Biological Evaluation of EPA-Issued NPDES Permit for Dworshak Dam, U.S. Army Corps of Engineers Permit No. ID0028568

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and
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Acronyms

BE – biological evaluation
BMP – Best Management Practices
CWIS – cooling water intake structure
DDT – Dichloro-diphenyl-trichloroethane
DMR – Discharge Monitoring Report
DPS – distinct population segment
EAL – environmentally acceptable lubricant
EFH – essential fish habitat
ESA – Endangered Species Act
ESU – ecological significance unit
LAA – likely to adversely affect
MGD – million gallons per day
ML – Minimum level
MSA – Magnuson-Stevens Fishery Conservation and Management Act
NCCW – Noncontact cooling water
NE – no effect
NLAA – not likely to adversely affect
NOAA – National Oceanic and Atmospheric Administration
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
NWEVC – naturally weathered Exxon Valdez crude oil
PAH – polycyclic aromatic hydrocarbons
PCB – Polychlorinated Biphenyls
PCP - pentachlorophenol
SIC – Standard Industrial Classification
T&E – threatened and endangered
TEC – threshold effect concentration
TMDL – Total Maximum Daily Load
TPAH – total polycyclic aromatic hydrocarbons
US EPA – Unites States Environmental Protection Agency
USFWS – United States Fish & Wildlife Service
WAFWA – Western Association of Fish and Wildlife Agencies

1 Introduction and Summary

The U.S. Environmental Protection Agency (EPA) conducted a biological evaluation to identify potential impacts to federally listed Endangered or Threatened species that could result from the issuance of the National Pollutant Discharge Elimination System (NPDES) permit for Dworshak Dam (ID0028568).

The proposed NPDES permit for Dworshak Dam operated by the U.S. Army Corps of Engineers (USACE) authorizes the following types of discharges into Nez Perce tribal waters: equipment cooling water, equipment and floor drain water, and specific maintenance waters. The permit requires the following:

- Numeric effluent limits on discharges for oil and grease and pH;
- Narrative effluent limits prohibiting "oxygen-demanding materials in concentrations that would result in an anaerobic water condition";
- Narrative effluent limits stating "waters shall be free from hazardous, toxic, deleterious, radioactive, floating, suspended or submerged matter that would impair designated uses";
- The use of environmentally acceptable lubricants (EALs), unless technically infeasible; and
- Technologies and operations that minimize the impingement and entrainment of fish in cooling water intake structures (CWIS).
- Monitoring requirements for flow, oil and grease, pH, temperature;
- A detailed best management practices (BMP) plan and BMP annual report to prevent and minimize oil releases, including oil accountability tracking;
- An EAL annual report to inventory equipment where EALs may be used and to report when and where EALs have been implemented;
- A CWIS study and annual report to report on the implementation of technologies to meet CWIS permit conditions; and
- A PCB Management Plan and PCB Annual Report to inventory past actions to reduce/remove PCBs, identify potential current sources, and describe actions to reduce those sources.

The permit does not regulate the river flow through the turbines or spill over the dams and does not authorize oil spills.

The Threatened and Endangered Species of concern identified for this action are:

<u>Threatened Species</u>:
Snake River (SR) Spring/Summer-run Chinook, NOAA
Snake River (SR) fall-run Chinook, NOAA
Snake River (SR) Basin Steelhead, NOAA
Bull trout *(Salvelinus confluentus),* USFWS
Spalding's Catchfly *(Silene spaldingii),* USFWS

EPA has determined the issuance of the federal dam permit **is *not likely to adversely affect*** SR spring/summer Chinook, SR fall Chinook, SR steelhead, and bull trout because the pollutant discharges authorized in the permit are at levels that are unlikely to harm the above species. EPA has also determined that issuance of the federal dam permit will have ***no effect*** on Spalding's Catchfly because the species is not present in the action area, which would result in the proposed action having no effect.

Table 1 summarizes the species and effect determinations for this action.

Table 1. Summary of Determinations for NOAA and USFWS Threatened and Endangered Species

Threatened and Endangered Species (NOAA)	**Determination**
Snake River (SR) spring/summer-run Chinook	Not Likely to adversely affect
Snake River (SR) fall Chinook	Not Likely to adversely affect
Snake River (SR) Basin Steelhead	Not Likely to adversely affect
Threatened and Endangered Species (USFWS)	**Determination**
Bull Trout	Not likely to adversely affect
Spalding's Catchfly	No Effect

Critical Habitat
The action area includes critical habitat for SR fall-run Chinook and bull trout. EPA has determined that issuance of the Dworshak Dam permit is ***not likely to adversely affect*** the critical habitat for these species because the proposed discharges authorized by the permit will have discountable or insignificant effects on the Primary Constituent Elements (PCEs). The determinations are summarized in Table 2 and further described in Section 5.

Table 2. Summary of Determinations for NOAA and USFWS Critical Habitat

Critical Habitat	**Determination**
NOAA species: Snake River (SR) fall-run Chinook USFWS species: Bull trout	Not likely to adversely affect

Essential Fish Habitat

The action area includes essential fish habitat for chinook salmon. Essential fish habitat only relates to species for which the Pacific Fishery Management Council has developed management plans. EPA has determined that issuance of the Dworshak Dam permit is ***not likely to adversely affect*** essential fish habitat for these species because the proposed discharges authorized in the permit will not be harmful to water quality and physical habitat. The determinations are summarized in **Table 3** and further described in **Section 5**.

Table 3. Summary of Determinations for Essential Fish Habitat

Essential Fish Habitat	Determination
NOAA species: Chinook salmon	Not likely to adversely affect

Table 4 lists the sections of this BE that relates to the recommended contents by NOAA and USFWS of Biological Assessments.

