Appendix F
Aquatic Species and Habitats Resource Analysis Report

June 2022

Proposed Goldendale Energy Storage Project

Aquatic Species and Habitats Resource Analysis Report

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

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Acronyms and Abbreviations

AFY	acre-feet per year
BMP	best management practice
CGA	Columbia Gorge Aluminum
DPS	distinct population segment
Ecology	Washington Department of Ecology
EFH	essential fish habitat
EIS	environmental impact statement
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FERC	Federal Energy Regulatory Commission
HUC	Hydrologic Unit Code
KPUD	Public Utility District No. 1 of Klickitat County
NAVD88	North American Vertical Datum of 1988
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NWI	National Wetlands Inventory
PCB	polychlorinated biphenyl
RCW	Revised Code of Washington
RM	river mile
SEPA	State Environmental Policy Act
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMMP	Vegetation Management and Monitoring Plan
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WMP	Wildlife Management Plan
WSI	West Surface Impoundment

Summary

This report describes the aquatic species and habitats existing conditions and probable impacts in the study area resulting from the proposed project and No Action Alternative.

The proposed project occurs in the semi-arid Columbia Plateau region of Washington, adjacent to the middle Columbia River. Aquatic habitat within the project area includes small, disconnected wetlands and ponds, and portions of intermittent streams. In the upper reservoir area, these intermittent streams are hydrologically connected for at least a portion of the year to Swale Creek, a tributary to the Klickitat River and a stream that provides habitat for rainbow trout (*Oncorhynchus mykiss*), steelhead (*O. mykiss*), and Chinook salmon (*O. tshawytscha*) in its lower reaches. Due to the seasonal nature and small area of streams and wetlands directly affected by the proposed project, effects on amphibians, turtles, and fish would be minor and would likely be effectively minimized by regulatory requirements and recommended mitigation actions. Aquatic habitat and species in the Columbia River are not anticipated to be affected by the proposed project.

Table 1
Aquatic Species and Habitats Impact Summary

TYPE OF IMPACT	SIGNIFICANT ADVERSE IMPACT FINDING	MITIGATION REQUIRED BY PERMIT	ADDITIONAL MITIGATION PROPOSED	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
Proposed Project: Construction				
Disturbance, injury, or mortality of aquatic species	No	None	Amphibian salvage during construction	No
Loss of aquatic habitat or reduction in aquatic habitat function	No	Compensatory wetland, stream, and buffer mitigation Restoration of disturbed wetlands, streams, and buffers	Construction Water Resource Monitoring and Response Plan	No
Proposed Project: Operations				
Disturbance, injury, or mortality of aquatic species	No	None	Wildlife surveys to include aquatic species	No
Loss of aquatic habitat or reduction in aquatic habitat function	No	None	Operations Water Resource Monitoring and Response Plan Vegetation Management and Monitoring Plan	No

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

1 Introduction

Free Flow Power Project 101, LLC (the Applicant) has proposed to build a pumped-water energy storage system that is capable of generating energy through release of water from an upper reservoir down to a lower reservoir (FFP 2020a). This will be referred to as the "proposed project." This report describes aquatic species and habitat that may occur within the project area and assesses probable impacts on those species and habitats from construction and operation of the proposed project and from a No Action Alternative. Chapter 2 of the State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) provides a more detailed description of the proposed project and No Action Alternative.

1.1 Resource Description

For the purposes of this analysis, aquatic habitat constitutes areas that have flowing or still surface water that may be rain and snow dependent and temporary (ephemeral), seasonal (intermittent with flow occurring during certain times of the year), or year-round (perennial) and provide habitat for species that use these areas. Aquatic species are defined as species using aquatic habitats for some or all of their life cycle. Impacts on surface water flow, quality, and hydrology are primarily addressed in the *Surface and Groundwater Hydrology Resource Analysis Report* (Appendix B of the EIS; Aspect 2022), whereas the species-specific habitat features created by those aquatic habitats are discussed in this report. Similarly, wetlands are referenced in this report as potential habitat for amphibious species; however, impacts on wetlands and the extent of streams and other non-wetland waters such as ponds are primarily addressed in the separate *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS; Anchor QEA 2022a).

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

- Surface water that provides habitat for aquatic and amphibious species
- State-listed aquatic and amphibious species as designated by the Washington Fish and Wildlife Commission and species identified as candidates for listing by the Washington Department of Fish and Wildlife (WDFW)
- Aquatic and amphibious species listed under the federal Endangered Species Act (ESA)
- Aquatic and amphibious species that are uncommon across the state or are unique to the Columbia Basin or Middle Columbia River region

1.2 Regulatory Context

Table 2 identifies relevant federal, state, and local regulations that contributed to the evaluation of potential impacts on aquatic species and habitats within the study area.

Table 2
Applicable Laws, Plans, and Policies

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
Federal	
Endangered Species Act (United States Code [USC] 16.1531 et seq.)	• Provides for the conservation of species listed as threatened or endangered and the habitat upon which they depend. – **Section 7**: Requires consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration (NOAA) Fisheries when undertaking a federal action to ensure the conservation of any listed animal species and critical habitat so as not to jeopardize the continued existence of any listed species. NOAA Fisheries manages listed marine species while USFWS manages listed terrestrial and freshwater species.
Clean Water Act (USC 33.1251 et seq.)	• Establishes the basic structure for regulating pollutant discharges into waters of the United States and makes it unlawful to discharge any pollutant from a point source into those waters without a permit. • Includes the following key sections that are relevant to permitting facilities for which construction or operation could result in a discharge into waters of the United States: – **Section 404:** Regulates the placement of dredged or fill material into waters of the United States. – **Section 401:** Requires that a water quality certificate be obtained for any activity within waters of the United States that needs a federal permit. – **Section 303(d):** Requires that all states restore their waters to be "fishable and swimmable." Section 303(d) of the Clean Water Act establishes a process to identify and clean up polluted waters.
Magnuson-Stevens Fishery Conservation and Management Act Provisions; Essential Fish Habitat (Code of Federal Regulations 67.2343)	• Governs marine fisheries management in U.S. federal waters; federal agencies are required to consult with NOAA Fisheries on activities that may affect essential fish habitat.
Fish and Wildlife Coordination Act (USC 16.661)	• Requires equal consideration and coordination of wildlife conservation with other water resources development programs and provides authority to USFWS and NOAA Fisheries to evaluate impacts on fish and wildlife from federal actions that result in modifications to waterbodies.
State	
Washington State Hydraulic Code (Washington Administrative Code [WAC] 220.660)	• Serves to protect fish, shellfish, and their habitats by requiring all actions that use, divert, obstruct, or change the natural flow or bed of salt or fresh state waters to obtain a Hydraulic Project Approval from the Washington Department of Fish and Wildlife (WDFW).
State and Protected Species (WAC 220.610)	• Grants WDFW the responsibility to oversee the listing and recovery of state endangered, threatened, or sensitive species to ensure their survival as free-ranging populations in the state.
Washington State Wildlife Action Plan	• Provides a comprehensive plan for conserving the state's fish and wildlife and its natural habitats as part of the State and Tribal Wildlife Grants Program. Identifies the Species of Greatest Conservation Need. Many species of uncertain conservation need are listed in the Washington State Wildlife Action Plan.

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
Washington State Priority Habitats and Species	• Documents WDFW's catalog of habitats and species considered to be priorities for conservation and management intended to be used by local governments that are responsible for the protection of fish and wildlife habitat under the Growth Management Act, Shoreline Management Act, SEPA, and the Forest Practices Act.
Washington State Shoreline Management Act (Revised Code of Washington [RCW] 90.58)	• Requires all local jurisdictions with Shorelines of the State to adopt Shoreline Master Programs consistent with the Shoreline Management Act, which emphasizes appropriate shoreline land use, protection of shoreline environmental resources, and protection of the public's right to access and use state shorelines.
Washington State Growth Management Act (RCW 36.70A)	• Requires all cities and counties in Washington to adopt development regulations, according to the best available science, that protect critical areas as defined in RCW 36.70A.030(5), including fish and wildlife habitat conservation areas.
Water Resources Act of 1971 (RCW 90.54)	• Provides fundamentals of water resource policy for the state to ensure that waters of the state are protected and fully utilized for the greatest benefit to the people of the State of Washington; provides direction to state and local governments in carrying out water and related resources programs.
Fish and Wildlife (RCW Title 77)	• Authorizes WDFW to regulate fish, shellfish, and wildlife species in the State of Washington. Includes the following chapters that are relevant to impacts on fish species and habitats: – **77.44:** Warmwater game fish enhancement program – **77.55:** Construction projects in state waters – **77.57:** Fishways, flow, and screening – **77.85:** Salmon recovery – **77.95:** Salmon enhancement program – **77.105:** Recreational salmon and marine fish enhancement program – **77.110:** Salmon and steelhead trout – Management of resources – **77.135:** Invasive species
Invasive/Non-Native Species (WAC 220.640)	• Classifies prohibited and regulated species and regulates the introduction or possession of non-native and invasive aquatic species.
Washington Department of Natural Resources Natural Heritage Program (advisory)	• Provides guidance and assigns conservation status to species and habitats to support federal, state, and local land management policies and listing decisions; has no direct regulatory authority.
Local	
Klickitat County Critical Areas Ordinance (No. 0080613, Chapter IV)	• Regulates land use to protect the county's critical areas (wetlands, aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife conservation areas) from environmental impacts.
Klickitat County Flood Damage Protection Ordinance (No. 0120120)	• Regulates development to promote public safety and minimize losses due to flood conditions, including regulating alteration of natural floodplains and other physical conditions that help control flood waters.

2 Methodology

2.1 Study Area

The study area for the analysis of aquatic species and habitats includes the following areas that have documented surface water in or near the proposed project area and that provide aquatic habitat, or surface waters and aquatic habitats that are hydrologically connected to those flowing from the project footprint (Figure 1). The following aquatic habitats and the species that may occur there are included in the study area:

- Surface waterbodies located within the project footprint (including streams, ponds, and wetlands)
- Swale Creek, the receiving stream for drainage from the upper reservoir area, and a perennial tributary to the Klickitat River, an area of major salmon and steelhead production
- The segment of the Columbia River adjacent to the proposed project, which includes the reach of the Columbia River immediately downstream of John Day Dam (also called the Lake Celilo pool), and the reservoir retained by John Day Dam (also called the Lake Umatilla pool)
- Upper and lower reservoirs that would be constructed for the proposed project

The project area defines the area of the proposed project in which construction of new infrastructure and operations would occur, including two reservoirs, underground water conveyance tunnels, power generation infrastructure, and existing transmission lines (Figure 1, shown in red). The project area includes 621.9 acres of private lands primarily owned by NSC Smelter, LLC, and an existing utility right-of-way owned by Bonneville Power Administration. A portion of the lower project area is located on lands that were previously occupied by the former Columbia Gorge Aluminum (CGA) smelter. This facility was a primary aluminum reduction smelter that generally operated from 1969 to 2003, with a few periods when the plant shut down or had limited operation. Additional land in the lower project area is owned by the U.S. government and is associated with John Day Dam. Current land use consists of open space, wind energy production, a former smelter, and transportation infrastructure (e.g., SR 14 and existing gravel access roads).

2.2 Technical Approach

Information to describe the affected environment for aquatic habitats is focused on the existing conditions and ecological functions of the waterbodies present in the study area. Information to describe the affected environment for aquatic species is focused on species that use aquatic habitat for part or all of their lifecycle. This includes fish, amphibians, and turtles likely to be present within the study area based on surveyed waterbodies and expected species ranges documented in the State of Washington Priority Habitats and Species List (WDFW 2019a), WDFW's Statewide Integrated Fish Distribution Web Map (WDFW and NWIFC 2018), the Washington Gap Analysis for Amphibians (Dvornich et al. 1997), and other resources as cited. See Attachment 1 for a complete list of aquatic and amphibious species that may be in the study area along with details on species status.

The analysis relies on existing documents developed for other regulatory processes, including the Applicant's Federal Energy Regulatory Commission (FERC) Final License Application, Clean Water Act Section 401 Water Quality Certification Applications, and associated field studies to identify species and habitats in the project area (FFP 2020a). In addition, publicly available information on existing species and habitats from state and federal agencies was used to make determinations about the importance of the affected habitats and species in context of their uniqueness across Washington and the viability of their populations. The analysis for this report did not include any additional data collection or modeling.

Species considered include salmon and steelhead that use the Swale Creek watershed of the Klickitat River subbasin and Mid-Columbia River for rearing and migration, and Southern Resident killer whales (*Orcinus orca*), which depend on salmonid prey from the Columbia Basin. Habitats were characterized in terms of natural processes, whether they are properly functioning for native aquatic species, and prevalence of invasive species.

The magnitude of proposed project impacts was evaluated in the context of the health and uniqueness of species populations and habitat functions that support those species. Determinations about the magnitude of impacts are also informed by conclusions from other resource reports prepared for the SEPA EIS (primarily those for water resources and wetlands [Aspect 2022; Anchor QEA 2022a]). The conclusions of those reports help define the natural processes that would be affected by the proposed project in the context of expected changes to the broader environment over time. Natural processes that were evaluated include instream flows and water quality (primarily temperature) in the Swale Creek watershed and Columbia River.

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

2.3 Impact Assessment

The analysis of impacts on aquatic species considered construction- and operation-related effects resulting from project activities. Impacts on aquatic species habitats were also considered, including changes to habitat quantity or habitat function, that is, changes to the natural processes that support that habitat. Impacts from construction were evaluated for their relatively short-term effects, as well as any longer-term effects that persist after the expected 5-year construction period has ended. Impacts from operations were evaluated for the remaining duration of the initial project operating license, which is expected to be a period of 45 years.

Impacts on aquatic species include those that may cause disturbance, injury, or mortality to aquatic species. The magnitude of effects can depend on the duration, frequency, and permanence of the impact and whether the habitat or species affected is federally listed under the ESA or has special status in the State of Washington. Impacts on aquatic habitat include those that cause the loss of aquatic habitat or reduce the ecological function of that habitat by changing water quantity, water quality, riparian area condition, prey abundance, interactions with non-native species, or other key functional elements. Significant impacts would be those that cause mortality, permanent injury, or a level of habitat loss or degradation that would affect the viability of a species.

