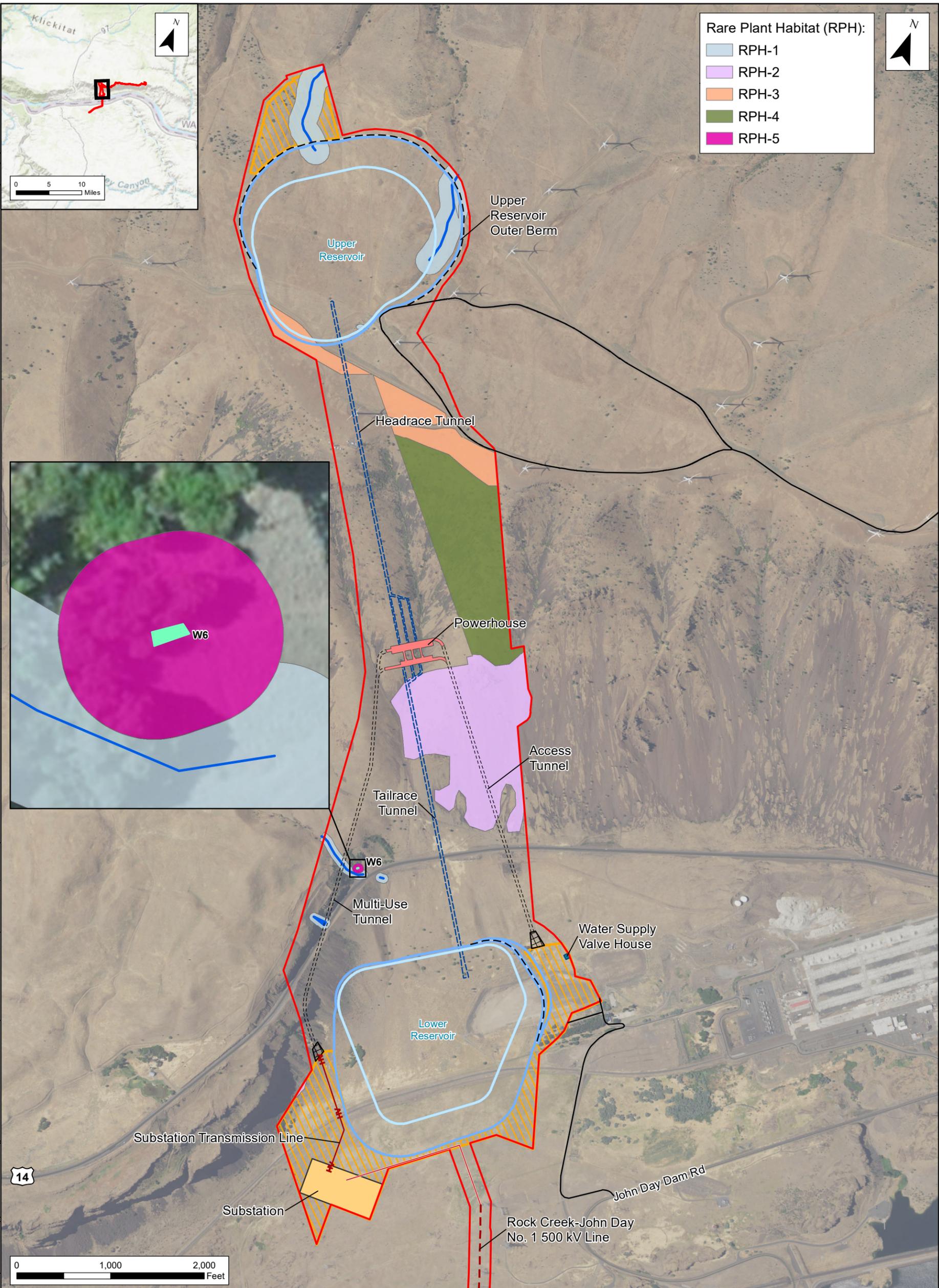
Note: -- = non-flowering plant

The field team began the survey at the northernmost study area boundary near the proposed upper reservoir site, located within the Tuolumne Wind Project owned by the Turlock Irrigation District. Suitable habitat locations were documented using a handheld GPS (see Figure 2.1-1). The random meander method was used to survey habitats. The suitable habitats were identified and thoroughly searched by walking east-west from boundary to boundary, incrementally working southward toward the Columbia River. The steep escarpment of basalt cliffs and talus in the middle of the study area was physically inaccessible, so it was surveyed looking down slope to the south from a distance of approximately 30 to 150 feet. All suspected rare plant observations were photographed and specimens collected in labeled re-sealable plastic bags for later review.

The lower reservoir area includes part of the former CGA smelter property, decommissioned in 2003, and a section of Highway 14. The survey began at the southeastern study area boundary near the proposed location of the lower reservoir, working westward using the same methods employed in the upper reservoir area. The westernmost edge of the study boundary extending north to Highway 14 lies on a steep slope, making this portion of the study area inaccessible. This area was surveyed looking up the slope to the west from a distance of 50 to 150 feet.

2.1.2 Results and Discussion

Targeted timing of survey efforts and seasonally average conditions for plant growth in the region (U.S. Climate Data 2019) facilitate a high confidence level for identification of the target species. Based on known primary constituent elements of suitable habitat for these species, the study area was found to contain habitat suitable for eight of the 14 rare plant species surveyed. This habitat can be separated into five distinct RPH classes as described below (Figure 2.1-1). No individuals from the 14 target species or other sensitive plant species were observed in the study area.



Rare Plant Habitat (RPH):

- RPH-1
- RPH-2
- RPH-3
- RPH-4
- RPH-5

Legend

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

Figure 2.1-1
Rare Plant Habitat in the Study Area
 Final License Application
 Goldendale Energy Storage Project
 Goldendale, WA

2.1.2.1 RPH-1