Table 4. Corresponding Sections of this BE to NOAA Fisheries and USFWS Recommended Contents for Biological Assessments

Recommended Content		Heading in this BE	Section(s)
Introduction	Introduction	Introduction and Summary	1
List of Species	List of Species (citation) Critical Habitat (official status)	Introduction and Summary	1
Project Description	Type and scope of Project Project components pertinent to the species Management action such as proposed monitoring of species and mitigation that may affect species	Description of the Proposed Action and Action Area	2
Description of Project Area	Legal description and map Define action area Current condition of habitat parameters Past and present activities related to species/habitat Analysis of cumulative effects	Description of the Proposed Action and Action Area; Cumulative Effects;	2 6
Description of Species and Habitat	General species descriptions and habitat requirements Species distribution and habitat specific to action area by life history phase Species status, distribution, and abundance trends in action area Description of Critical Habitat, if designated	Status of Species and Critical Habitat	3
Inventories and Surveys	Describe effort to obtain information on species status Describe information used in Description of Species and Habitat in a Table	Status of Species and Critical Habitat	3
Analysis of Effects	Description of parameters of concern Analysis of effects Environmental baseline – track the conservation status of a species and its environment up to the present	Description of the Environmental Baseline; Effects of the Action; Essential Fish Habitat Analysis	4 5 7

	moment (starting at time of listing or earlier) Effects determinations Analysis of effects to designated critical habitat		
Conclusions	Summary of determinations Statements of effect of the project on the species (e.g., no affect, may affect, etc.)	Summary of Determinations	5.7
References	Literature cited Copies of pertinent documents and maps List of personal communication contacts, contributors, preparers	References	8
Supporting Information	Supporting documents that will assist the reviewer	Appendices	A-B

2 Description of the Proposed Action and Action Area

2.1 Discussion of the Federal Action and Legal Authority

U.S. EPA Region 10 (EPA) is proposing to issue a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of pollutants to waters of the Nez Perce Tribe from Dworshak Dam operated by the USACE on North Fork Clearwater River (**Figure 1**).

Figure 1. Map of the Dworshak Dam on the North Fork Clearwater River.

The proposed action is the issuance of an EPA-issued NPDES permit for Dworshak Dam on the North Fork Clearwater River. This permit will authorize the following types of discharges from Dworshak Dam into Nez Perce waters: equipment cooling water, equipment and floor drain water, and specific maintenance waters. The proposed permit does not regulate waters that flow over the spillway or pass through the turbines. *See National Wildlife Federation v. Consumers Power Company*, 862 F.2d 580 (6th Cir. 1988); *National Wildlife Federation v. Gorsuch,* 693 F.2d 156 (D.C. Cir. 1982). The permit also does not authorize oil spills. The permit contains the following requirements and stipulations:

- Numeric effluent limits on discharges for oil and grease and pH;
- Narrative effluent limits stating “the permittee is prohibited from discharging toxic substances and deleterious materials in concentrations that impair the beneficial uses of the receiving water”

- Narrative effluent limits prohibiting "oxygen-demanding materials in concentrations that would result in an anaerobic water condition";
- Narrative effluent limits stating "waters shall be free from hazardous, toxic, deleterious, radioactive, floating, suspended or submerged matter that would impair designated uses";
- The use of environmentally acceptable lubricants (EALs), unless technically infeasible; and
- Technologies and operations that minimize the impingement and entrainment of fish in cooling water intake structures (CWIS).
- Monitoring requirements for flow, oil and grease, pH, temperature;
- A detailed best management practices (BMP) plan and BMP annual report to prevent and minimize oil releases, including oil accountability tracking;
- An EAL annual report to inventory equipment where EALs may be used and to report when and where EALs have been implemented;
- A CWIS study and annual report to report on the implementation of technologies to meet CWIS permit conditions; and
- A PCB Management Plan and PCB Annual Report to inventory past actions to reduce/remove PCBs, identify potential current sources, and describe actions to reduce those sources.

To ensure protection of water quality and human health, the permit establishes effluent limits, monitoring requirements, and other conditions necessary to comply with the Clean Water Act (CWA) and applicable water quality standards [Section 301(b)(1)(C) of the CWA]. The permit establishes numeric and narrative effluent limits and permit conditions that comply with applicable water quality standards and protects the beneficial uses of the waters where the facility discharges. The numeric permit limits are enforced end-of-pipe, since there is no mixing zone allowed for dilution, and the Corps must comply with narrative limits and all permit conditions.

Water Quality Standards Considered for Dworshak Dam:

- The numeric and narrative criteria applicable to all freshwaters of the State are found in: IDAPA 58.01.02.200 (General Surface Water Quality), IDAPA 58.01.02.250 (Surface Water Quality Criteria For Aquatic Life Designations), IDAPA 58.01.02.251 (Surface Water Quality Criteria For Recreation Use Designations), IDAPA 58.01.02.252 (Surface Water Quality Criteria For Water Supply Designations), and IDAPA 58.01.02.253 (Surface Water Quality Criteria For Wildlife Habitat and Aesthetics Use Designations).

- Dissolved oxygen criteria below dams are referenced in IDAPA 58.01.02.276. Table 02 (Dissolved oxygen standards for waters discharged from dams, reservoirs and hydroelectric facilities). Although the numeric criteria described for dissolved oxygen standards in 250.02.a.(*DO Criteria for surface waters*) and 250.02.f.i (*DO criteria related to salmon spawning*) do not apply at the point of discharge below dams, reservoirs and hydroelectric facilities, they do apply downstream from the point of measurement where important salmonid spawning habitat is located (IDAPA 58.01.02.276).

- Numeric and narrative criteria relevant for dissolved gas concentration and gas supersaturation can be found in IDAPA 58.01.02.250.01b and IDAPA 58.01.02.300. Application of the gas supersaturation standard is under the authority of the director and may be applied to account for excess stream flow conditions, assure protection of the fishery resource, or ensure compliance of operational procedures such that operations do not increase juvenile fish mortalities or interfere with adult fish migration (IDAPA 58.01.02.300).

- The numeric and narrative criteria for toxic substances for the protection of aquatic life, primary contact recreation and domestic water supply can be found at IDAPA 58.01.02.200.02 (Toxic Substances) and IDAPA 58.01.02.210.01a and 210.01b (Tables: 01a Criteria for Protection of Aquatic Life and 01b Criteria for Protection of Human Health).

- Agricultural Waters. Water quality criteria for agricultural water supply can be found in EPA's Water Quality Criteria 1972, also referred to as the "Blue Book" (EPA R3-73-033)

The permit contains language for the following narrative criteria:

- Toxic Substances. Surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses. These substances do not include suspended sediment produced as a result of nonpoint source activities (IDAPA 58.01.02.200.02).

- Deleterious Materials. Surface waters of the state shall be free from deleterious materials in concentrations that impair designated beneficial uses. These materials do not include suspended sediment produced as a result of nonpoint source activities (IDAPA 58.01.02.200.03).

- Floating, Suspended, or Submerged Matter. Surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses (IDAPA 58.01.02.200.05).