The evaluation separately identified direct or indirect impacts that may result from construction and operation of the proposed project or from the No Action Alternative. Direct impacts are those that would occur in the study area as the result of and at the same time as the construction and operation of the proposed project. Indirect impacts are those that would occur later in time or farther in distance but that are attributable to certain aspects or activities related to the proposed project.

3 Technical Analysis and Results

3.1 Overview

This section describes the affected environment before any construction begins within the study area (Section 3.2). It discusses the probable impacts on aquatic and amphibious species and their habitat from the proposed project (Section 3.3) and No Action Alternative (Section 3.4). For the proposed project, required permit conditions that could address the impacts are identified (Section 3.3.3). This report also identifies mitigation measures that could avoid, minimize, or reduce potential impacts (Section 3.3.4) and determines if there would be significant and unavoidable adverse impacts remaining after mitigation (Section 3.3.5).

3.2 Affected Environment

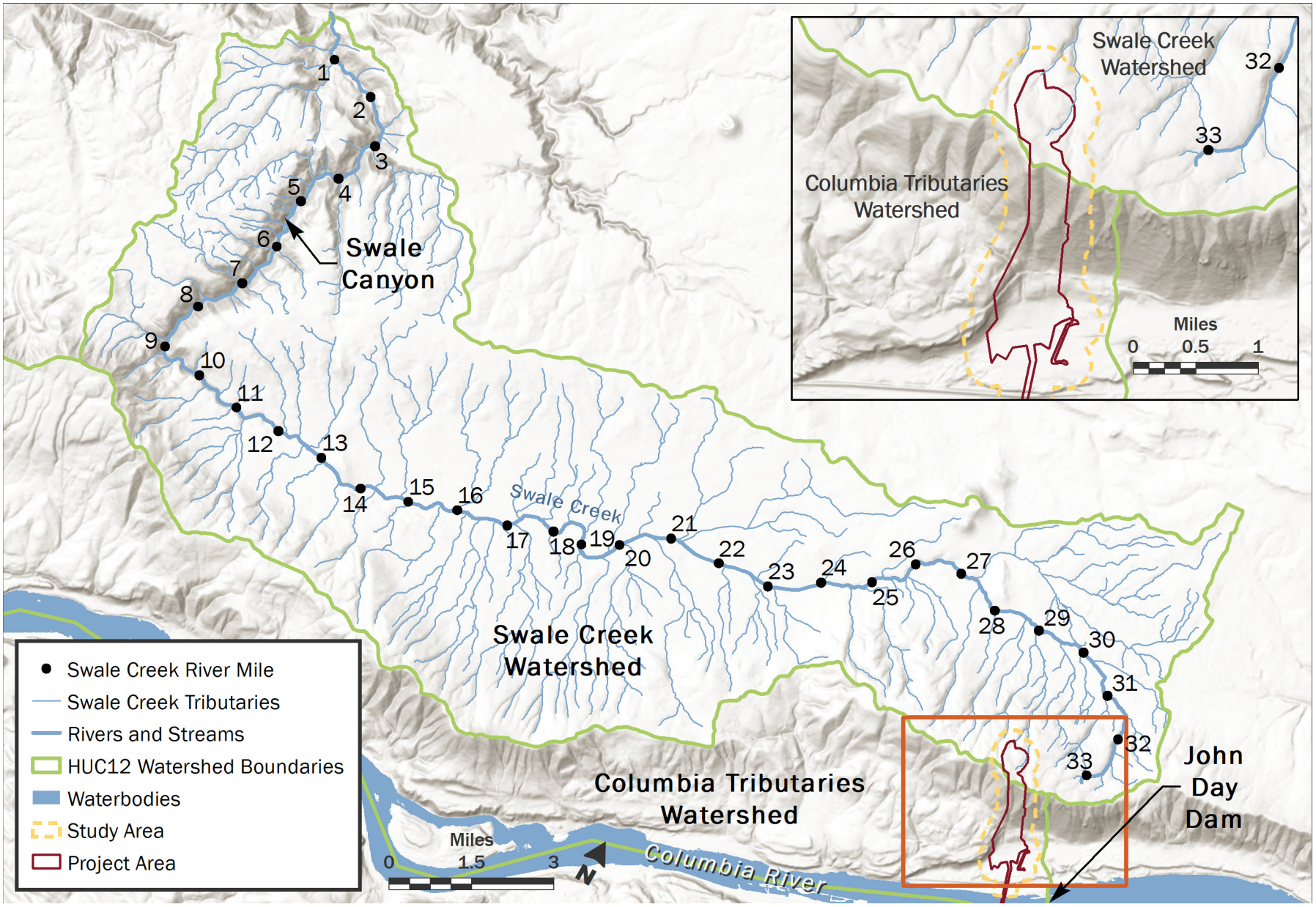
The following sections describe the types of aquatic habitats and species, including freshwater fish, amphibians, and turtles, that could be affected by the proposed project, with a focus on State Priority Habitats and Species and federally listed species. The discussion is divided into two sections, Aquatic Habitats and Aquatic Species.

3.2.1 Aquatic Habitats

The project area is located approximately 1,500 feet north of the Columbia River shoreline where the river flows westward through the eastern foothills of the Cascade Mountains. Elevations in the project area vary from 400 to 500 feet relative to North American Vertical Datum of 1988 (NAVD88) in the southern portion to a high point of approximately 2,500 feet NAVD88 in the northern portion. The climate in this region is semi-arid and temperate with moderately wet, cool winters and hot, dry summers. In nearby Goldendale, Washington, average daily high temperatures of 86°F occur in July and August with less than 0.2 inches of precipitation per month, and average daily low temperatures of 24°F occur in December and January with up to 3 inches of precipitation per month, primarily as rain (National Weather Service 2021). Land cover in the project area is scrub-shrub and canyon grassland.

The project area occurs in the Hells Gate Canyon-Columbia River subwatershed (Hydrologic Unit Code [HUC] 170701050103), and Upper Swale Creek subwatershed (HUC 170701060403) as characterized under the U.S. Geological Survey's hydrologic unit classification system (Figure 1). These subwatersheds are in the Columbia tributaries and the Swale Creek watersheds, respectively, which are encompassed by Washington Water Resource Inventory Area 30. The Columbia tributaries watershed drains to the Columbia River and the Swale Creek watershed drains to the Klickitat River. When flowing in spring and summer, the waters in the northern portion of the project area where the upper reservoir would be located are hydrologically connected to the aquatic habitat and fish community in Swale Creek to the north and west. In the southern portion of the project area where the lower reservoir would be located, perennial instream habitat occurs to the south in the mainstem middle Columbia River. The project area lies adjacent to the John Day Dam at river mile (RM) 215.6, and 23 RM upstream of the Dalles Dam, which impound the Columbia River; the river is also referred to as the Lake Umatilla pool upstream of the John Day Dam and Lake Celilo pool downstream of the John Day Dam. The surface water elevation in the Lake Umatilla pool ranges from approximately 253 to 264 feet NAVD88, whereas the Lake Celilo pool elevation ranges from approximately 151 to 156 feet NAVD88.

Figure 1
Watersheds Surrounding the Proposed Project



Source: WDNR 2021

The State of Washington Priority Habitat types that would be affected by the proposed project include instream habitat and freshwater wetlands (WDFW 2019a). Instream habitat is defined as the combination of physical, biological, and chemical processes and conditions that interact to provide functional life-history requirements for instream fish and wildlife resources. Freshwater wetlands are defined as transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water at some time during the growing season of each year.

Instream habitat and freshwater wetlands can be further subdivided by the predominant hydrologic conditions in different areas and accessibility of the habitat to aquatic animals. In this report, three primary surface water types that may be affected by the proposed project are identified: ephemeral, intermittent, and perennial (see the sidebar for definitions). The streams within the project area have been determined to be ephemeral and intermittent based on field survey observations (ERM 2021). Ponds were confirmed to be human-made stock ponds that are disconnected from other surface waters based on field observations and publicly available aerial photographs (FFP 2020b; ERM 2021). Because portions of those ponds contain emergent vegetation, they were also classified as wetlands in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS). The instream and freshwater wetland habitat features are shaped by a combination of hydrologic conditions, geophysical conditions, and human uses of the land.

Surface waters that provide aquatic habitat can be categorized based on how long water is present and flowing on the land throughout the year:

- **Ephemeral streams** have flowing water during brief periods of rain or snow-melt, typically during fall and early spring rain events in the Columbia Basin.
- **Intermittent streams** are seasonal, with flowing water only during certain times of the year based on precipitation patterns or groundwater levels, typically during the late winter and spring in the Columbia Basin.
- **Perennial streams** have flowing water year-round.

At the top of the plateau where the upper reservoir would be located, past human uses of the land appear to have been relatively low intensity, with a history of open rangeland for livestock and dryland agriculture in downslope areas of the Swale Creek watershed. Currently, gravel roads cross the upper project area within the project boundary, serving the adjacent Tuolumne Wind Project, various small-scale service buildings, and other built infrastructure. The Tuolumne Wind Project is composed of 62 wind turbines located along the plateau to the north, east, and west of the project area. Human uses within and immediately adjacent to the lower reservoir have been more intensive, including areas occupied by the former CGA smelter, which operated from 1969 through 2003 and contributed contaminants to the surrounding soil and groundwater. The former smelter was added to the Washington Department of Ecology's (Ecology's) Hazardous Sites List in 1990 and is currently undergoing cleanup. The lower project area is also crossed by Washington SR 14.

3.2.1.1 Surface Waterbodies Within the Project Boundary

The proposed project is located in two subbasins of the middle Columbia River basin (HUC 170701): Klickitat River subbasin and Middle Columbia-Hood subbasin. Project elements would be located within the following subwatersheds:

- The upper reservoir and upper temporary staging area are located on lands that drain north, then west in the 18,711-acre Upper Swale Creek subwatershed (HUC 170701060403) within the Klickitat River subbasin, a major tributary to the middle Columbia River (Figures 1 and 2a).
- The lower reservoir and associated power production infrastructure lies within the 20,355-acre Hells Gate Canyon-Columbia River subwatershed (HUC 170701050103) within the Middle

Columbia-Hood subbasin, draining a number of small, short tributaries to the middle Columbia River (Figures 1 and 2b).

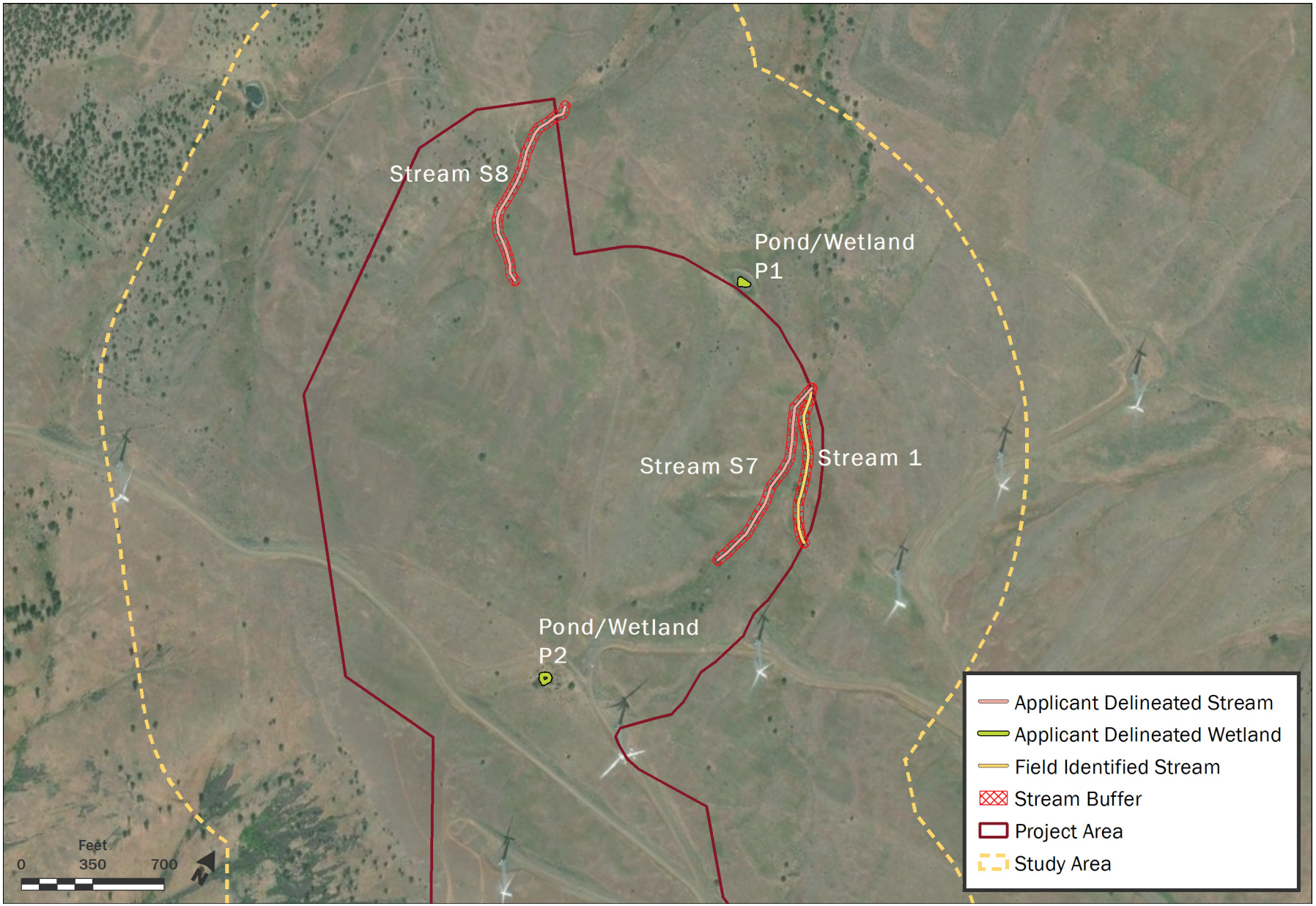
- The approximately 4 miles of the transmission right-of-way traverses the Columbia River. It is also in the Hells Gate Canyon-Columbia River subwatershed, which extends across the river and includes lands that drain to the middle Columbia River.