RPH-1 is characterized by seeps and ephemeral streams located in both the upper and lower portions of the study area (Figures 2.1-2 and 2.1-3). RPH-1 in the upper reservoir area was found to be suitable for California broomrape. This is due to presence of seasonally moist grassland with well-drained soil and an abundance of this parasitic species' preferred host—sagebrush (*Artemisia tridentata*). The remainder of RPH-1 is located to the south near Highway 14 and is characterized by seeps and streams whose moisture regimes may be sufficient to support Nuttall's quillwort and smooth goldfields, but are unlikely to support these species due to the dominance of upland vegetation. The lowest elevation in the study area (340 feet amsl) is near the maximum of this species' known range (200 to 345 feet amsl), further reducing the probability that Nuttall's quillwort occurs within the study area. However, Nuttall's quillwort is relatively inconspicuous and may be more widespread than current data indicates due to its resemblance to grass shoots and absence of flowers.



Figure 1.1-2: RPH-1 Upper Reservoir Area; Aspect—Southeast



Figure 2.1-3: RPH-1 Middle Area above Highway 14—Southwest

2.1.2.2 RPH-2

RPH-2 occurs along the steep south-facing talus slopes which span the center of the study area (Figure 2.1-4). This habitat was determined not to be of high quality due to the prevalence of introduced invasive species such as cheatgrass (*Bromus tectorum*), the Klickitat County Class C noxious weed Canada thistle (*Cirsium arvense*), and common fiddleneck (*Amsinckia menziesii*), which is associated with disturbed land (Washington State University [WSU] 2013). Steep gradients, unstable talus slopes, and basalt outcroppings result in sparse vegetation in the higher elevations of this area. However, greater vegetation cover persists on the scree and talus slopes below the cliffs. Visual observations made from above and below this area were extrapolated out to characterize the steep inaccessible middle section of RPH-2. Species of desert parsley (*Lomatium* spp.) were observed in this area but none were identified as Suksdorf's desert parsley or smooth desert parsley. Gray's desert parsley (*Lomatium grayi*), an associated species to smooth desert parsley, was observed as well as fern leaf desert parsley (*Lomatium dissectum*). Suksdorf's desert parsley habitat is not considered to be present in the study area due to absence of the Oregon white oak (*Quercus garryana*) with which this species is associated.