Minimizing Entrainment and Impingement on Cooling Water Intake Structures (CWIS)

The permit addresses Section 316(b) of the CWA. Section 316(b) seeks to minimize adverse effects from cooling water intake structures on fish, and the statute requires the permit writer to use best professional judgment to determine the best technology available (BTA) to be used to ensure that these effects are minimized. In 2014, EPA published a federal rule on requirements for cooling water intake structures at existing facilities (2014 CWIS 316(b) Rule). On January 13, 2021 and July 8, 2022, EPA issued a memo stating that the 2014 CWIS Rule does not apply at hydroelectric facility because it is ambiguous whether the Rule had intended it to. However, EPA's memo states that the CWA statute Section 316(b) does apply to any NPDES facility with a CWIS. This permit applies the CWA statute and uses best professional judgment to determine BTA.

Section 316(b) of the CWA requires that facilities with CWIS ensure that the location, design, construction, and capacity of the structure reflect the best technology available (BTA) to minimize adverse impacts on the environment. The statute requires BTA standards to reduce impingement and entrainment of aquatic organisms at existing power generating and manufacturing facilities. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system. The statute requires that the permit select BTA using best professional judgment to minimize impingement and entrainment.

401 Certification Conditions

Section 401 of the Clean Water Act (CWA) states that a federal agency may not issue a permit to discharge to waters of the United States unless a Section 401 water quality certification is issued or waived. Since this facility discharges to waters of the Nez Perce and the Nez Perce Tribe has not been approved for Treatment as a State (TAS) from EPA, EPA is the certifying authority. EPA recognizes that the 401 certifications are consequences of the proposed action and need to be considered as part of the analysis of effects.

Section 401 of the CWA requires that the certification conditions must be at least as stringent as Nez Perce water quality standards, so any certification conditions would add more protections to threatened and endangered species, critical habitat, or essential fish habitat. Therefore, 401 certification conditions will only require more stringent conditions than the proposed action, and determinations on the proposed action would also apply to a proposed action with any 401 certification conditions.

One of the draft 401 certification conditions for Dworshak Dam requires monitoring of mercury (Hg) and methylmercury (MeHg) at each outfall twice a year. This condition is included in the draft 401 certification at the request of the Nez Perce Tribe in accordance with Nez Perce Tribal Code.

This condition is included in the draft 401 certification in order to gather information regarding potential Hg and MeHg discharge at the dam. Biogeochemical conditions in some reservoirs promote the conversion of deposited Hg into MeHg, and there is a lack of information regarding Hg and MeHg in the discharge from the outfalls at Dworshak Dam.

The Hg and MeHg monitoring provisions in the 401 certification provide more information on potential effects on methylmercury on downstream fish resources. Methylmercury studies at other dam sites (e.g. Hells Canyon Complex) indicate effects to humans from consuming resident fish. EPA does not anticipate any effects from methylmercury on ESA-listed species from discharges from Dworshak Dam.

2.2 Discussion of the Project Purpose and Objectives

The purpose of issuing a NPDES permit to Dworshak Dam is to allow the USACE (the Corps) to discharge oil and grease and pH in compliance with the CWA. This is the first individual NPDES permit issued by EPA for this facility and will be effective for five years.

NPDES permit implement the CWA's goals as stated in Section 101 of the Act. The NPDES permitting program is authorized by Section 402 of the CWA and implemented by regulations appearing in Part 122 of Title 40 Code of Federal Regulations (CFR) as well as other Parts of 40 CFR. All NPDES permit must include effluent limits at least as stringent as the applicable technology-based limits, regardless of the discharge's impact on water quality. NPDES permit also implement the CWA's "fishable/swimmable" goal (Section 101(a)(2)) by including water quality-based limits that may be more stringent than technology-based limits. Water quality-based effluent limits are required by Section 301(b)(1)(C) of the CWA, and they protect the aquatic life, human health, and recreation uses of the nation's waters.

2.3 Description of Dworshak Dam

The Corps owns and operates Dworshak Dam. The facility discharges into mile 1.9 of the North Fork Clearwater River on the Nez Perce Reservation near Ahsahka, Idaho. EPA is the permitting authority for Indian Country in Idaho.

Dworshak Dam produces electricity through the use of falling water from the upstream Dworshak reservoir through Francis turbines and generators in the dam. This facility includes 3 generating units, the dam, reservoir, canal systems or tunnel systems, and associated equipment and structures used in the generation of hydroelectric power. **Appendix A** includes a diagram of Dworshak Dam, and **Figure 2** includes a general schematic of the facility.