The USGS National Hydrography Dataset (NHD; USGS 2021) identifies nine water features within the proposed project area. These features were also identified in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) database (USFWS 2020). All of the NHD and NWI mapped surface water features within the Washington State portion of the proposed project area were assessed during a May 2019 wetland and waters delineation completed for the Applicant by ERM-West, Inc. (FFP 2020b; shown in Figures 2a and 2b). The purpose of that delineation was to determine if those mapped features exist in the field and if so, whether the characteristics and locations match the NHD and NWI datasets.

A subsequent stream flow assessment was carried out for the Applicant by ERM-West, Inc., in March 2021 to determine which waterbodies within the project area were hydrologically connected by surface flow to downstream areas and to confirm whether flow in the streams is ephemeral, intermittent, or perennial. It was determined that flow in the uppermost reach of Stream S7 (approximately the first 350 feet) was ephemeral with no surface or hyporheic flow observed. Lower reaches of Stream S7 and Stream S8 were determined to have intermittent flow, indicated by the presence of surface water at the time of the survey and presence of specific macroinvertebrate types (ERM 2021).

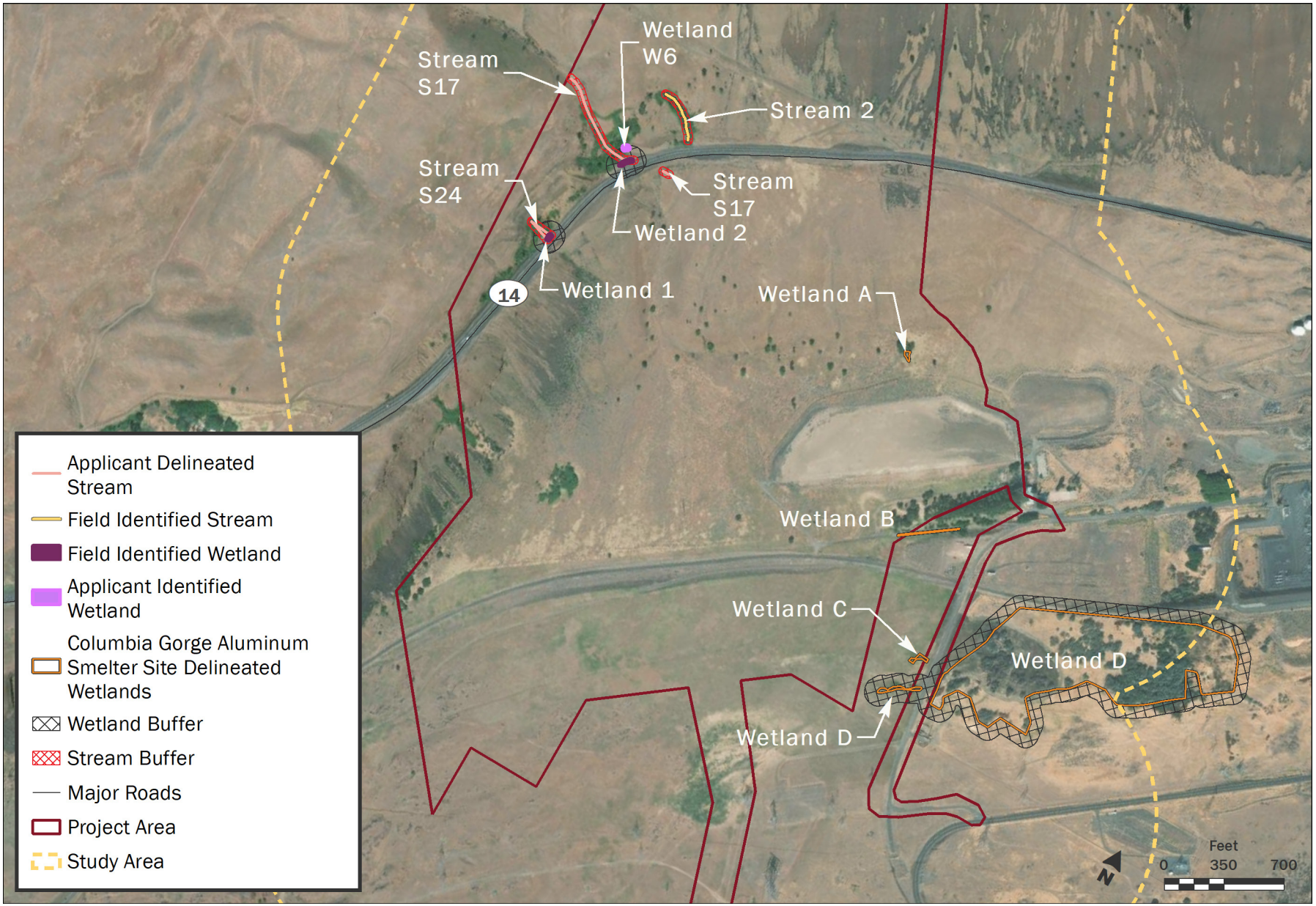
Two additional water feature(s) were identified during a reconnaissance of the project area by Anchor QEA on July 19 and 20, 2021 (Anchor QEA 2022a; Figures 2a and 2b). Those additional features include a stream assumed to be ephemeral near the upper reservoir area (Stream 1) and a second stream assumed ephemeral or intermittent adjacent to SR 14 (Stream 2). In addition, wetlands mapped in the wetland delineation prepared for the CGA smelter site were included where they coincide with the project area (Figure 2b). Features located along the proposed transmission line right-of-way (i.e., the Columbia River) were assessed using desktop methods (e.g., aerial photography and soil mapping) and were not field verified. All surface waterbodies and wetlands in the project area that were field verified are presented in Figures 2a and 2b and described in greater detail in the *Surface and Groundwater Hydrology Resource Analysis Report* (Appendix B of the EIS) and *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS).

Figure 2a
Aquatic Habitat in the Northern Portion of the Study Area (Upper Reservoir Area)



Source: FFP 2021; field knowledge gained through site visits performed by Anchor QEA and Ecology July 2021

Figure 2b
Aquatic Habitat in the Southern Portion of the Study Area (Lower Reservoir Area)



Source: FFP 2021; PGG 2013; field knowledge gained through site visits performed by Anchor QEA and Ecology July 2021

Table 3 summarizes the potential aquatic habitat features of the surface waters (streams and ponds) and wetlands that were verified to exist in the project area during the May 2019 wetland and waters delineation effort (FFP 2020b) and the July 2021 (Anchor QEA 2022a) field visit.

Table 3
Surface Waters and Wetlands in the Project Area

WATERBODY NAME	TYPE	APPROXIMATE DIMENSIONS	SUBSTRATE AND RIPARIAN VEGETATION TYPES	EVIDENCE OF SURFACE WATER	SOURCE
Stream S7[1]	Intermittent stream with ephemeral upstream extent	16 to 24 inches wide, 1 to 3 inches deep, 995 feet within project area	Small cobbles, gravels, and fines; grasses and herbaceous vegetation	Algal matting on substrate	FFP 2020b
Stream S8[1]	Intermittent stream	12 to 24 inches wide, 1 to 3 inches deep, 990 feet within project area	Small cobbles, gravels, and fines; grasses and herbaceous vegetation	Pockets of standing water; algal matting on substrate	FFP 2020b
Stream S17[1]	Intermittent stream	24 inches wide, 1 to 3 inches deep, no downstream connections	Mud, fine gravels; shrubs, grasses, and herbaceous vegetation	Flowing water to culvert; possible subsurface outflow	FFP 2020b
Stream S24	Groundwater seep to drainage ditch	Not reported	Substrate not reported (excavated hillside); shrubs	Groundwater seep with flowing water to ditch and culvert; possible subsurface outflow	FFP 2020b, Anchor QEA 2022a
Stream 1	Ephemeral stream	8 to 12 inches wide, 1 to 3 inches deep, 773 feet long	Small cobbles, gravels, and fines; grasses and herbaceous vegetation	Algal matting on substrate	Anchor QEA 2022a
Stream 2	Intermittent stream	24 inches wide, 1 to 3 inches deep, 316 feet long	Mud, fine gravels; shrubs, grasses, and herbaceous vegetation	Flowing water indicated by debris sorting, wracking	Anchor QEA 2022a
Wetland W6	Wetland	0.003 acre	Herbaceous wetland	PEM1C	FFP 2020b
Pond/Wetland P1[1]	Artificial pond	0.2 acre (0.001 acre within project area), 1 to 2 feet deep, no outlet	Some emergent vegetation	PUBFx Standing water; partially dries up annually	FFP 2020b

WATERBODY NAME	TYPE	APPROXIMATE DIMENSIONS	SUBSTRATE AND RIPARIAN VEGETATION TYPES	EVIDENCE OF SURFACE WATER	SOURCE
Pond/Wetland P2	Artificial pond	0.03 acre, unknown depth, no outlet	No emergent vegetation	PUBCx Standing water; dries up annually	FFP 2020b
Wetland A	Wetland	0.028 acre	Herbaceous wetland	PEM1C	PGG 2013
Wetland B[1]	Wetland	0.051 acre	Scrub-shrub wetland	PSS1C	PGG 2013
Wetland C[1]	Wetland	0.049 acre	Herbaceous wetland	PEM1C	PGG 2013
Wetland D[1]	Wetland	13.784 acre	Scrub-shrub wetland	PSS1C	PGG 2013
Wetland 1	Wetland	0.020 acre	Scrub-shrub/ herbaceous wetland	PSS/PEM1C	Anchor QEA 2022a
Wetland 2	Wetland	0.037 acre	Scrub-shrub/ herbaceous wetland	PSS/PEM1C	Anchor QEA 2022a

Notes:
1. Extends outside project area.

Cowardin system wetland codes:

PEM1C: palustrine emergent, persistent, seasonally flooded
PSS1C: palustrine scrub-shrub, broad-leaved deciduous, seasonally flooded
PSS/PEM1C: palustrine scrub-shrub/palustrine emergent, persistent, seasonally flooded
PUBCx: palustrine, unconsolidated bottom, seasonally flooded, excavated
PUBFx: palustrine, unconsolidated bottom, semipermanently flooded, excavated

Due to the ephemeral or intermittent and disconnected nature of the waterbodies and wetlands in the project area, they do not likely provide any habitat for fish or turtles. However, they could provide habitat that supports amphibians. Amphibians may migrate among waterbodies during wetter seasons and may become resident in waterbodies that are isolated within the more arid landscape. Amphibians or other semi-aquatic species have not been surveyed, nor have their occurrences been recorded in the Swale Creek watershed in State of Washington databases (WDFW 2021). The amphibian species assemblage that may use the habitats may include species that commonly occur in the Columbia Basin and eastern foothills of the Cascade Mountains, including long-toed salamander (*Ambystoma macrodactylum*), Woodhouse's toad (*Anaxyrus woodhousii)*, Pacific tree frog (*Pseudacris regilla)*, Great Basin spadefoot (*Scaphiopus intermontanus*), and American bullfrog (*Lithobates catesbeianus*), described in greater detail in Section 3.2.2.1 and listed in Attachment 1, Table 1-3.

3.2.1.2 Swale Creek

Four of the waterbodies identified in or near the proposed upper reservoir area (Stream S7, Stream S8, Stream 1, Pond/Wetland P1, and Pond/Wetland P2) drain to Swale Creek, a primary tributary to the Klickitat River. Stream flow patterns in Swale Creek are unique owing to the local geology. Upstream of RM 3.1, flow in Swale Creek is intermittent. The upper and lower portions of Swale Creek are hydrologically connected by surface flows in winter and spring when groundwater levels are highest,

becoming hydrologically isolated in April or May through the summer and fall due to seasonal declines in groundwater levels. Continuous low volume flows of 0.25 to 0.5 cubic feet per second are supplied to the lower reaches of Swale Creek in summer and fall by local seeps and springs (WPN and Aspect 2005; Aspect 2007). Flows are likely similar to those observed historically and unlike other areas of the Columbia Basin where surface waters are diverted for irrigation, land uses do not appear to have greatly affected water quantity in the creek (WPN and Aspect 2005).

Swale Creek is currently listed on Ecology's 303(d) list because of temperature impairment (Ecology 2021). A water quality study completed between June and December 2003 showed exceedances of the temperature criterion of 18°C at all stations monitored (WPN and Aspect 2005). Other reports in Ecology's water quality assessments (Ecology 2021) showed exceedances of temperature criteria for the protection of salmon and steelhead (Supplemental Spawning and Incubation Criterion, Ecology 2011) commonly occur over several weeks during the spring and summer (criteria are 13°C from February 15 to June 1 during the steelhead spawning period, and 16°C throughout the year).

The lowest reaches of Swale Creek have been identified as designated critical habitat for the Mid-Columbia steelhead distinct population segment (DPS) within the Klickitat basin by NOAA Fisheries (Federal Register 70.52630) and included in a recovery plan for the Klickitat River (NMFS 2009).

From its confluence with the Klickitat River upstream to RM 3.1, Swale Creek has the potential to provide viable habitat for salmon, steelhead, and resident rainbow trout with channel restoration and enhancement to perennial flows (Inter-Fluve 2002). This includes winter-run and summer-run steelhead spawning and juvenile rearing, juvenile spring Chinook salmon rearing, and resident rainbow trout spawning, rearing, and resident migrations (NMFS 2009). The Mid-Columbia Steelhead Recovery plan (NMFS 2009) identifies the area of Swale Creek below RM 12.22 as a minor spawning area. Minor spawning areas are defined as a "contiguous production areas" capable of supporting at least 50 but less than 500 spawners. However, that plan notes that temperature and low stream flow are likely limiting factors to production. Because Upper Swale Creek becomes isolated in summer, movement of juvenile fish into the Klickitat River is restricted and significant mortality likely occurs when temperatures exceed lethal temperatures of approximately 20°C.