Figure 2.1-4: RPH-2 Central Study Area above Highway 14; Aspect—Northwest

2.1.2.3 RPH-3

RPH-3 is found as a band of Columbia Plateau scabland-shrubland located at the top of the escarpment along the southern edge of the upper reservoir area (Figure 2.1-5). This habitat is characterized by thin sandy to gravelly soil over basalt and exposed rock, with biological soil crust present in approximately 10 percent of this area. These conditions provide suitable habitat

for smooth desert parsley, Douglas' draba, and hot-rock penstemon. Suitable habitat is further indicated by presence of forbs such as phlox (*Phlox* spp.) lupine (*Lupinus* spp.), wild buckwheat (*Eriogonum* spp.), and other desert parsley species with which these target species are known to be associated. Herb-Robert (*Geranium robertianum*), a Klickitat county Class B noxious weed, was also found in this area.



Figure 2.1-5: RPH-3 Aspect—Southwest

2.1.2.4 RPH-4

RPH-4 is found across the steep south-facing middle slope of the study area just below RPH-3 and just above RPH-2 (Figure 2.1-6). This steppe habitat is characterized by an open shrub layer of sagebrush and buckwheat species interspersed by forbs such as arrow-leaf balsamroot (*Balsamorhiza sagittata*), lupine, phlox, and desert parsley. Western juniper (*Juniperus occidentalis*) and Ponderosa pine (*Pinus ponderosa*) stands are open to moderately dense in cover. These conditions provide the seasonally moist microsites required by few-flowered collinsia and common bluecup, and are also suitable for smooth desert parsley. Common bluecup can be challenging to detect unless present in large numbers; however, populations are typically small and composed of scattered individuals. Obscure buttercup is known to occur in similar environments but is not likely to occur in the study area due its affinity for north-facing slopes.



Figure 2.1-6: RPH-4 Aspect—South

2.1.2.5 RPH-5

RPH-5 is a wetland area associated with a seep just above Highway 14, which contains both flowing and standing water (Figure 2.1-7). These conditions are suitable for western ladies' tresses, Nuttall's quillwort, and smooth goldfields. Western ladies' tresses are associated with seep monkeyflower (*Mimulus guttatus*), which was identified within RPH-5. Surveys for western ladies tresses typically occur over multiple flowering seasons due to the species' propensity to lie dormant for up to several years.



Figure 2.1-7: RPH-5 Aspect—Northwest

2.1.2.6 Invasive and Noxious Weed Species

As discussed above, several introduced invasive and noxious weed species were observed within the RPH boundaries: cheatgrass Canada thistle, common fiddleneck, and herb-Robert.

Other weeds were observed in the study area and its vicinity that were not within any mapped RPH boundaries. Klickitat County Class B noxious weeds dalmatian toadflax (*Linaria dalmatica*) and rush skeletonweed (*Chondrilla juncea*) were observed in the lower reservoir as well as on the former CGA smelter property outside the study area. Russian olive (*Elaeagnus angustifolia*), Himalayan blackberry (*Rubus armeniacus*), and quackgrass (*Elymus repens*) are introduced invasive species that were identified within in the disturbed and developed lower portion of the study area and its vicinity.

2.1.3 Conclusions

Based on observations from the 2019 botanical survey, ERM concludes that no rare plant species are present; however, suitable habitat for California broomrape, common bluecup, Douglas' draba, few-flowered collinsia, hot-rock penstemon, Nuttall's quillwort, smooth goldfields, smooth desert parsley and western ladies' tresses exists within the study area. Due to the existing level of disturbance and presence of invasive plant species and Klickitat County designated noxious weeds, much of the study area is not considered to be high quality habitat and is therefore unlikely to support the species surveyed.