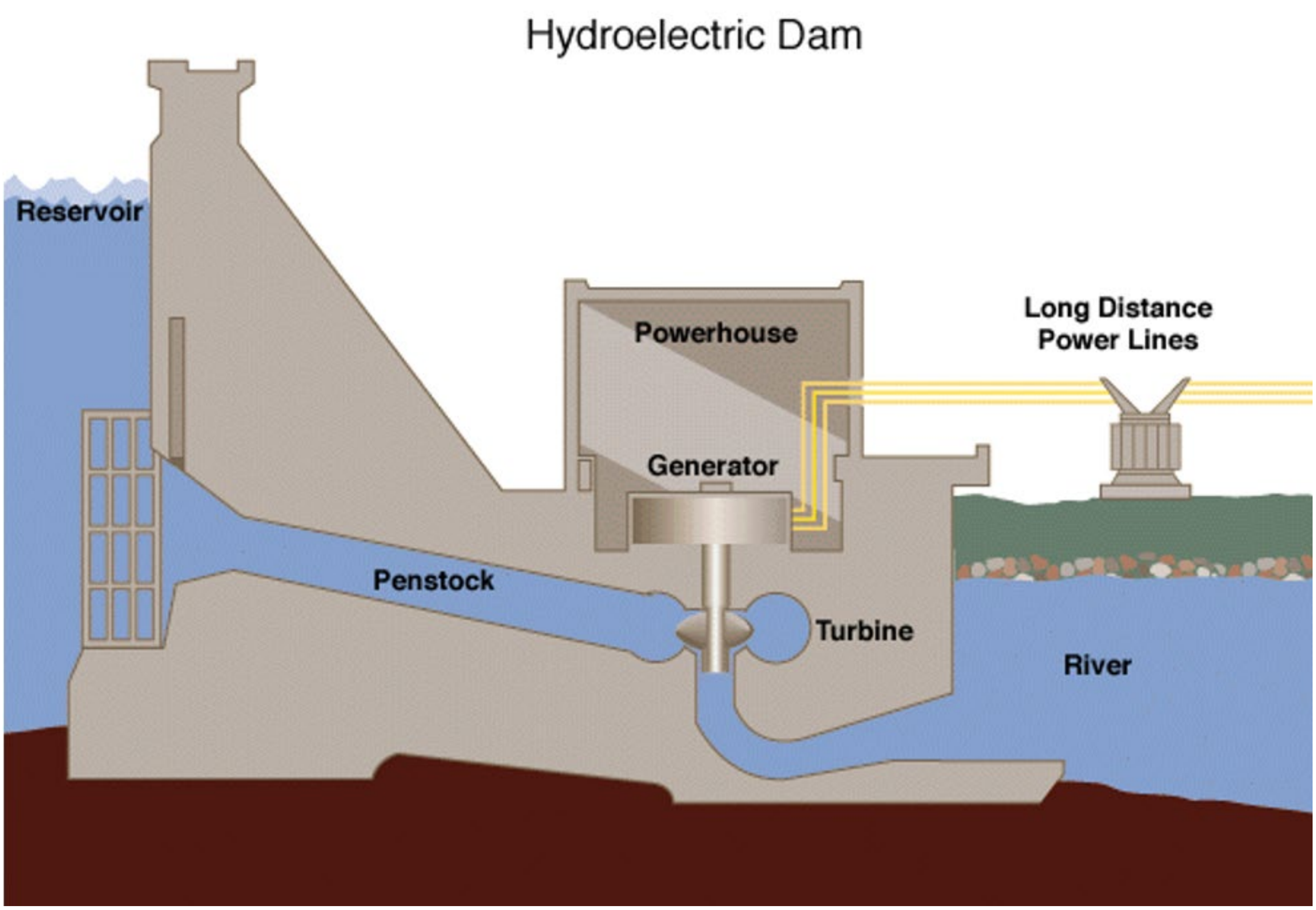


Figure 2. General Schematic of a Hydroelectric Facility. Reservoir water flows into the penstocks and then through the turbines, which power a generator. The turbines are cooled by water from a cold

water intake structure (CWIS). The CWIS is not pictured in this figure but at Dworshak is located in the dam tailrace.

2.3.1 Types of Discharges

The Dworshak Dam NPDES permit will cover the following discharges: cooling water discharges (Outfalls 001-003), the cooling water intake structure, equipment drainage and floor drain discharges (Outfalls 004 and 005), equipment and facility maintenance-related water discharges (Outfall 005), sump and dam leakage flows (Outfalls 004-006), and lubricants (all outfalls). Dworshak Dam discharges pollutants through outfalls located at or near the base of the facility, referred to as the tailrace. The following sections describe different types of discharges addressed by this permit.

Cooling Water Discharges and Cooling Water Intake Structures

Cooling water is used to cool down warm equipment such as generating units and to cool air conditioning units. Since the power generating units create excess heat, each individual generating unit has non-contact air-housing cooling water and non-contact thrust bearing cooling water associated with it ("cooling water"). These two types of cooling water are routed through (adjacent to) a given generating unit before combining and being discharged through a discrete outfall in the tailrace associated with that generating unit. Non-contact cooling water is defined as "water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product or finished product" (40 CFR 401.11(n)).

Related to cooling water discharges is the cooling water intake structure (CWIS) at the facility. The CWIS at Dworshak Dam removes water directly from the Clearwater River from two submerged intakes at the tailrace of the reservoir. There are two CWIS at Dworshak, mounted in the tailrace, one that feeds a 12" intake pipe and one that feeds an 18" intake pipe. Each CWIS has rectangular bar structures to prevent debris from entering. The 12" intake strainer has a 1"x1/4" bar spaced 1.5" on-center (OC) and the 18" intake strainer has a 1"x1/2" bar spaced 1.5" OC. The water from the CWIS is then pumped to a header leading into the turbine bearing oil cooler, thrust bearing oil cooler and surface air cooler of each unit, and discharged through Outfalls 001, 002, and 003. Each pump drawing water from the cooling water header has a basket strainer before the pump. The basket strainers are constructed out of steel mesh and have 1/8" perforated openings. The basket strainers are regularly checked and cleaned of moss and algae buildup. It is possible for fish or other organisms residing or migrating downstream of the dam to become impinged on these grates and screens, or otherwise be entrained into the facility.

Further discussion of the impact of the CWIS on ESA listed species is in Section 6.1.4.

The permit does not address water that flows over the spillway or passes through the turbines. See National Wildlife Federation v. Consumers Power Company, 862 F.2d 580 (6th Cir. 1988); National Wildlife Federation v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982). However, at the point that water is extracted for cooling water, its status moves from pass-through water to cooling water, which is addressed in this permit.

Equipment Drainage and Floor Drain Discharges

Dworshak Dam has a series of canal systems and tunnels within the dam, and like many hydroelectric generating facilities, there is a tendency for water to leak into and through the dam. Drainage water is collected by floor drains, trench drains, and station sumps; spillway sumps and sump pumps are used to discharge this water – along with oil, grease and other water from equipment and floor drains – through discrete outfalls ("equipment and floor drain-related water").

At Dworshak Dam, the equipment and floor drain related water is discharged through the drainage sump, unwatering sump, and skeleton bay outfalls (Outfalls 004-006). The facility uses skimmers and gravity oil/water separators on these outfalls. These oil/water separators use the force of gravity to separate the lower density oils as a layer on top of the oil/water interface and the heavier particulate matter (sludge) as a layer on the bottom of the oil/water separator. The design of oil/water separators is based on the following parameters: water flow rate, density of oil to be separated, desired oil removal capacity, and operating temperature range.

Equipment and Facility Maintenance-Related Water Discharges

The equipment and facility maintenance-related water discharges include water from the facility during periods of equipment, station, and facility maintenance. Maintenance-related waters from the unwatering sump (Outfall 005) discharges approximately 2 days/year. During equipment maintenance operation, discharges occur from the dewatering of equipment containing river water such as the turbine, penstock, navigation locks, and dewatering sumps, which may contain residual oil and grease, detritus, or silt. The maintenance-related water is diverted into Outfall 005 and is treated by a skimmer and an oil/water seperator before discharge.

At some facilities, cooling water may be diverted to the equipment and floor drain water drainage system, resulting in a comingled discharge, which could increase outfall water temperatures. This is not expected to take place at Dworshak Dam, and even at facilities where it does take place, heat increases from commingled discharges are likely to be small or immeasurable since most drainage water is leakage water or other water with temperatures the same as leakage water.