Habitat for steelhead, resident rainbow trout, and resident coastal cutthroat has been identified in the lowest reaches of Swale Creek by Klickitat County (Inter-Fluve 2002), NMFS (2009), and WDFW (2019b, 2021). A broader fish survey has not been performed in Swale Creek but is likely to reflect common resident fish community assemblages in low-order streams of the eastern foothills of the Cascades (described further in the following section). The fish community is likely to include longnose dace (*Rhinichthys cataractae*), speckled dace (*R. osculus*), redside shiner (*Richardsonius balteatus*), peamouth (*Mylocheilus caurinus*), chiselmouth (*Acrocheilus alutaceus*), Northern pikeminnow (*Ptychocheilus oregonensis*), bridgelip sucker (*Catostomus columbianus*), largescale sucker (*C. macrocheilus*), mountain sucker (*C. platyrhynchus*), and torrent sculpin (*Cottus rhotheus*) (Wydoski and Whitney 2003). Invasive species that favor warmer water may also occur including sunfish (*Lepomis* spp.), largemouth bass (*Micropterus salmoides*), and bullhead (*Ameiurus* spp.). Fish distribution is limited by lack of hydrologic connectivity within Swale Creek throughout the year.

3.2.1.3 Columbia River

The Columbia River is to the south and downslope of the proposed lower reservoir and power generation infrastructure. The flows and channel form of this reach are highly modified (compared to historic conditions) by the Federal Columbia River Power System, in particular the John Day Dam, which is immediately adjacent to the proposed project. Due to the semi-arid climate and existing infrastructure of

the former CGA facility and SR 14, none of the waterbodies identified in the project area appear to drain directly to the Columbia River. The project would use water withdrawn from the Lake Umatilla pool of the Columbia River via an existing intake structure located approximately 1.2 miles upstream of the John Day Dam.

Ecology's current U.S. Environmental Protection Agency-approved Water Quality Assessment identifies the Lake Umatilla pool of the Columbia River upstream of John Day Dam as impaired (Category 5) for water temperature and pesticides and polychlorinated biphenyls (PCBs) in tissue (Ecology 2021). The proposed project's electrical transmission line alignment crosses the Lake Celilo pool of the Columbia River downstream of the John Day Dam, which is listed as Category 5 for temperature (Ecology 2021).

Shoreline conditions near the project boundary and below John Day Dam are highly modified by the dam facility and infrastructure associated with power generation and the former CGA smelter. Little to no riparian vegetation is present, banks are typically armored with large cobble or boulders, and channel complexity is lacking. Shoreline habitat is typically limited to a narrow band of shallow-water habitat along the river's high water mark.

What is known about the fish community in this reach of the Columbia River comes largely from monitoring for high value and protected anadromous species that migrate through John Day Dam to reach upstream tributary subbasins. Such species include salmon, steelhead, and Pacific lamprey (*Entosphenus tridentata*). American shad are an abundant invasive anadromous species that has invaded the mainstem Columbia River up to approximately Priest Rapids Dam (RM 397). Assumptions can be made about the presence of resident native and non-native fish species in this reach of the Columbia River based on known and assumed distributions (Wydoski and Whitney 2003; Dauble 2009) and observations made in surveys in other nearby reaches (Ward 2001).

3.2.1.4 Ecological Functions of Aquatic Habitat in Semi-Arid Regions

In semi-arid regions, aquatic habitats and associated riparian vegetation develop along elevation contours and gradients determined by geomorphic erosional and depositional formations. Disconnected or seasonally flowing streams and waterbodies are characteristic of the Columbia Plateau region. In many areas, including the Swale Creek watershed, dendritic drainage patterns of first-order ephemeral/intermittent watercourses join downstream to form larger channels and riparian corridors. In comparison to wetter environments, water is present on the land for shorter durations and low levels of precipitation support lower vegetation biomass in riparian areas.

The following unique ecological functions are provided by low-order ephemeral and intermittent surface waters with intact riparian corridors in the Columbia Plateau region:

- Provision of fish and wildlife habitat, oftentimes temporary, especially for reproduction or early rearing life stages in the spring
- Support of a greater diversity and density of plant and animal species than surrounding upland areas
- Regulation of water temperature when shaded by reed-beds or riparian shrubs and trees
- Provision of erosion control by the roots of aquatic and riparian vegetation that stabilize soils that are typically friable, with low moisture content, and easily transported by wind
- Recharge of groundwater via infiltration, which may support seeps or cool-water upwellings in downgradient areas

- Provision of organic inputs (e.g., leaves, pollen, and terrestrial insects) as a source of nutrients that support aquatic food webs in close proximity, or distant downstream areas when seasonally connected

When compounded across the landscape, these ecological functions of low-order streams support fish and aquatic habitats in larger receiving streams. Development of these areas can lead to long-term degradation of aquatic habitat. Aquatic and riparian areas in semi-arid climates are more fragile than in wetter climates, taking longer to recover from disturbance due to fewer hydrologic connections and more erodible soils.

The flowing surface waterbodies located within the project area (Streams 1, 2, S7, S8, and S17) are first-order streams that are seasonally disconnected from larger streams and rivers. As a result, these streams do not provide habitat for fish directly. These streams would provide some ecological function to downstream fish habitat in Swale Creek due to seasonal connections and possibly in areas of groundwater infiltration.

The still-water habitat located in the project area primarily occurs in two ponds (Pond/Wetland P1 and Pond/Wetland P2) during wet seasons. The two ponds are artificially created, likely for watering livestock, small in scale (less than 0.5 acre total), disconnected from flowing surface water, and are seasonally dry. For these reasons, the pond habitat is not likely to support turtles.

All of the stream, pond, and wetlands identified in the project area are likely to provide adequate habitat for the amphibian species predicted to occur in the Columbia Plateau region (listed in Section 3.2.2). Amphibians may migrate among waterbodies during wetter seasons and may become resident in waterbodies that are isolated within the more arid landscape.

3.2.2 Aquatic Species

Wildlife surveys for amphibians, turtles, or other aquatic species have not occurred in the project area. The potential for these aquatic species to exist in the project area has been assessed based on the habitat types in the project area, known distributions of some species, and habitat preferences for given species. Greater detail is given for those species more likely to occur in the project area and state-listed species.

3.2.2.1 Amphibians and Turtles

Amphibian species that may occur in the project area are listed in Table 1-3 in Attachment 1, based on the habitat types that exist in the project area and each species' predicted distribution. Unless noted, assumptions about the presence of amphibian species are based on Washington Gap Analysis Predicted Distribution Maps, which use land cover classification, species' range limits and known distributions, habitat associations, literature review, and expert opinion to predict the potential ranges for vertebrate species in Washington at a broad scale (Dvornich et al. 1997). In general, the Gap Analysis predicts core habitat (habitat that is relatively intact and sufficiently large to host several individuals) or marginal habitat (habitat that is patchy and lacks connection to other predicted habitats) for amphibians in the project area.

Several amphibians that could occur in the study area rely on still water such as ponds or slow-moving streams to lay eggs. These include the long-toed salamander, Pacific treefrog, Woodhouse's toad, western toad (*Anaxyrus boreas*), and the invasive American bullfrog. In contrast, the Great Basin spadefoot is a toad species that can be found in dry areas such as grasslands and prairies. It could also potentially occur in the project area. During the field assessments, unidentified tadpoles were observed in

Pond/Wetland P2 in the upper reservoir area (FFP 2020b) and unidentified adult frogs or toads were observed in the vicinity of Stream S7.

Long-toed salamanders are found throughout Washington State, including in human-disturbed and urban areas. Within grassland or shrub-steppe ecological regions, they can be found in moist areas, converging on aquatic habitats during breeding season. Long-toed salamander live mostly underground in rodent burrows, hibernating in groups in winter. The breeding season varies between January and July. Core and marginal habitat for the long-toed salamander is predicted to occur in the project area (Dvornich et al. 1997).

Pacific treefrogs are associated with similar aquatic habitats as long-toed salamanders, breeding from November to July in permanent or non-permanent water sources with tadpoles requiring up to 3 months to complete metamorphosis. Core habitat for the Pacific treefrogs is predicted to occur in the project area (Dvornich et al. 1997).

Little is known about Woodhouse's toad in Washington, though it is known to live in variety of habitats along the Columbia River within the more arid Columbia Basin ecological region including sagebrush, prairie, and riparian areas. It uses self-dug or rodent burrows in the ground and prefers wetlands and similar irrigated microhabitats as breeding sites. Breeding occurs from March to July. Core habitat for Woodhouse's toad is predicted to occur in the project area (Dvornich et al. 1997).

Western toad occur mainly in the southeastern portion of Washington State, found on the land in woodlands, meadows, and mountainous wetlands. They dig shallow burrows in low ground or shelter under rocks or logs. Breeding season is February to April with tadpoles requiring up to 2 months to complete metamorphosis. Habitat for the western toad in the project area is predicted to be marginal and patchy.

The Great Basin spadefoot relies mainly on small ephemeral pools across the arid landscape and are only found in water during the breeding season in April to June after heavy spring or summer rain. They have the fastest metamorphosis rate of any North American frog or toad, with tadpoles completing metamorphosis in about 1 week. Core and marginal habitat for the Great Basin spadefoot is predicted to occur in the project area (Dvornich et al. 1997).

The Oregon spotted frog (*Rana pretiosa*) is a federally listed threatened species and state-listed endangered species that has been eliminated from the majority of its historic range. One of the only two known existing populations in Washington State occurs in mountainous areas of Klickitat County. However, based on its typical habitat preference for still-water habitat in mature hardwood and conifer forests, it is unlikely to occur in or near the project area.

The American bullfrog is an introduced species in Washington State and the largest frog in North America, originally found only east of the Rocky Mountains. They are known to compete with and prey directly on native amphibians. They are commonly found in lakes, ponds, and wetlands in the water or on the shoreline. Breeding season is spring and summer, but tadpoles take 2 years to complete metamorphosis.

Woodhouse's toad, western toad, Oregon spotted frog, and western pond turtle are included in the list of Washington's Species of Greatest Conservation Need (WDFW 2015).

The western pond turtle (*Actinemys marmorata*) is also a state-listed endangered species that can occur in Klickitat County. USFWS has made a 90-day finding that listing western pond turtle may be warranted. Due to the disconnected and ephemeral/intermittent nature of the waterbodies in the project area, the western pond turtle is unlikely to occur in the project area.

3.2.2.2 Fish

Numerous fish species occur in the mainstem middle Columbia River and its tributaries. Many species move through the mainstem to access habitat in tributaries upstream, and others are resident in the riverine habitat below John Day Dam, or the more lake-type reservoir pool of Lake Umatilla upstream of the dam.

Characteristics of the fish species likely to occur in the middle Columbia River and Swale Creek are summarized below. In particular, key information about the life stages, habitat preferences, and seasonal abundance of those species is provided with a focus on State Priority Species in the Columbia River and Swale Creek. A complete list of fish species that could occur near the project area is provided in Attachment 1, Tables 1-1 and 1-2.

3.2.2.2.1 Migratory Species

Salmon, Steelhead, and Bull Trout

Historically, salmon spawning and rearing occurred throughout the mainstem reaches of the middle and upper Columbia River. Salmon and trout generally require riverine conditions for spawning and embryo incubation with coarse gravels for building redds, and cold, low turbidity water flowing through the redds at relatively high velocities to oxygenate and sustain the incubating embryos. After emerging from gravels in the spring and early summer, salmonid fry typically rear in slower-velocity microhabitats that provide forage and cover from overhanging vegetation, woody material, and riverbanks, often taking advantage of smaller side channels or off-channel habitat in the floodplain that may be seasonally wet.

Presently, the majority of accessible habitat in the mainstem Columbia River has been converted to a series of deep, low-velocity pools impounded by hydroelectric dams with little habitat diversity. Anadromous Chinook salmon, sockeye salmon (*O. nerka*), coho salmon (*O. kisutch*), steelhead, and bull trout (*Salvelinus confluentus*) from major upstream tributaries use the middle Columbia River as a migratory corridor, passing through the reach adjacent to the project and through the John Day Dam on their seaward migration as juveniles and return spawning migrations as adults. These include populations from numerous tributary rivers, including large numbers from the Umatilla and Walla Walla rivers, Snake River and subbasin tributaries, Yakima River, and the Wenatchee, Entiat, Methow and Okanogan rivers that collectively make up the upper Columbia tributaries. Chum salmon (*O. keta*) and pink salmon (*O. gorbuscha*) rarely occur upstream of Bonneville Dam (RM 146) in the middle Columbia River.

Juvenile salmon and steelhead smolts migrate through the middle Columbia River and John Day Dam between April and August. Peak abundance (run timing) through John Day Dam depends on the species and stock, but smolts that outmigrate as yearlings (age 1 year), which include Chinook salmon, coho salmon, sockeye salmon, and steelhead, tend to be most abundant in May, whereas subyearling (aged less than 1 year) Chinook salmon tend to pass through later in late June and early July (FPC 2021a). Migration rate through the middle Columbia River is dependent on seasonal flows and fish size; however, the trend is for salmon and steelhead smolts to pass through the middle Columbia River dams and reservoirs relatively rapidly, travelling from McNary Dam to Bonneville Dam, a distance of 146 RM, in approximately 5 days (FPC 2021a).

Bull trout are considered extirpated from the mainstem Columbia River, and no adults have been observed migrating through John Day Dam since recordkeeping started in 1968. The mainstem Columbia River remains a USFWS-designated critical habitat for middle and upper Columbia River bull trout, providing potential foraging, migrating, and overwintering habitat for juveniles and subadults that originate from colder tributaries and undertake a fluvial or adfluvial life histories (forms that undertake freshwater migrations from tributaries to the mainstem Columbia River).

The Klickitat River subbasin is an important area of salmon and steelhead production, and the lower reaches of Swale Creek are accessible to anadromous fish. Habitat factors that likely limit steelhead production in the Klickitat River subbasin include low summer flows and high summer water temperatures that may occur naturally but may also have been exacerbated by human changes to the landscape (NOAA 2009). Winter steelhead are present and summer steelhead spawn in Swale Creek up to approximately the crossing with Harms Road at about RM 27 (WDFW and NWIFC 2018). Fisheries data suggest that juvenile steelhead may rear in lower pools of lower Swale Creek for 1 to 3 years before moving downstream to the Klickitat and Columbia Rivers (Yakama Nation 2021). In the lowest 3 to 4 RM of Swale Creek, spring and fall Chinook salmon are documented to be present and coho salmon spawning has been documented during periods of perennial flow (WDFW and NWIFC 2018).