Project impacts to these habitats have the potential to occur in all RPH areas. However, due to the quality of the existing environment and the absence of rare plant species, Project impacts are not likely to adversely affect any Klickitat County sensitive plant species.

2.2 Priority Habitat and Species Survey

The majority of the study area is composed of previously disturbed lands, including the former CGA smelter property of the lower reservoir area and disturbed shrub-steppe habitat adjacent to wind development of the upper reservoir area.

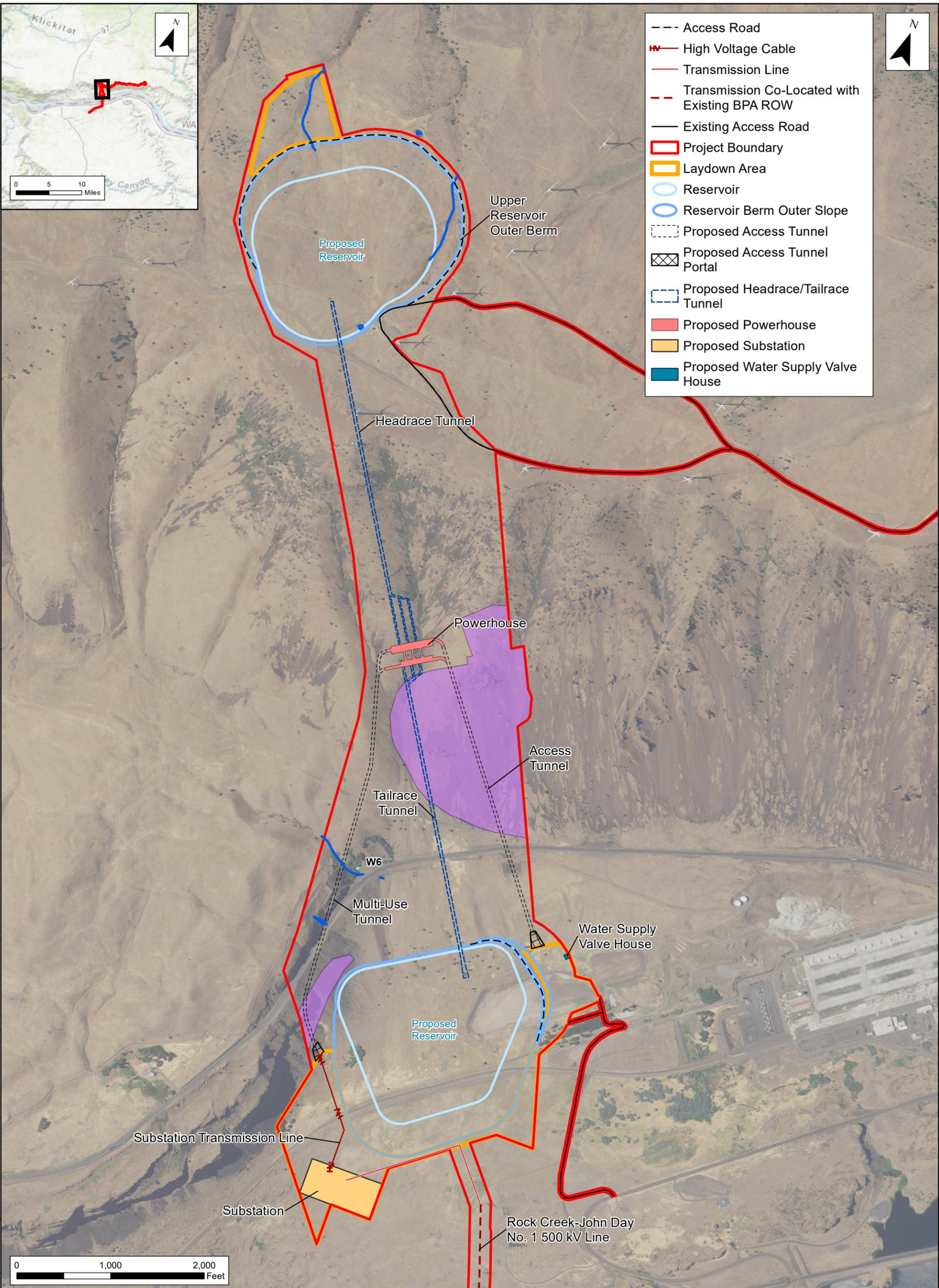
Some habitat features within the Project Boundary support specific wildlife species requirements. These areas are catalogued by WDFW as Priority Habitat features (WDFW 2015), and are mapped as part of the WDFW PHS mapping (WDFW 2018) (see Table 2-3 and Figure 2.2-1).