Equipment Using Lubricants

There are a wide array of structures and other equipment associated with the generation of hydroelectric power, much of which involves the application of oil and grease lubrication. Dworshak Dam generates hydroelectric power with Francis turbines, which involve much less oil interfacing with water than the Kaplan turbines used at many other Columbia and Snake River Dams. Francis turbine operations are less likely to involve oil and grease discharges to hydroelectric generation water, but leaks are still possible. Hydroelectric generating water, cooling water, stormwater, and drainage water may be exposed to oil and grease through interfacing with equipment used to generate hydroelectricity, including wicket gates; greased bushings; lubricated wire rope; and in-water equipment such as bearings, blocks, trucks, and guides, that can add pollutants when lubricants come into contact with water ("lubricants"). These lubricants can be discharged in the tailrace with equipment and floor drain-related water, equipment and facility maintenance-related water and can potentially mix with the hydroelectric generating water.

2.3.2 Description of Outfalls

Below in **Table 5** is a brief description of the outfalls at Dworshak Dam. Appendix A also includes pictures of the facility and general outfall locations.

Table 5. Dworshak Dam Outfall Description

Outfall	Outfall Description	Type of Discharge	Maximum Daily Discharge	Average Daily Discharge and Frequency
001	Main Unit 1 Turbine Bearing and Non-Contact Cooling Water	Non-contact Cooling Water	1.3 MGD	1.3 MGD; 10 months/year
002	Main Unit 2 Turbine Bearing and Non-Contact Cooling Water	Non-contact Cooling Water	1.3 MGD	1.3 MGD; 6 months/year
003	Main Unit 3 Thrust Bearing and Non-Contact Cooling Water	Non-contact Cooling Water	3.0 MGD	3.0 MGD; 6 months/year
004	Powerhouse Drainage Sump	Equipment and floor drain discharges	3.6 MGD	1.8 MGD; 2.5 hours/day
005	Unwatering Sump	Maintenance-related discharges, Equipment and floor drain discharges	4.3 MGD	2.1 MGD; 2 days/year
006	Skeleton Bay	Equipment and floor drain discharges	5.8 MGD	2.9 MGD; 7.5 hours/day
Source: Dworshak Dam Permit Application, Submitted February 19 2019; USACE comments submitted Nov 14 2022				

2.3.3 Effluent Limitations and Monitoring

The draft permit proposes a 5 mg/L daily maximum effluent limit for oil and grease and a pH limit of 6.5 to 9.0 s.u.

Table *6* summarizes the proposed effluent limits and monitoring requirements.

Table 6. Effluent Limitation and Monitoring Requirements for Outfalls 001, 002, 003, 004, 005, 006: Non-Contact Cooling Water, Drainage Sump, Unwatering Sump, and Skeleton Bay

Parameter	Units	Effluent Limitations	Monitoring Requirements		
			Sample Location	Sample Frequency	Sample Type
Parameters With Effluent Limits					
pH	std units	Between 6.5 – 9	Effluent	1/week or 1/month[1]	Grab
Oil and grease	mg/L	5 (daily maximum[2])	Effluent	1/week or 1/month[1]	Grab
Report Parameters					
Flow	mgd	Report	Effluent	1/month	Measurement/ Calculation
Temperature	°C	Report 7DADM[3], daily maximum, and daily average.	Effluent[4]	Continuous or 1/month[5]	Measurement/ Calculation
Visible Oil Sheen, Floating, Suspended, or Submerged Matter	--	See Paragraph I.B.4 of this permit.			Visual Observation

Notes

1. In the first year of the permit, if there are no exceedances of the pH limit or oil and grease limit in an outfall, the required monitoring frequency for that pollutant is reduced to 1/month for that outfall. If there are exceedances in the first year of the permit, the frequency will remain 1/week for the remainder of the permit term for that outfall.
2. Maximum daily effluent limit is the highest allowable daily discharge. The daily discharge is the average discharge of a pollutant measured during a calendar day.
3. 7-day average daily maximum (7DADM). This is a rolling 7-day average calculated by taking the average of the daily maximum temperatures. The 7-day average daily maximum for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.
4. Temperature monitoring only required for the Outfalls 001,002, and 003.
5. See Permit Paragraph I.B.10. In the first six months of the effective date of the permit, monthly sampling is required. Continuous monitoring is required after the first six months of the effective date of the permit.

Oil and Grease

The oil and grease limits are derived from the narrative water quality criteria in the state water quality standards, which states that "waters shall be free from hazardous, toxic, deleterious, radioactive, floating, suspended or submerged matter that would impair designated uses (IDAPA 58.01.02.200.01-200.05);"

EPA interprets these narrative criteria as prohibiting a discharge to these waters that would cause an oil sheen. Although effluent concentrations are low for oil and grease, these are the primary pollutants introduced by facility operations and could be present in discharges from sumps, dewatering, and cooling water. EPA has established daily maximum oil and grease limitations of 5 mg/L to represent the concentration at which there is no oil sheen on surface waters. This limit is consistent with several NPDES permits for other federal dams in Washington (see https://www.epa.gov/npdes-permit/draft-discharge-permit-federal-hydroelectric-projects-lower-columbia-river and https://www.epa.gov/npdes-permit/draft-discharge-permit-federal-hydroelectric-projects-lower-snake-river) and at shipyards[1] where a 5 mg/L effluent limitation was established to control for no visible oil sheen. This concentration was based on best professional judgment and on the detection limit for oil and grease, which is 5 mg/L. A daily maximum effluent limit of 5 mg/L will ensure the narrative water quality standards for deleterious, toxic, floating, and no visible oil sheen are met. EPA believes that this limit is a reasonable standard for facility that have numeric effluent limits for oil and grease discharges. The permit does not authorize oil spills. If the numeric limit for oil and grease is exceeded, it is a violation of the permit and is entered into EPA's NPDES compliance and enforcement database for potential future enforcement action. The facility is required to report spills to EPA under the Oil Pollution Act and the facility's Spill Prevention Control and Countermeasures (SPCC) Plan, which are not part of these proposed action. The permit does require the facility to report to EPA and the Nez Perce Tribe if there is an unaccounted oil release into the environment.

pH

The pH limit is also a water quality-based effluent limit established using applicable water quality standards for pH. EPA believes these limits meet water quality standards protective of all uses, including those for aquatic life.

Heat

The proposed permit requires temperature monitoring of the effluent at the outfalls which include the discharge of cooling water (Outfalls 001,002, and 003). Other Columbia and Snake River dam permits include a heat limit based on the Columbia and Snake Rivers. TMDL. However, since Dworshak Dam is operated to release cold water to cool the mainstem Columbia and Snake Rivers during critical fish migration, heat at the facility is not expected to be a concern.