Chinook salmon, chum salmon, sockeye salmon, steelhead, and bull trout are Candidates on the State Priority Species List (WDFW 2019a). The mainstem middle Columbia River adjacent to the project area is used as a migration corridor and included as critical habitat for a number of salmon Evolutionarily Significant Units (ESUs) and trout DPSs listed under the Federal ESA (58 FR 68543, 64 FR 57399, 70 FR 52629, 75 FR 63898). These include the following populations:

- Upper Columbia River ESU spring Chinook salmon: Endangered; 1999 (64 FR 14308), 2005 (70 FR 37159), updated 2014 (79 FR 20802)
- Snake River spring/summer-run ESU Chinook salmon: Threatened; 1992 (57 FR 14653), 2005 (70 FR 37159), updated 2014 (79 FR 20802)
- Snake River fall-run ESU Chinook salmon: Threatened; 1992 (57 FR 14653), 2005 (70 FR 37159), updated 2014 (79 FR 20802)
- Middle Columbia River DPS steelhead: Threatened; 1999 (64 FR 14517), 2006 (71 FR 833), updated 2014 (79 FR 20802)
- Upper Columbia River DPS steelhead: Threatened; 1997 (62 FR 43937); reclassified to threatened 2006 (71 FR 833) and 2009 (74 FR 42605); updated 2014 (79 FR 20802)
- Snake River DPS steelhead: Threatened; 1997 (62 FR 43937), 2006 (71 FR 833), updated 2014 (79 FR 20802)
- Snake River ESU sockeye salmon: Endangered; 1991 (56 FR 58619), 2005 (70 FR 37159), updated 2014 (79 FR 20802)
- Columbia River DPS bull trout: Threatened; 64 FR 58910 1999)

Swale Creek is included as critical habitat for the Middle Columbia River DPS of Steelhead up to their known spawning extent at approximately RM 27.

The Columbia River is also essential fish habitat (EFH) for Chinook and coho salmon. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (Federal Register 67.2343). EFH is protected for species managed for marine fisheries.

Bull trout and steelhead are State Candidate species for listing, and bull trout and Mid-Columbia steelhead are listed as Species of Greatest Conservation Need in the Washington State Wildlife Action Plan (WDFW 2015). Salmon and trout are included in the State Priority Species List to protect vulnerable aggregations and as species of recreational, commercial, and/or Tribal importance.

Lamprey

The Pacific lamprey is another important anadromous species of the Columbia River basin that can migrate upstream many hundreds of miles to complete the freshwater phase of its life cycle in tributary streams to large rivers in Oregon, Washington, Idaho, and British Columbia. After hatching, larvae

(ammocoetes) drift downstream and burrow in soft substrate in low gradient, backwater habitats and quiet eddies of cold-water streams to filter feed and rear for up to 8 years (Torgerson and Close 2004; Moser et al. 2015). After metamorphosing, the juveniles (macrophthalmia) begin downstream migration, which usually occurs between late fall and spring. Lamprey mature into adults in the ocean, and spend several years in the marine environment. Adults migrate back to freshwater between February and June and may spend up to a year in the freshwater habitat before spawning between March and July. Lamprey are largely nocturnal and generally migrate mid-channel in the lower part of the water column as they stop frequently to attach to substrate. Activity is usually restricted to darkness (Moser et al. 2015). The decline of Pacific lamprey populations in the Columbia River basin has been caused by several factors including poor passage and predation at mainstem hydroelectric dams; reduced flows, dewatering, and high water temperature in tributary spawning areas; and an overall reduction in the quality and quantity of habitat in the basin (Close 2000). Between 1,000 to 27,000 adult Pacific lamprey have been observed passing over John Day Dam annually since 1999.

Another less common lamprey species, the river lamprey, also migrate to the ocean as they transform from the larval stage into juveniles, and later into adults. Detailed distribution records are not available for river lamprey, although Wydoski and Whitney (2003) show their distribution as far inland as the upper reaches of the Yakima River. No river lamprey have been observed in the Columbia Basin since 1980, and the species may have been extirpated from the drainage (Lindsey et al. 2016).

Pacific lamprey and river lamprey are included as a Species of Greatest Conservation Need in the Washington State Wildlife Action Plan (WDFW 2015) and as Species of Tribal Importance (WDFW 2019a). River lamprey are listed as a State Candidate species (WDFW 2019a). Both Pacific and river lamprey are listed by USFWS as Federal Species of Concern (USFWS 2010, 2018).

American Shad

The American shad (*Alosa sapidissima*) is by far the most abundant invasive fish species in the Columbia River, having increased in numbers dramatically since the mid-1970s. Adult American shad now constitute the largest single run of any anadromous fish in the Columbia River, including wild and hatchery-origin salmon (Hasselman et al. 2012). Adult American shad typically number in the hundreds of thousands to millions at John Day Dam in late June and early July (FPC 2021b). Spawning occurs in open water of rivers. After hatching, fry remain in the river for their first summer of life (Wydoski and Whitney 2003). Unlike salmon that die after spawning, shad may return to the ocean soon after spawning and survive to spawn in successive years.

White Sturgeon

White sturgeon (*Acipenser transmontanus*) are the largest fish species in the Columbia River basin, reaching up to 12 feet in length. White sturgeon are well documented in Lake Umatilla, the pool impounded by John Day Dam, and downstream of the project in the Lake Celilo pool. During spawning, eggs are broadcast into the water column in relatively swift portions of the river and may be dispersed downstream before settling into river substrate. Larvae hatch approximately 1 week later and grow rapidly. All life stages prefer relatively deep water (39 to 72 feet) (Wydoski and Whitney 2003).

White sturgeon are not state or federally listed; however, they are included in the State List of Species of Greatest Conservation Need (WDFW 2015) and are included in the State Priority Species List (WDFW 2019a) to protect vulnerable aggregations and they are a species of recreational, commercial, and Tribal importance. A recreational catch and release fishery exists in the lower and middle Columbia River.

3.2.2.2.2 Resident Fish Species

An abundant resident fish population occurs in the middle Columbia River and its tributaries. That population is composed of species that spend their entire life cycle in that portion of the river—in contrast to anadromous salmonids and lamprey that migrate long distances and only occur in the study area during portions of their life-cycles (Dauble 2009).

Rainbow Trout, Cutthroat Trout, and Mountain Whitefish

Similar to the anadromous salmon and steelhead, resident rainbow and cutthroat trout also prefer clean, cold-water habitat, which is especially key for spawning. Adults require enough water depth and flow to provide unimpeded access to spawning areas. Spawning adults require specific flow conditions, cover, and access to spawning gravels to deposit eggs. Rainbow trout are a candidate species for state endangered species listing.

Mountain whitefish (*Prosopium williamsoni*) are a common native species in both riverine and reservoir pools in the Columbia River basin. Relatively little information on juvenile mountain whitefish abundance and activity exists for the middle Columbia River; however, they are likely to be common near the project area and in Swale Creek. In their first year, young fish rear in spring through the summer in shallow water, moving into deeper water as they grow (Wydoski and Whitney 2003; Dauble 2009). In summer, adult mountain whitefish tend to occur in groups in pools and in cooler locations of upstream tributaries.

Freshwater Sculpins, Minnows, and Suckers

Sculpins are benthic species widely distributed in Washington rivers. Adult sculpins prefer mainstem, medium or small rivers with gravel or cobble substrate. The species also commonly use side channels and tolerate warm or cool water. Generally, sculpins are not highly mobile, with a range of a few hundred meters or less. Sculpin occupy the river environment year-round. Juveniles prefer shoreline, mid-water environments between March and July, while moving to the bottom of shallow channels as adults (Wydoski and Whitney 2003). Prickly sculpin and torrent sculpin (*Cottus asper* and *C. rhotheus*) occupy the middle Columbia River (Wydoski and Whitney 2003; Dauble 2009).

Redside shiner, longnose dace, leopard dace (*Rhinichthys falcatus*), speckled dace, northern pikeminnow, peamouth, and chiselmouth are minnow species common and abundant in the middle Columbia River (Wydoski and Whitney 2003; Dauble 2009). Redside shiner and the dace species are small-bodied fishes that grow to approximately 6 inches as adults. Juveniles and most adult minnows prefer shallow nearshore and shoreline environments, with low velocities during the warmer months, while retreating to deeper water from October through April. Northern pikeminnow, peamouth, and chiselmouth are relatively fast growing and long lived, growing up to 12 inches and occupying deeper water. Adult northern pikeminnow are aggressive predators and consume large numbers of juvenile salmonids in the Columbia River system.

Largescale suckers (*Catostomus macrocheilus*) are another abundant species in the middle Columbia River. Adult largescale suckers tolerate high water velocities and prefer deeper water habitats during the day, moving to shallower habitat at night. Juveniles prefer shallower water, pools, and backwaters. Suckers prefer gravel substrate and riffle habitat for spawning, which occurs in the spring. Adult largescale suckers undertake spawning migrations in spring, (Wydoski and Whitney 2003; Gadomski and Wagner 2009). Longnose, bridgelip, and mountain suckers (*C. catostomus, C. columbianus*, and *C. latyrhynchus*) also occur in the middle Columbia River but relative abundance for these species is unknown.

Leopard dace and mountain sucker are listed by WDFW as Species of Greatest Conservation Need (WDFW 2015) and as State Candidate species (WDFW 2019a).

Non-Native Resident Fish Species

One major group of non-native fish species that have been introduced to the Columbia River basin are centrarchids, or fish from the sunfish family including smallmouth bass (*Micropterus dolomieu*). Bass are opportunistic predators and large individuals can prey heavily on juvenile salmon where their distributions overlap (Wydoski and Whitney 2003). Other abundant invasive fish species include walleye (*Sander vitreus*), crappie (*Pomoxis* spp.), yellow perch (*Perca flavescens*), and members of the carp or bullhead family.

A complete list of non-native fish species observed in the middle Columbia River is in Attachment 1, Table 1-2.

Uncommon Resident Species

Native species that are known to occur in adjacent reaches or tributaries to the middle Columbia River (such as the lower Yakima and lower Snake rivers) include western river lamprey, burbot (*Lota lota*), Umatilla dace (*Rhinichthys umatilla*), Paiute sculpin (*Cottus beldingi;* a State Candidate species for listing), reticulate sculpin (*C. perplexus*), mottled sculpin (*C. bairdi*), threespine stickleback (*Gasterosteus aculeatus*), longnose sucker (*Catostomus catostomus*), and sand roller (*Percopsis transmontana*). Non-native species that may rarely occur include, channel catfish (*Ictalurus punctatus*), western mosquitofish (*Gambusia affinis*), tench (*Tinca tinca*), and largemouth bass.

3.3 Proposed Project

The Applicant has proposed to build a pumped-water energy storage system that releases water from an upper reservoir downhill to a lower reservoir to generate energy (Figures 3a and 3b). The upper reservoir would be located in an upland area that drains to the north into the Swale Creek subdrainage. The lower reservoir and associated powerplant infrastructure would be located near the Columbia River. The lower reservoir area includes lands that were previously used as support areas for the former CGA smelter. A proposed aboveground transmission line would connect from a proposed substation near the lower reservoir to an existing, available circuit on Bonneville Power Administration transmission line structures within an existing utility right-of-way. The existing transmission lines aerially cross the Columbia River to the existing Bonneville Power Administration John Day Substation in Oregon.

Construction of the proposed project would require an initial fill of the pumped storage system (lower reservoir plus conveyance piping) using water from the Columbia River under an existing water right and using an existing water intake that is not in direct connection with surface water. The Public Utility District No. 1 of Klickitat County (KPUD) industrial water conveyance system includes intake and pumping facilities off-stream from the Columbia River. The pump station is adjacent to the Lake Umatilla portion of the Columbia River just upstream of John Day Dam. The existing intake to the pump station draws water from the bottom of an infiltration gallery that consists of a 28-foot-deep by 93-foot-wide excavated channel filled with clean gravel that prevents fish from becoming entrained. Water is supplied to the infiltration gallery from an intake pool that is physically separated from the main channel of the Columbia River by a rock and gravel-filled embankment to support the BNSF railroad. Water is drawn from the Columbia River to the intake pond, and then into the infiltration gallery, by seepage through the rock embankment (Rye Development 2021). Periodic additions of make-up water during operations would also be required to offset water losses due to evaporation and leakage. Water for construction and operation of the proposed project would be purchased from KPUD. The existing KPUD water right fully covers the proposed project's total and consumptive water needs and as such would not result in new waters being appropriated from the Columbia River (Aspect 2022).