Table 2.2-1: PHS in Study Area

PHS Type	Description	Survey Results
John Day Talus	Talus slopes above John Day Dam. Homogenous areas of rock rubble ranging from 0.5 to 6.5 feet in diameter composed of basalt, andesite, and/or sedimentary rock, including riprap and mine tailings.	Confirmed in study area
John Day Cliffs	Cliffs above John Day Dam. Areas greater than 25 feet high and occurring below 5,000 feet in elevation.	Confirmed in study area
Oak Woodland Habitat	Stands of Oregon white oak or mixed oak-conifer where $\geq 25\%$ of canopy cover is oak; or where canopy cover is $< 25\%$ and oak is $\geq 50\%$ of the canopy.	Not observed in study area

Source: WDFW 2015 and 2018

Note: -- = not surveyed



Legend

- Waterbody
- Wetland
- John Day Talus PHS

Figure 2.2-1
Priority Habitat and Species in the Study Area
 Final License Application
 Goldendale Energy Storage Project
 Goldendale, WA

2.2.1 Methods

ERM ground-truthed WDFW PHS mapping for the study area concurrently with botanical survey efforts on May 14 and 15, 2019. Maps and GPS data of PHS boundaries within the study area were taken into the field. The same survey method described above for the botanical survey was also used for the PHS survey, instead targeting WDFW PHS mapping locations within the study area.

2.2.2 Results and Discussion

John Day Talus PHS was confirmed to be present in the study area and is geographically consistent with WDFW PHS mapping. This PHS is found across the steep middle section of the study area beginning just above Highway 14 extending north to terminate at the base of the John Day Cliffs PHS, and as steep slopes along the westernmost boundary of the study area. While these areas are true to the WDFW definition of John Day Talus PHS, the presence of introduced upland vegetation such as cheatgrass and Canada thistle indicate this habitat is not of high quality. Common fiddleneck is also abundant in this area and, while native, is considered to be an indicator species of disturbed land (WSU 2013).

Oak/Pine Mixed Forest PHS was surveyed throughout the entirety of the study area. Stands of Ponderosa pine and western juniper were observed within mapped PHS boundaries in the upper and lower reservoir areas and the middle escarpment, but no Oregon white oak was observed within the study area. Due to the absence of Oregon white oak this PHS is determined not to be present within the study area.

2.2.3 Conclusions

PHS mapping efforts confirmed the presence of WDFW John Day Talus PHS in all previously mapped areas. This is not considered to be high quality habitat due to the presence of invasive plant species, noxious weeds, and evidence of disturbance. Oak/Pine Mixed Forest PHS was not observed within any of the WDFW mapped areas, and no Oregon white oak was observed within the study area. Therefore, Oak Pine Mixed Forest PHS is determined not to be present within the study area.

Project impacts to John Day Talus PHS have the potential to occur during construction of the underground powerhouse and southernmost tunnel portal.

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