2.3.4 Additional Permit Requirements

In addition to the numeric and narrative effluent limits and requirements to control the pollutants, the permit includes specific best management practices to minimize the discharge of oil and grease and reduce the reliance on petroleum-based lubricants. It also requires the use and evaluations of EALs for

[1] Barnacle Point Shipyards WA-003099-6, Dakota Creek Industries WA-003141-1, Vigor Shipyards, Incorporated WA-000261-5, Everett Shipyard, Piers 1, 3 and Adjacent Area WA-003200-0.

all oil-water interfaces, unless technically infeasible, and requires the USACE to evaluate, track, and report the transition from petroleum-based lubricants to EALs. The permit also requires measures to track and minimize PCB discharges. Finally, the permit requires the facility to provide information on their cooling water intake structure, the presence of organisms that may be impinged and entrained, and to maintain existing technologies that minimize the impingement and entrainment of organisms.

Best Management Practices Plan

The permit requires the development and implementation of a site-specific BMP Plan, which prevents or minimizes the generation and potential release of pollutants from the facility to the waters of the United States through BMPs. This includes, but is not limited to, oil accountability tracking; site-specific measures to prevent the escape of grease and heavy oils used for lubrication and hydraulics; identification of site-specific vulnerabilities, ways to address these vulnerabilities, and contingency planning for potential oil releases from these vulnerabilities; and measures to reduce the need for lubricants for all facility equipment that come in contact with river water.

The BMP Plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of discharges associated with day-to-day work activity at the facility from equipment and floor drain-related water, maintenance-related water (collectively referred to as the "internal facility drainage water"), and any other facility-related water. The BMP Plan shall describe and ensure the implementation of practices which are to be used to eliminate or reduce the pollutants in internal facility drainage water discharges and facility-related water associated with operations at the facility and to assure compliance with the terms and conditions of this permit. The BMP Plan should incorporate elements of pollution prevention as set forth in the Pollution Prevention Act of 1990 (42 U.S.C. § 13101).

EALs

The permit requires the use of EALs for all equipment with oil to water grease interfaces, unless technically infeasible. EPA’s 2011 Environmentally Acceptable Lubricants report defines EALs as “lubricants that have been demonstrated to meet standards for biodegradability, toxicity, and bioaccumulation potential that minimize their likely adverse consequences in the aquatic environment, compared to conventional lubricants.” The permit requires that EALs used in hydroelectric generating facilities are consistent with the definition of EALs in EPA’s 2011 Environmentally Acceptable Lubricants report. The permit defines technically infeasible for EALs as follows: no EAL products are approved for use in a given application that meet manufacturer specifications for that equipment; products which come pre-lubricated (e.g., wire ropes) and have no available alternatives manufactured with EALs; or products meeting a manufacturer’s specifications are not available.

The permittee must also develop an EAL Annual Report, which will require an evaluation of equipment that are candidates for EAL use, whether EALs are technically feasible, and a timeline for which EALs will be implemented. It also requires the report to be updated annually. The USACE has completed a series of reports on the feasibility of EALs and prioritization of EALs. Several of these reports may fulfill a part of the permit requirements. Any of these reports may be used and if needed, supplemented, to fulfill the permit requirements.

Wicket gates, in-line equipment, lubricated wire ropes, and Francis turbines all use lubricants which may encounter water. This may result in release of lubricants into water. Currently, oil and grease are the primary lubricants used for equipment. However, EALs are an alternative lubricant that are biodegradable and less harmful to aquatic life species. EALs also offer a reasonable alternative to longer-term, but costly solutions such as oilless turbines. EALs prevent or minimize the generation and potential release of pollutants from the facility to the waters of the United States.

PCBs

The permit requires a PCB Plan and PCB Annual Report. The PCB Plan must describe PCB monitoring that has been completed and the PCB sources that could come into contact with water and be discharged. The PCB Plan must also identify the actions USACE is taking to prevent, track, and address PCB releases. The PCB Annual Report must describe how the permittee is implementing the PCB Plan, evaluate the effectiveness of actions, and propose any new steps that must be taken to optimize effectiveness.

EPA has also taken a conservative approach and included provisions in the permit that prohibit the discharge of PCBs and the discharge of toxic substances in concentrations that impair the beneficial uses of the receiving water. The permit also requires Dworshak Dam to use lubricants, paint and caulk that do not contain PCBs, unless technically infeasible.

Cooling Water Intake Structures

The permit requires existing technologies to minimize entrainment and impingement mortality in cooling water intake structures. As discussed above, the permit requires the facility to implement the best technology available for minimizing adverse environmental impacts from the impingement and entrainment of various life states of fish (e.g., eggs, larvae, juveniles, and adults) by the CWIS. This includes equipment and action to deter fish from intakes, and cleaning and checking all trash racks, trainers, and intake screens.

The permit requires the permittee to submit a CWIS Evaluation Report by one year from the effective date of the final permit. The CWIS Evaluation Report must include the locations of the cooling water intake structures, an evaluation of strainers and fish presence, information on current fish impingement and entrainment, and an evaluation of additional operations or technologies to minimize fish impingement and entrainment.

The permit also requires the permittee to submit a CWIS Annual Certification by February 28 after the first year of the effective date of the permit, and annually thereafter, that includes a certification statement that BTA has been properly operated and maintained and that documents any changes to the facility that have been made. These permit conditions will help ensure that fish impingement mortality and entrainment at CWIS are minimized and that they are maintained and optimized throughout the permit cycle.

Reporting Requirements

This permit includes the standard monitoring and reporting requirements required of all facility with NPDES permit. General monitoring, recording, and reporting requirements include a representative sampling (of routine and non-routine discharges), monitoring procedures, reporting of monitoring results, additional monitoring by the permittee, maintenance, and retention of certain records, 24-hour notice of noncompliance reporting, other noncompliance reporting (not falling under the 24-hour requirement), and changes in discharge of toxic substances. These topics are covered in detail in the permit.

2.4 Description of the Action area

The ESA implementing regulations define action area as all area to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR section 402.02). The action area for the proposed action is 500 meters downstream of the Dworshak Dam. EPA selected this action area because effects from the pollutants in the proposed action are negligible beyond this point; based on EPA's water quality dilution modeling[2], maximum dilution occurs at 471 meters downstream of the facility. The outfalls discharge where water used for hydroelectric power is also released. The water used to generate hydroelectric power is the same as the river flow, except for flow in spill. Water discharged from outfalls in the proposed action is a small amount compared to the turbine flow and the overall flow of the river.