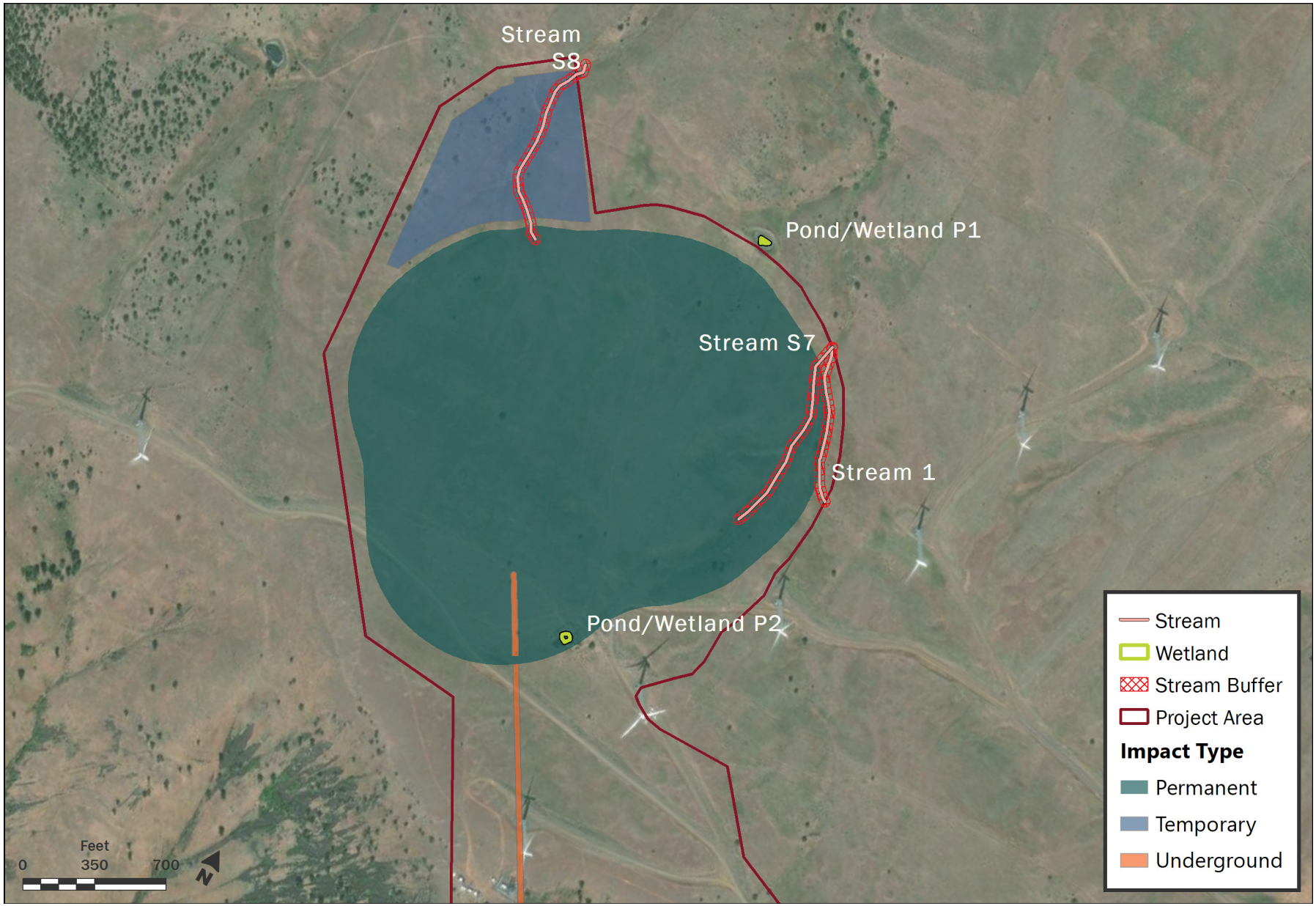
Completing the earthwork construction elements of the proposed project would create temporary noise and ground-borne vibrations. Noise and vibration would primarily be the result of activities such as excavation, blasting. tunneling, aggregate processing and concrete batch plants, reservoir embankment placement/compaction, and truck traffic. Temporary increased noise and vibration may affect aquatic species. Additional details on noise and vibration are provided in the *Environmental Health Resource Analysis Report* (Appendix I of the EIS; Aspect and Anchor QEA 2022) and the *Terrestrial Species and Habitats Resource Analysis Report* (Appendix G of the EIS; Anchor QEA 2022b). Some construction activities would create continuous noise, whereas noise associated other construction activities, such as blasting, would be intermittent.

During construction, stormwater generated in the project area would be managed in accordance with a National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit. During operations of the proposed project, stormwater generated from the project area would be managed in accordance with NPDES Industrial Stormwater General Permit for the protection of aquatic habitat.

The discussion of impacts is organized to address the following key areas of aquatic habitat and species groups that are dependent on waters in or flowing from the project area:

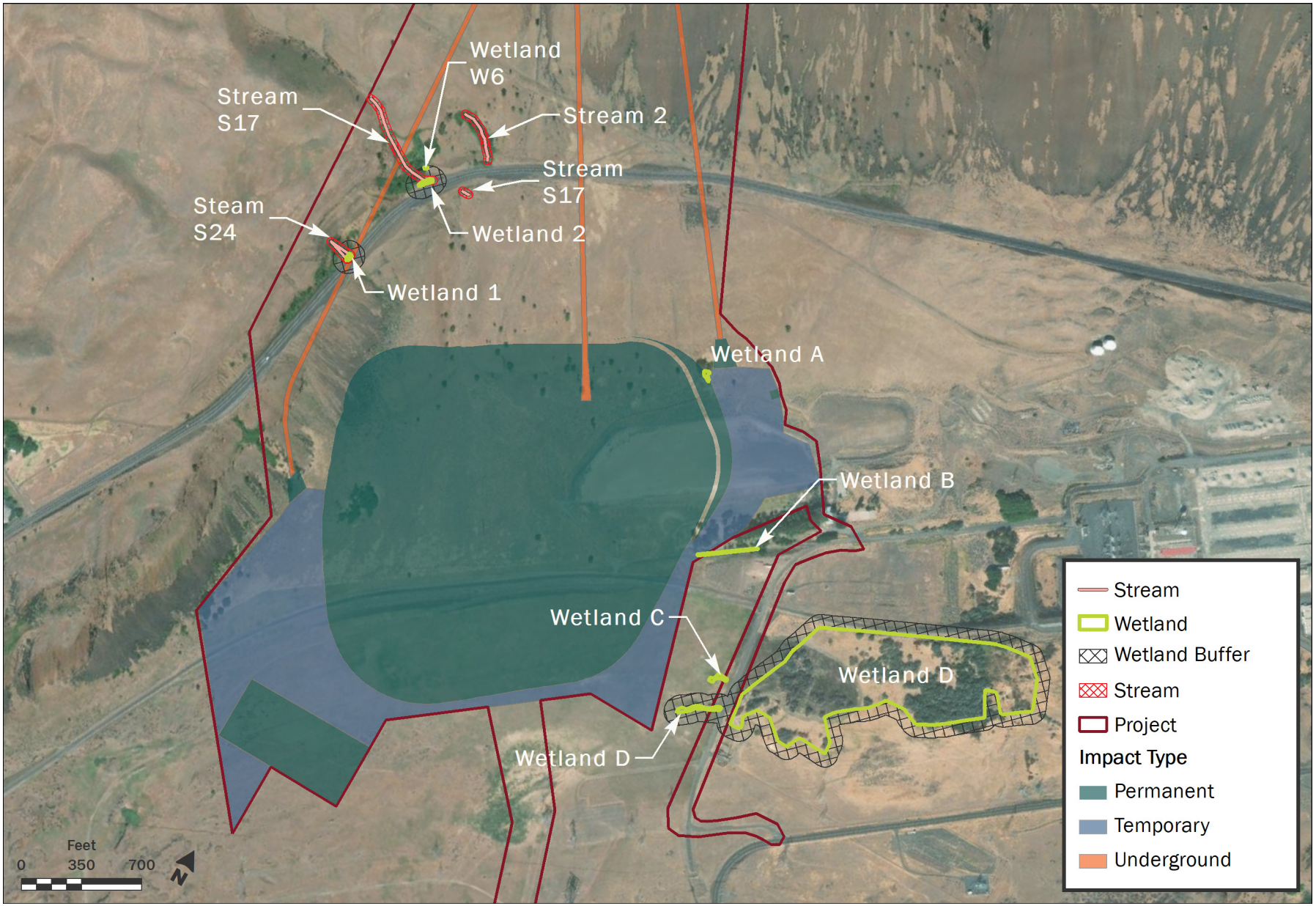
- Aquatic habitat in Swale Creek watershed
- Aquatic habitat in the Columbia River
- Amphibians and turtles
- Fish

Figure 3a
Direct Impacts on Aquatic Habitats in Northern Portion of the Study Area (Upper Reservoir Area)



Sources: FFP 2021; field knowledge gained through site visits performed by Anchor QEA and Ecology July 2021

Figure 3b
Direct Impacts on Aquatic Habitats in Southern Portion of the Study Area (Lower Reservoir Area)



Sources: FFP 2021; PGG 2013; field knowledge gained through site visits performed by Anchor QEA and Ecology July 2021

3.3.1 Impacts from Construction

This section describes direct and indirect impacts resulting from construction of the proposed project.

3.3.1.1 Direct Impacts

Aquatic Habitat in Swale Creek Watershed

Construction of the proposed upper reservoir would remove and permanently cover approximately 890 feet of ephemeral/intermittent Stream S7, approximately 75 feet of intermittent Stream S8, approximately 775 feet of Stream 1, and all of the 0.03-acre Pond/Wetland P2 (Figure 3a). Immediately north of the proposed reservoir, approximately 800 feet of intermittent Stream S8 would be disturbed and compacted due to its location within the temporary construction staging area. The Applicant has proposed to design the staging area and employ construction best management practices (BMPs) throughout the work (described in the *Wetlands and Regulated Waters Resource Analysis Report*), to minimize effects on Stream S8 and facilitate its restoration to the extent practical following completion of construction.

Effects of construction on these waterbodies would result in a localized degradation in ecological function of the aquatic habitat, including the factors discussed in Section 3.2.1.4, such as native animal and plant diversity in the riparian areas, water temperature regulation, erosion control, water infiltration, and organic inputs to the aquatic food web. In semi-arid climates, aquatic habitats are more fragile and may require more time to recover than in wetter environments.

The proposed project would affect aquatic habitat due to permanent loss of a small area of ephemeral/intermittent Stream S7, temporary and permanent impacts on a small area of intermittent Stream S8, and a temporary or permanent reduction in aquatic habitat function. The impacts to these waterbodies would eliminate wetland functions and aquatic habitat and result in degradation of ecological functions in downstream waters. However, the overall level of lost function and habitat would likely be minimal given the relatively small size of the affected areas and the limited ecological function and aquatic habitat that they currently provide.

The Applicant has proposed preparation of a mitigation plan for those impacts that will be submitted to and approved by the U.S. Army Corps of Engineers (USACE) and Ecology as a component of the Clean Water Act-related permitting required for the project. WDFW's Hydraulic Project Approval process would include conditions intended to minimize impacts to instream and riparian habitat and functions for the intermittent streams S7 and S8. The mitigation that will be required for impacts to wetlands and waterbodies (see Section 4.2 of the EIS) will reduce potential impacts to aquatic habitat in the Swale Creek watershed. Additional measures may be required as part of permitting, and mitigation measures are described in Sections 3.3.3 and 3.3.4 to further reduce potential impacts. There would not be a significant adverse impact on aquatic habitat in the Swale Creek watershed.

Aquatic Habitat in the Columbia River Tributaries Watershed and Columbia River

No direct impacts are anticipated on aquatic habitat areas of flowing water draining to the Columbia River Tributaries watershed (Streams S17 and S24) during construction in the lower reservoir area (Figure 3b). No in-water work is proposed for portions of the project adjacent to or crossing the Columbia River. The Applicant's proposed construction BMPs and compliance with NPDES Construction Stormwater General Permit are expected to protect aquatic habitat in the Columbia River from unintentional releases of pollution or turbidity during construction. Major excavation and disturbance of soils is not expected to occur near the Columbia River.

Construction of the lower reservoir would result in excavation and backfilling a portion of Wetland A (0.015 acre). The eastern portion of Wetland A and the western portion of Wetland B would be temporarily affected by the construction of laydown areas for stockpiling excavated materials at the lower reservoir and are expected to be restored following construction (0.013 acre). These permanent and temporary losses of wetland areas would have a minimal effect on aquatic habitat in these wetlands and would be mitigated according to regulatory requirements. Therefore, there would be no significant adverse impact.

Amphibians and Turtles

Excavation and backfilling in ephemeral/intermittent Streams S7, S8, Stream 1, Pond/Wetland P2, and Wetlands A and B may cause mortality, injury, or disturbance to the normal behavior of amphibians or turtles using these habitats or their young, especially for tadpoles that are not able to move out of the area being disturbed. Activities that generate high levels of noise and vibration that exceed background levels, such as blasting to construct the reservoirs and powerhouse, or drilling to construct water conveyance tunnels, may cause temporary disturbance to normal species behaviors during the construction period. Impacts are greater for noise that increases sharply, such as with blasting. The potential for infrequent mortality, injury, and temporary disturbance to amphibians during the 5-year construction period would result in adverse impacts on amphibians or turtles, but these impacts would not be significant.

Fish

Streams S7 and S8 are ephemeral or intermittent headwater streams that are not fish-bearing and are located at least 15 RM upstream of the fish-bearing portion of Swale Creek within Swale Canyon. As a result, no direct impacts on fish would occur during construction of the upper reservoir.

Major noise-generating work such as blasting or drilling to construct the underground components of the project (e.g., tunnels, powerhouse, and reservoirs) may cause noise to be transmitted to the water depending on the local geology. This would occur at a distance from the Columbia River that would limit noise transmission to a level that is not likely to cause disturbance to fish in the Columbia River.

Stormwater runoff resulting from construction of the lower reservoir and proposed substation would not directly affect the water quality in the Columbia River with appropriate BMPs proposed by the Applicant that are described in the *Surface and Groundwater Hydrology Resource Analysis Report* (Appendix B of the EIS).

Construction of the proposed project is not expected to directly impact fish nor critical habitat for any listed fish species.

3.3.1.2 Indirect Impacts

As previously discussed, there would be a permanent or multi-year reduction in ecological function associated with loss or degradation of ephemeral and intermittent stream habitats and hydrologically connected areas downstream. Slow rates of recovery in the semi-arid climate may delay the recovery of ecological function in downstream areas. Swale Creek is documented habitat for rainbow trout and steelhead, both of which are State Candidate species of recreational, commercial, and Tribal importance. In addition, the Middle Columbia River DPS of Steelhead that occur in lower Swale Creek are ESA-listed as threatened. The stream areas affected represent a small portion of Swale Creek, which flows intermittently over 33 RM, and fish habitat occurs at least 15 RM downstream of the affected headwaters. Critical habitat for Middle Columbia Steelhead would not be directly affected and viability of the DPS is not expected to be adversely affected by this magnitude of habitat loss. A permanent or multi-year reduction in ecological function would result in some indirect effects on aquatic habitat and fish in

the Swale Creek watershed unless mitigated with compensatory mitigation and restoration actions as noted for direct impacts. However, this would not result in a significant adverse impact.

During the construction of the upper and lower reservoirs, excavation may occur below the level of unconsolidated groundwater aquifers and dewatering of the site may be necessary. The resulting localized drawdown of groundwater could lead to temporary dewatering of connected seeps and surface waters, as described in greater detail in the *Surface and Groundwater Hydrology Resource Analysis Report* (Appendix B of the EIS). This effect could be moderated if this groundwater is returned to the shallow aquifer on site.