3 Status of Species and Critical Habitat

3.1 Species Lists from USFWS and NOAA

The complete list of federally listed, threatened and endangered species that are known or suspected to occur within the action area are listed in **Table 7** below. The table identifies the species, their ESA status, and whether Critical Habitat is designated within the action area. EPA identified the species of concern for this Biological Evaluation (BE) based on discussions with NMFS and USFWS. EPA also accessed information from the USFWS website, Information for Planning and Consultation (IPaC), on May 25, 2022 to obtain further information on species and critical habitat in the action area. EPA identified species of concern as dependent on water for all or most of their life histories.

The primary action evaluated in this BE is the issuance of the NPDES permit for wastewater discharges from Dworshak Dam. To be affected by this action, a species must have at least some portions of their life history occurring within the waters where the facility discharge.

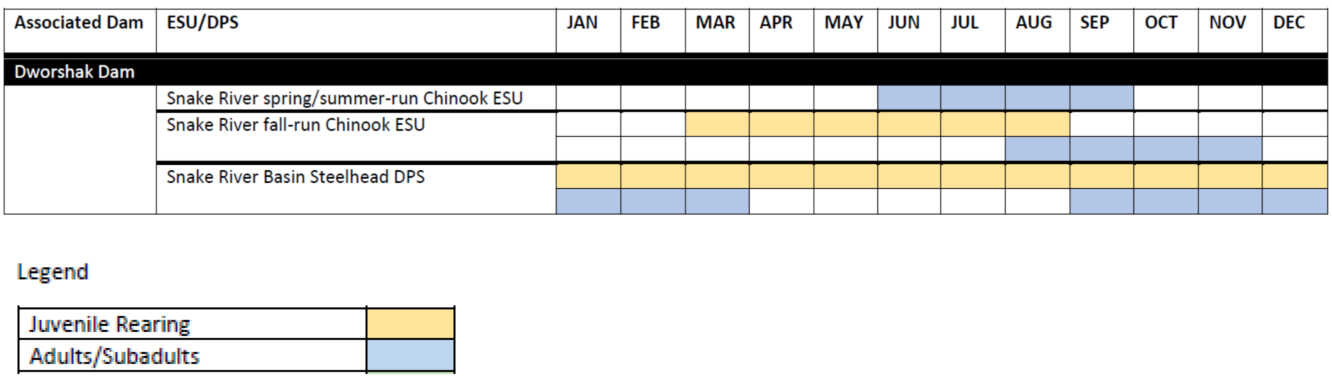
Table 7. ESA Listed and Threatened found within the North Fork Clearwater

Species	Critical Habitat in Action area?	Status
Chinook salmon, Snake River (SR) spring and summer-run (*Oncorhynchus tshawytscha*)	None in action area	Threatened FR Notice: 70 FR 37159 Date: 6/28/2005
Chinook salmon, Snake River (SR) fall-run (*Oncorhynchus tshawytscha*)	Yes FR Notice: 58 FR 68543 Date: 12/28/1993	Threatened FR Notice: 70 FR 37160 Date: 6/28/2005

[2] EPA used CORMIX to model dilution of the outfalls downstream of the facility. See Footnote 5 for more information.

Steelhead, Snake River Basin (SR) (*Oncorhynchus mykiss*)	None in action area	Threatened FR Notice: 71 FR 833 Date: 1/5/2006
Bull trout (*Salvelinus confluentus*)	Yes FR Notice: 75 FR 63898 Date: 10/18/2010	Threatened FR Notice: 64 FR 58910 Date: 11/01/1999

Table 8. Presence of NMFS Species in the Action Area



3.2 Chinook Salmon, Snake River Spring/Summer-run

Description

The Snake River (SR) spring and summer-run Chinook salmon (*Oncorhynchus tshawytscha*) return to spawn in Snake River tributaries after two to three years in the ocean. SR spring/summer-run Chinook are both stream-type fish, with juveniles that migrate to sea as yearling smolts. SR spring/summer-run Chinook salmon enter the Clearwater subbasin from June through September. Juvenile SR spring/summer-run Chinook salmon emerge from spawning gravels from February through June (Bjornn and Peery 1992). After rearing in their nursery streams for about one year, smolts begin migrating seaward from April through May (Bugert et al. 1990, as cited in Matthews and Waples 1991; Cannamela 1992). After reaching the mouth of the Columbia River, SR spring/summer-run Chinook salmon probably inhabit near-shore area before beginning their northeast Pacific Ocean migration. For detailed information on the life history and stock status of SR spring/summer-run Chinook salmon, see Matthews and Waples (1991), NMFS (1995), and NMFS (1991).

This ESU was listed as threatened on June 28, 2005 (NMFS 2005c). The August 18, 1994 Emergency Rule (NMFS 1994), reclassifying SR spring/summer-run Chinook salmon from threatened to endangered, expired on May 2, 1995.

Distribution

SR spring/summer-run Chinook salmon are found in several subbasins of the Snake River (CBFWA 1990) Of these, the Grande Ronde and Salmon Rivers are large, complex systems composed of several smaller tributaries that are further composed of many small streams. In contrast, the Tucannon and Imnaha Rivers are small systems with most salmon production in the main river. In addition to these major subbasins, three small streams, Asotin, Granite, and Sheep Creeks, which enter the Snake River between Lower Granite and Hells Canyon Dams, provide small spawning and rearing area (CBFWA 1990).

Within the mainstem Clearwater River below Dworshak Dam, SR spring/summer Chinook are found as adults during the months of June through September, as they migrate upstream to spawn in tributaries. However, it is not expected that adults spawn within the North Fork Clearwater or that juveniles are present in the action area in the North Fork Clearwater below Dworshak Dam (NMFS, correspondence 2022).

Threats to Species

Recent trends in redd counts in major tributaries of the Snake River indicate that many subpopulations could be at critically low levels. Loss and degradation of tributary habitats and the hydropower system continue to pose significant threats to the viability of the species. Subpopulations in the Grande Ronde River, Middle Fork Salmon River, and Upper Salmon River Basins are at particularly high risk due to increased hatchery production in this area. Both demographic and genetic risks are of concern for such subpopulations, and in some cases, habitat may be so sparsely populated that adults have difficulty finding mates. NOAA Fisheries estimated that the median population growth rate for fish of wild origin decreased (lambda) over a base period from 1980 through 1998 as compared to the spawning effectiveness of hatchery fish released in the wild (Tables B-2a and B-2b in McClure et al. 2000). Estimated hatchery chinook at Lower Granite Dam accounted for a minimum of 69.7 percent of the run. The spring chinook count in the Snake River was at an all-time low of approximately 1,500 as recently as 1995, but in 2001 and 2002 both hatchery and wild/natural returns to the Snake River increased (FPC 2003).