No other indirect impacts on aquatic habitat in the Columbia River, fish, amphibians, or turtles due to construction of the proposed project are anticipated. Because indirect effects on salmon and steelhead in the Swale Creek watershed are not likely to affect the viability of middle Columbia River populations, the proposed project would also not indirectly affect salmon and steelhead predators including orca.

3.3.2 Impacts from Operation

Operation of the proposed project would involve pumping water from the lower reservoir through the conveyance system to the upper reservoir, then releasing that water through the underground headrace, powerhouse, and tailrace to the lower reservoir. Although design details have yet to be finalized, the preliminary project design includes measures specifically intended to prevent water seepage/leakage from the system, which would minimize changes to surface and subsurface drainage. Make-up water would be withdrawn periodically from the Columbia River source using KPUD's permitted intake and water right.

3.3.2.1 Direct Impacts

Aquatic Habitat in Swale Creek Watershed

The proposed 60-acre upper reservoir would capture an estimated 19 acre-feet per year (AFY) in precipitation and groundwater recharge that would otherwise flow to the Swale Creek watershed. However, it is estimated that the Swale Creek watershed may gain approximately 30 AFY due to underground leakage from the water conveyance infrastructure between the two reservoirs, resulting in a net gain in water flow to the Swale Creek watershed (based on a water balance analysis described in the *Surface and Groundwater Hydrology Resource Analysis Report*). No other effects on ecological function of the existing ephemeral and intermittent streams are anticipated during operations. The change in water quantity to these habitats would result in a minimal effect in the Swale Creek watershed, and any adverse impacts would not be significant.

Aquatic Habitat in the Columbia River Tributaries Watershed and the Columbia River

The proposed 63-acre lower reservoir would capture an estimated 11 AFY in precipitation and groundwater recharge, which would be offset by leakage from water conveyance infrastructure that may contribute approximately 70 AFY to groundwater within the proposed project footprint. Under current conditions, most of the incident precipitation likely infiltrates or evapotranspires versus becoming runoff, consistent with the lack of defined stream channels across the area. This change in runoff infiltration to groundwater would not result in a significant adverse impact to aquatic habitat.

No direct impacts of operation are anticipated on the aquatic habitat in the Columbia River, given that changes to hydrologic inputs to the river as a result of additional groundwater would be small or undetectable. Other ecological functions of the Columbia River such as water quality and intact riparian areas are likely to receive adequate protection by compliance with existing local, state, and federal regulations during operations.

Amphibians and Turtles

Amphibians that occur in the natural aquatic habitats are not likely to be disturbed, injured, or killed by project operations or disturbed by noise and vibration from the operating facility. The upper and lower reservoirs could attract amphibians and turtles away from higher quality natural habitats elsewhere toward habitat that is low-quality and hazardous due to frequent emptying of the reservoir for normal project operations. Operation of the reservoirs could entrain, injure, and kill tadpoles or adult amphibians if they were to colonize the reservoirs. The Applicant has proposed wildlife deterrent measures that may reduce the attractiveness of this low-quality habitat for aquatic species. The presence and operation of the upper and lower reservoirs is not expected to result in significant adverse impacts to amphibians and turtles.

Fish

Surface waters within the project area are not fish-bearing and adequate protection to the waters and shorelines of the Columbia River during operations are expected, consistent with local, state, and federal regulation. Project operations would not involve work in the Columbia River, nor would the project create new barriers to fish movement in the Columbia River. No direct impacts of operation are anticipated on fish.

3.3.2.2 Indirect Impacts

No indirect impacts are anticipated on aquatic habitat or species from project operations.

3.3.3 Required Permits

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

- **Section 401 Clean Water Act Water Quality Certification (Ecology):** A Section 401 Water Quality Certification from Ecology will be required. This certification is required for any project that needs a federal permit or license that may result in any discharge into water of the United States. It is intended to provide reasonable assurance that the Applicant's proposed project will comply with state water quality standards and other requirements for protecting aquatic resources. The Section 401 Water Quality Certification would cover both construction and operation of the proposed project. Conditions from the Section 401 Water Quality Certification would become part of the new FERC license and the USACE permit.
- **Section 402 Clean Water Act NPDES Industrial Stormwater Permit (Ecology):** The proposed project would result in releases of water that require an industrial stormwater permit. All wastewater and stormwater generated from the Proposed Action and potentially discharged would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area would be defined and the type of NPDES permit would be determined and issued.
- **Section 404 Clean Water Act Permit (USACE):** Construction and operation of the proposed project would affect wetlands and streams, which are waters of the United States. Department of the Army authorization from USACE under Section 404 of the Clean Water Act would be required. As part of this approval, consultations for the ESA and Section 106 of the National Historic Preservation Act would be required.
- **Hydraulic Project Approval (WDFW):** The proposed project would use, divert, obstruct, and change the natural flow and bed of freshwaters of the state (intermittent Streams S7 and S8) and therefore would require a Hydraulic Project Approval from WDFW under the state's hydraulic code

rules (Washington Administrative Code 220.660). The Hydraulic Project Approval would include conditions intended to minimize impacts on instream and riparian habitat and functions.

- **Scientific Collection Permit (WDFW):** A scientific collection permit is required to salvage, move, or remove fish and wildlife species for research, construction, and other purposes (RCW 77.32.240, WAC 220.200.150, and WAC 220.450.030).
- **Potential Critical Areas Review (Klickitat County):** Critical areas review may be required because the proposed project is within, abutting, or likely to adversely affect a critical area or buffer.
- **Potential Fill and Grade Permit (Klickitat County):** A permit could be required for filling and grading necessary to construct the proposed project.
- **Potential Floodplain Development Permit (Klickitat County):** A flood hazard zone permit may be required for any construction or development that takes place within an area of special flood hazard.

3.3.4 Proposed Mitigation Measures

As part of a final FERC license application, the Applicant has proposed to follow industry standard BMPs. These would be documented in a Soils Erosion Control Plan and Stormwater Pollution Prevention Plan to mitigate for the potential effects of erosion and sedimentation on waterbodies, and therefore on aquatic species and habitats (FFP 2020a). These measures would be enforced as part of Clean Water Act permits.

WDFW's Hydraulic Project Approval process would include conditions intended to minimize impacts to instream and riparian habitat and functions for the intermittent streams. Compensatory mitigation for unavoidable impacts on aquatic species and habitats would also be addressed in coordination with WDFW through development of the Applicant's Vegetation Management and Monitoring Plan (VMMP; FFP 2020c) and Wildlife Management Plan (WMP; FFP 2020d). The surface waters affected (Streams S7 and S8) are not fish-bearing and there would be no direct impacts on fish or critical habitats for special status species. Therefore, consultation with NOAA Fisheries, USFWS, or federal, state, and Tribal fisheries co-managers for impacts on salmon, steelhead, and bull trout is not anticipated. Due to the proximity of the project to the Columbia River, however, some level of consultation may be required.

Compensatory mitigation for impacts on wetlands and regulated waters would be addressed through the Clean Water Act Section 404 Permit process for federally jurisdictional wetlands, the Section 401 Water Quality Certification process, Ecology's Administrative Order process under Revised Code of Washington 90.48 of the Washington Water Pollution Control Law for non-federally regulated waters, and WDFW's Hydraulic Project Approval process for intermittent streams. Those permit-required mitigation measures would also protect aquatic species and habitats and are aligned with Applicant recommendations documented in the Applicant's final FERC license application for the protection of aquatic species and wildlife resources (Exhibit E, Sections 3.1.3 and 3.2.3, FFP 2020a). Those permit-required mitigation measures are described in further detail in the *Wetlands and Regulated Waters Resource Analysis Report* (Appendix C of the EIS) and Section 4.2, Water Resources, of the EIS.

WDFW-Proposed Mitigation Measures

The Applicant proposed several mitigation measures to reduce impacts on terrestrial species and habitats in their draft VMMP (FFP 2020c) and draft WMP (FFP 2020d). Drafts of the VMPP and WMP were developed in coordination with USFWS, WDFW, and the Oregon Department of Fish and Wildlife and are being revised in coordination with those agencies. Once finalized, those plans will be included as articles of the FERC license and will be enforced with other license requirements. Section 4.7 of the EIS and the

Terrestrial Species and Habitats Resource Analysis Report (Appendix G of the EIS) contain a more complete description of the Applicant's draft VMMP (FFP 2020c) and draft WMP (FFP 2020d).

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

- **Wildlife Surveys to Include Aquatic Species.** Scientifically based wildlife surveys described in the draft WMP would focus on recording observations of birds, mammals, and reptiles. To determine the potential presence of state or federally listed aquatic species such as Oregon spotted frog, western toad, and western pond turtle, observations of amphibians, turtles, and other aquatic species should also be recorded when they are encountered during wildlife surveys. These species would also be included in the Wildlife Incident Reporting System measures in the WMP.
- **Amphibian Salvage During Construction.** If state or federally listed aquatic species, including Oregon spotted frog, western toad, and western pond turtle, are present on the site, proposed BMPs will be used for the salvage and translocation of amphibians out of surface waters to be excavated or backfilled during construction.

Relevant Mitigation Measures in Other Resource Reports and Sections

In addition to the permit-required and WDFW-proposed measures, implementation of mitigation proposed in other reports and EIS sections would also further reduce potential effects of the proposed project and protect aquatic species and habitats.

The following is a brief summary of Ecology-proposed water resources mitigation measures; Section 4.2.2.3 of the EIS and the *Surface and Groundwater Hydrology Resource Analysis Report* (Appendix B of the EIS) contain complete descriptions of these measures:

- **Construction Water Resource Monitoring and Response Plan.** This mitigation measure for the protection of water quantity and water quality during construction would also protect aquatic species and habitats (see Section 4.2 of the EIS and Appendix B).
- **Operations Water Resource Monitoring and Response Plan.** This mitigation measure for the protection of water quantity and water quality during operations would also protect aquatic species and habitats (see Section 4.2 of the EIS and Appendix B).

The following is a brief summary of an Applicant-proposed mitigation measure to reduce impacts on terrestrial species and habitats; a summary of the VMPP is provided in Section 4.7.2.3 of the EIS and the *Terrestrial Species and Habitats Resource Analysis Report* (Appendix G of the EIS):

- **The Applicant's Draft Vegetation Management and Monitoring Plan.** The Applicant proposed several mitigation measures to reduce impacts on terrestrial habitat and species in their draft VMMP (FFP 2020c) (see Section 4.7 of the EIS and Appendix G). Measures in the VMMP that would also protect aquatic species and habitats include planting, post-construction restoration, noxious weed management, and measures that would include preventing the establishment of woody riparian vegetation at reservoir edges to reduce the attraction of riparian-dependent species to the reservoir.

3.3.5 Significant and Unavoidable Adverse Impacts

The analysis found the proposed project would have no significant adverse impacts to aquatic species and habitats. Mitigation that will be required for impacts to wetlands and waterbodies (see Section 4.2.2.3 of the Draft EIS and the *Surface and Groundwater Hydrology Resource Analysis Report*) will reduce potential impacts to aquatic habitat. Additional measures may be required as part of

permitting, and measures are described in Section 3.3.4 to further reduce potential impacts. There would be no significant and unavoidable adverse impacts on aquatic species and habitats from construction or operation of the proposed project.

3.4 No Action Alternative

The No Action Alternative represents the future aquatic habitat conditions within the study area in the absence of implementing the proposed project. KPUD would continue to hold the existing Cliffs water right, which may provide water supply to other customers or be placed in trust. The wind energy project and other existing energy infrastructure in the study area would continue to be operated. Investigation of contamination and development of cleanup actions on the CGA smelter site would continue through a separate Model Toxics Control Act cleanup process.

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

A cleanup action could improve overall conditions for aquatic species and habitats, but could involve impacts on aquatic habitats from water diversions, cut and fill, vegetation disturbance, and increased noise and vibration. These could lead to additional mortality, injury, and temporary disturbance to amphibians and turtles. Any cleanup action that would require the excavation or placement of fill material into a wetland or water would follow the required Clean Water Act Section 404 Permit process, which would include mitigation requirements. Other state and local permits would also be required, which would also require mitigation for unavoidable impacts.

Overall, any impacts on the existing quantity and ecological function of aquatic habitat within the study area are expected to be minor. Through compliance with laws and with implementation of appropriately determined mitigation measures, there would be no significant adverse impacts related to aquatic species and habitats from the No Action Alternative.

4 References

Anchor QEA, LLC, 2022a. *Wetlands and Regulated Waters Resource Analysis Report*. Proposed Goldendale Energy Storage Project. Draft Environmental Impact Statement Appendix C. June 2022.

Anchor QEA, LLC, 2022b. *Terrestrial Species and Habitats Resource Analysis Report*. Proposed Goldendale Energy Storage Project. SEPA Draft Environmental Impact Statement Appendix G. June 2022.

Aspect (Aspect Consulting), 2007. Hydrologic information report supporting water availability assessment, Swale Creek and Little Klickitat Subbasins, WRIA 30. Prepared for the Water Resource Planning and Advisory Committee. Project No. 070024-001-01. Klickitat County Natural Resources Department. Goldendale, WA.

Aspect, 2022. *Surface and Groundwater Hydrology Resource Analysis Report*. Proposed Goldendale Energy Storage Project. SEPA Draft Environmental Impact Statement Appendix B. June 2022.

Aspect and Anchor QEA (Aspect Consulting, LLC and Anchor QEA, LLC), 2022. *Environmental Health Resource Analysis Report.* Proposed Goldendale Energy Storage Project. SEPA Draft Environmental Impact Statement Appendix I. June 2022.

Close, D., 2000. Confederated Tribes of the Umatilla Indian Reservation, Pacific Lamprey Research and Restoration Project, Report to Bonneville Power Administration, Contract No. 00000248-1, Project No. 199402600. BPA Report DOE/BP-00000248-1.

Dauble, D.D., 2009. *Fishes of the Columbia Basin.* Sandpoint, Idaho: Keokee Books.

Dvornich et al. 1997. Volume 2: Amphibians and Reptiles of Washington State: Location data and predicted distributions. In Cassidy et al. 1997.

Ecology (Washington Department of Ecology), 2011. Waters Requiring Supplemental Spawning and Incubation Protection for Salmonid Species. January 2011.

Ecology, 2021. Water quality assessment & 303(d) list. Available at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d.

ERM (Environmental Resources Management), 2021. Approved Jurisdictional Determination Request Memorandum. June 1, 2021.

FFP (FFP Project 101, LLC), 2020a. Goldendale Energy Storage Hydroelectric Project: Final License Application for FERC Project No. 14861. Includes Exhibits A through G. June 22, 2020.

FFP, 2020b. Goldendale Energy Storage Hydroelectric Project: Final License Application for FERC Project No. 14861. Appendix B: Wetlands and Water Delineation Report. June 17, 2020.

FFP, 2020c. Goldendale Energy Storage Hydroelectric Project: Final License Application for FERC Project No. 14861. Appendix E: Vegetation Management and Monitoring Plan. June 17, 2020.

FFP, 2020d. Goldendale Energy Storage Hydroelectric Project: Final License Application for FERC Project No. 14861. Appendix D: Wildlife Management Plan. June 17, 2020.

FFP, 2021. Response to Washington Department of Ecology Request for Information (RFI) #2. August 30, 2021.

FPC (Fish Passage Center), 2021a. Annual Report. BPA Contract # 78040 REL 21 BPA Project #1994-033-00 1/1/20 to 12/31/20.

FPC, 2021b. Website Database. Accessed 10-4-2021. Accessible at: https://www.fpc.org/web/apps.

Gadomski, D. M., and P.G. Wagner, 2009. "Factors Affecting the Age-0 Resident Fish Community Along Shorelines of the Hanford Reach of the Columbia River." *Northwest Science* 83(3):180 188.

Hasselman, D. J., R. A. Hinrichsen, B. A. Shields, and C. C. Ebbesmeyer, 2012 The Rapid Establishment, Dispersal, and Increased Abundance of Invasive American Shad in the Pacific Northwest. *Fisheries* 37(3): 103-114.

Inter-Fluve Inc. 2002. Swale Creek Channel Assessment Project. Prepared for Yakama Nation Fisheries Program. June 21, 2002.

Lindsey, C., P. Wagner, and J. Nugent, 2016. Calendar Year 2012 Assessment of Larval Pacific Lamprey on the Hanford Reach of the Columbia River. Prepared for the U.S. Department of Energy Contact DE-AC06-09RL14728 by Mission Support Alliance. May 2016.

Moser, M.L., A.D. Jackson, M.C. Lucas, and R.P. Mueller, 2015. "Behavior and Potential Threats to Survival of Migrating Lamprey Ammocoetes and Macrophthalmia." *Reviews in Fish Biology and Fisheries* 25(1):103 16.

National Weather Service 2021. NOW Data – NOAA Online Weather Data. Accessed September 16, 2021. Available at: https://www.weather.gov/wrh/Climate?wfo=pdt.

NMFS (National Marine Fisheries Services), 2009. Recovery Plan for the Klickitat River Population of the Middle Columbia River Steelhead Distinct Population Segment. Northwest Region. September 2009.

PGG, 2013. Septic System, Wetlands, Upper Fluoride Area, and Soil Background Investigation Report, Former Columbia Gorge Aluminum Smelter. Prepared by Plateau Geoscience Group LLC under contract to Blue Mountain Environmental and Consulting Company for NSC Smelter LLC. March 15.

Rye Development, 2021. Letter to: Kimberly Bose, Federal Energy Regulatory Commission. Regarding: Goldendale Energy Storage Project, FERC Project No. 14861 – RESPONSE TO THE COMMISSIONS REQUEST FOR ADDITIONAL INFORMATION. October 4, 2021.

Torgerson, C.E., and D.A. Close, 2004. "Influence of habitat heterogeneity on the distribution of larval Pacific lamprey (Lampetra tridentata) at two spatial scales." *Freshwater Biology* 49:614-630.

USFWS (U.S. Fish and Wildlife Service), 2010. Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (Entosphenus tridentatus). April 2010.

USFWS, 2018. Species Fact Sheet River Lamprey (Lampetra ayresii). Accessed August 23, 2018. Available at: https://www.fws.gov/wafwo/species/Fact%20sheets/Riverlampreyfinal.pdf.

USFWS, 2020. National Wetlands Inventory Wetlands Mapper. Updated: October 1, 2020. Accessed September 14, 2021. Available at: http://www.fws.gov/wetlands/Data/Mapper.html.

USGS (U.S. Geological Survey), 2021. The National Hydrography Dataset (NHD). Accessed September 14, 2021. Available at: http://nhd.usgs.gov/data.html.

Ward, D.L., 2001. Draft Mainstem Columbia River Subbasin Summary. Northwest Power Planning Council. March 2001.

WDFW (Washington Department of Fish and Wildlife), 2015. Washington's State Wildlife Action Plan: 2015 Update. Washington Department of Fish and Wildlife, Olympia, Washington.

WDFW, 2019a. "Priority Habitats and Species List." Olympia, Washington. Available at: https://wdfw.wa.gov/species-habitats/at-risk/phs/list.

WDFW, 2019b. "Priority Habitats and Species: Maps." Available at: https://wdfw.wa.gov/species-habitats/at-risk/phs/maps.

WDFW (Washington Department of Fish and Wildlife), 2021. PHS (Priority Habitat and Species) On the Web. Accessed October 1, 2021. Available at: https://geodataservices.wdfw.wa.gov/hp/phs/.

WDFW and NWIFC (Washington Department of Fish and Wildlife and Northwest Indian Fish Commission), 2018. Statewide Washington Integrated Fish Distribution (SWIFD) Geospatial Open Data Portal". Updated May 21, 2018. Accessed September 16, 2021. Available at: https://geo.wa.gov/datasets/4ed1382bad264555b018cc8c934f1c01_0/explore?location=47.265479%2C-120.672158%2C7.90.

WDNR (Washington Department of Natural Resources), 2021. WA DNR GIS Open Data. Available at: https://data-wadnr.opendata.arcgis.com/.

WPN and Aspect (Watershed Professionals Network and Aspect Consulting Inc.), 2005. *WRIA 30 Level 1 Watershed Assessment, Appendix A to WRIA 30 Watershed Management Plan*. January 2005. Available at: https://www.klickitatcounty.org/DocumentCenter/View/152/Appendix-A---Level-I-Watershed-Assessment---January-2005-PDF.

Wydoski, R.S., and R.R. Whitney, 2003. *Inland Fishes of Washington.* Second edition, revised and expanded. Bethesda: American Fisheries Society in association with the University of Washington Press.

Yakama Nation, 2021. Request for Proposals, Engineering Design Services, Swale Creek Tributary: Road Crossings and Habitat Improvement. Yakama Nation Fisheries – Klickitat Field Office. Undated.

Attachment 1
Aquatic and Amphibious Species in the Project Area

Table 1-1
Fish Species with Special Status Known to Occur in the Middle Columbia River

COMMON NAME	SCIENTIFIC NAME	STATE PRIORITY SPECIES STATUS AND CRITERIA	FEDERAL ENDANGERED SPECIES ACT STATUS	PRIORITY AREA[1]	LIFE HISTORY TYPE	HABITAT USE
Pacific lamprey	*Entosphenus tridentata*	Not Listed, Recreational, Commercial, and/or Tribal Importance	Not listed	Any occurrence	Anadromous	Migration
River lamprey	*Lampetra ayresi*	Candidate	Not listed	Any occurrence	Anadromous	Unknown
White sturgeon	*Acipenser transmontanus*	Not Listed, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Not listed	Any occurrence	Freshwater resident	Migration, rearing, overwintering
Leopard dace	*Rhinichthys falcatus*	Candidate	Not listed	Any occurrence	Freshwater resident	Migration, rearing, overwintering
Mountain sucker	*Catostomus platyrhynchus*	Candidate	Not listed	Any occurrence	Freshwater resident	Migration, spawning, rearing, incubation, overwintering
Bull trout	*Salveliunus confluentus*	Candidate, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Threatened (Columbia River DPS, Mid-Columbia Recovery Unit)	Any occurrence	Adfluvial	Foraging, migration, overwintering

COMMON NAME	SCIENTIFIC NAME	STATE PRIORITY SPECIES STATUS AND CRITERIA	FEDERAL ENDANGERED SPECIES ACT STATUS	PRIORITY AREA[1]	LIFE HISTORY TYPE	HABITAT USE
Chinook salmon	*Oncorhynchus tshawytscha*	Candidate, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Threatened (Snake River fall-run ESU, Snake River spring/summer-run ESU); Endangered (Upper Columbia spring-run ESU)	Any occurrence	Anadromous	Migration
Chum salmon (fall-run)	*Oncorhynchus keta*	Candidate, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Threatened (Columbia River chum salmon ESU)	Any occurrence	Anadromous	Migration (uncommon)
Coastal resident cutthroat trout	*Oncorhynchus clarki clarki*	Not Listed, Recreational, Commercial, and/or Tribal Importance	Not listed	Any occurrence	Freshwater resident or anadromous	Migration, spawning, rearing, incubation, overwintering (uncommon)
Coho salmon	*Oncorhynchus kisutch*	Not Listed, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Species of Concern (Mid- and Upper Columbia tributaries)	Any occurrence	Anadromous	Migration
Pink salmon	*Oncorhynchus gorbuscha*	Not Listed, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Not listed	Any occurrence	Anadromous	Migration (uncommon)

COMMON NAME	SCIENTIFIC NAME	STATE PRIORITY SPECIES STATUS AND CRITERIA	FEDERAL ENDANGERED SPECIES ACT STATUS	PRIORITY AREA[1]	LIFE HISTORY TYPE	HABITAT USE
Steelhead trout	*Oncorhynchus mykiss*	Candidate, Recreational, Commercial, and/or Tribal Importance	Threatened (Middle Columbia River DPS, Snake River Basin DPS, Upper Columbia River DPS)	Any occurrence	Anadromous	Migration
Rainbow trout	*Oncorhynchus mykiss*	Candidate, Recreational, Commercial, and/or Tribal Importance	Not listed	Any occurrence	Freshwater resident	Migration, rearing, overwintering
Sockeye salmon	*Oncorhynchus nerka*	Candidate, Vulnerable Aggregations, Recreational, Commercial, and/or Tribal Importance	Endangered (Snake River ESU)	Any occurrence	Anadromous	Migration

Sources: WDFW 2019a, 2019b

Notes:

1. Species are considered a priority only when they occur within known limiting habitats or priority areas. If limiting habitats are unknown, or species are rare, the priority area is described as "any occurrence."

DPS: distinct population segment

ESU: evolutionarily significant unit

Table 1-2
Unlisted Fish Species Known to Occur in the Middle Columbia River

COMMON NAME	SCIENTIFIC NAME	LIFE HISTORY TYPE
Native Fish Species		
Bridgelip sucker	*Catostomus columbianus*	Freshwater
Burbot	*Lota lota*	Freshwater/Anadromous
Chiselmouth	*Acrocheilus alutaceus*	Freshwater
Largescale sucker	*Catostomus macrocheilus*	Freshwater
Longnose dace	*Rhinichthys cataractae*	Freshwater
Longnose sucker	*Catostomus catostomus*	Freshwater
Mottled sculpin	*Cottus bairdi*	Freshwater
Mountain whitefish	*Prosopium williamsoni*	Freshwater
Northern pikeminnow	*Ptychocheilus oregonensis*	Freshwater
Paiute sculpin	*Cottus beldingi*	Freshwater
Peamouth	*Mylocheilus caurinus*	Freshwater
Prickly sculpin	*Cottus asper*	Freshwater
Redside shiner	*Richardsonius balteatus*	Freshwater
Reticulate sculpin	*Cottus perplexus*	Freshwater
Sandroller	*Percopsis transmontana*	Freshwater
Speckled dace	*Rhinichthy osculus*	Freshwater
Three-spine stickleback	*Gasterosteus aculeatus*	Freshwater/Anadromous
Torrent sculpin	*Cottus rhotheus*	Freshwater
Western brook lamprey	*Lampetra richardsoni*	Freshwater
Non-native Fish Species		
American shad	*Alosa sapidissima*	Anadromous
Black bullhead	*Ameiurus melas*	Freshwater
Black crappie	*Pomoxis nigromaculatus*	Freshwater
Bluegill	*Lepomis macrochirus*	Freshwater
Brown bullhead	*Ameiurus nebulosus*	Freshwater
Brown trout	*Salmo trutta*	Freshwater/Anadromous
Channel catfish	*Ictalurus punctatus*	Freshwater
Common carp	*Cyprinus carpio*	Freshwater
Grass carp	*Ctenopharyngodon idella*	Freshwater
Goldfish	*Carrassius auratus*	Freshwater
Lake whitefish	*Coregonus clupeaformis*	Freshwater
Largemouth bass	*Micropterus salmoides*	Freshwater
Mosquitofish	*Gambusia affinis*	Freshwater
Pumpkinseed	*Lepomis gibbosus*	Freshwater
Smallmouth bass	*Micropterus dolomieu*	Freshwater
Tench	*Tinca tinca*	Freshwater
Walleye	*Sander vitreus*	Freshwater
Warmouth	*Lepomis gulosis*	Freshwater
White crappie	*Pomoxis annularis*	Freshwater
Yellow bullhead	*Ameiurus natalis*	Freshwater
Yellow perch	*Perca flavescens*	Freshwater

Sources: WDFW and NWIFC 2018; Wydoski and Whitney 2003; Ward 2001

Table 1-3
Amphibian Species Predicted to Occur within the Project Area

COMMON NAME	SCIENTIFIC NAME	PREDICTED HABITAT
Native Amphibian Species		
Great Basin spadefoot	*Scaphiopus intermontanus*	Core and marginal habitat
Long-toed salamander	*Ambystoma macrodactylum*	Dispersed core and marginal habitat
Pacific tree frog	*Pseudacris regilla*	Dispersed core habitat
Western toad*	*Anaxyrus boreas*	Dispersed marginal habitat
Woodhouse's toad	*Anaxyrus woodhousii*	Dispersed core habitat
Non-native Amphibian Species		
American bullfrog	*Lithobates catesbeianus*	Dispersed core habitat

Source: Dvornich 1997
* State Candidate Priority Species