Recovery Plans

NMFS released a recovery plan for SR spring- and summer-run Chinook salmon in November 2017 (NMFS 2017a). Efforts are underway to conserve and enhance natural chinook salmon populations by improving seaward migration survival, restoring habitat, reducing harvest, and modifying hatchery operations to reduce negative effects on wild fish.

Dworshak National Fish Hatchery, located on the confluence of the North Fork and mainstem Clearwater River produces spring Chinook salmon. The Dworshak NFH chinook are not listed in the SR spring/summer ESU, but other hatcheries have populations that are part of the listed ESU.

Critical Habitat

Critical habitat for the SR spring/summer-run Chinook salmon was listed on December 28, 1993 and revised on October 25, 1999 (NOAA 1999a). The designated habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers (except the

Clearwater River) presently or historically accessible to SR spring/summer-run Chinook salmon (except reaches above impassable natural falls and Hells Canyon Dam).

There is no critical habitat designated for SR spring/summer Chinook within the action area for the proposed action.

3.3 Chinook Salmon, Snake River (SR) Fall-Run

Description

The SR fall-run Chinook salmon (*Oncorhynchus tshawytscha*) spawn in rivers that are deeper and larger than those used by other Pacific salmon species due to the presence of larger gravel and increased water flow. These rivers include primarily the 100-mile reach of the Lower Snake River downstream of Hells Canyon Dam, upstream of the upper end of the Lower Granite Reservoir. Limited spawning also occurs in the tailraces of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Dams on the lower Snake River (Dauble et al. 1999; NMFS 2017a). Spawning also occurs in the lower mainstem of the Clearwater River, and in other major tributaries to the Lower Snake River.

Juvenile salmon typically migrate to sea within three months of emergence in freshwater streams and rivers but may spend up to a year in freshwater prior to emigration into the ocean to feed and mature. Adults return to the Snake River anywhere between ages two through five, with spawning most common at age four (Chapman et al. 1991). SR Chinook salmon are loosely separated into three groups – spring, summer and fall – based on their size and ocean life history. Eggs are deposited at a time to ensure that young salmon fry emerge the following spring when the river or estuary productivity is sufficient for juvenile survival and growth. Chinook salmon feed on terrestrial and aquatic insects, amphipods, and other crustaceans while young, and primarily on other fishes when older. Adults returning to spawn do not eat and live off their fat reserves (IDFG 2010b).

The SR fall-run ESU was listed as threatened on June 28, 2005 (NMFS 2005c). The August 18, 1994 Emergency Rule (NMFS 1994), reclassifying SR fall-run Chinook salmon from threatened to endangered, expired on May 26, 1995.

Distribution

The Snake River Basin drains an area of approximately 280,000 km^2 and incorporates a range of vegetative life zones, climatic regions, and geological formations. The Snake River ecological significance unit (ESU) includes the mainstem Snake River and all tributaries, from the Snake's confluence with the Columbia River in Washington to the Hells Canyon Dam complex on the border between Oregon and Idaho. Genetic analyses indicate that fall-run Chinook salmon in the Snake River are distinct from the spring/summer-run in the Snake River Basin (Waples et al. 1991), and as such are considered separately from the other two forms. They are also considered separately from fall-run Chinook because of considerable differences in habitat characteristics and adult ocean distribution, and less definitively, due to genetic differences.

Within the Snake River, there are five major spawning areas described in the species recovery plan: Upper Hells Canyon, Lower Hells Canyon, Grand Ronde River, and Clearwater River. The Lower Clearwater Major Spawning Area includes the reach of the mainstem Clearwater River upstream from the confluence with the Snake River to Selway Falls, and the lower reaches of the South Fork Clearwater, Middle Fork Clearwater, Potlatch, and Selway Rivers. The major spawning area does not include the North Fork Clearwater River below Dworshak Dam.

Although the North Fork Clearwater River is not a major spawning area, there may be individual SR fall Chinook salmon found in the action area. Adults that migrate into the action area of the North Fork Clearwater below Dworshak Dam would occur during the months of August through November, and this area may be used as juvenile rearing habitat during the months of March through August. However, as there is limited spawning within the action area, if any, the presence of juveniles is expected to be limited, since they would have to swim upstream to reach the action area. Most spawning in the region is expected downstream of the action area within the Clearwater River.

Threats to Species

Almost all historical SR fall-run Chinook salmon spawning habitat in the Snake River Basin was blocked or inundated by hydropower development; the upper reaches of the mainstem Snake River were the primary spawning area used by fall-run Chinook. The upper reaches of the North Fork Clearwater above Dworshak Dam are also blocked to spawning habitat due to the hydropower facility. The continued straying by nonnative hatchery fish into natural production area is an additional source of risk to wild chinook. Limiting factors and threats to SR fall-run Chinook include lost access to historic spawning and rearing habitat above the Hells Canyon Dam complex; mainstem Columbia and Snake River hydropower impacts to spawning, rearing, and migration habitat; lost access to habitat above Dworshak Dam; alteration to freshwater habitat caused by upriver dams and water management (altered river flow and temperature regimes, dissolved oxygen, substrate condition, and riparian vegetation), and hatchery and harvest related effects.

Recovery Plans

The National Marine Fisheries Service (NMFS) introduced a recovery plan for SR fall-run Chinook in November 2017 (NMFS 2017c). The plan details specific management strategies for the extant Lower SR population, which include developing more advanced life-cycle models; maintaining and improving spawning, incubation, rearing and migration conditions; addressing loss of off-channel habitat in the estuarine floodplain; continuing ongoing action to gain better understanding of potential climate change impacts; and reducing impacts of hatchery-origin fish on natural-origin chinook (NMFS 2017c). In addition, improved flow management and cool-water releases from Dworshak Dam reduce summer water temperatures, and has contributed to increased juvenile survival rates and increased numbers of returning adults (NMFS 2017c).

Critical Habitat

Critical habitat for the SR fall-run Chinook salmon was listed on December 28, 1993 (NMFS 1993).

Critical habitat for the listed ESU is designated to include river reaches presently accessible to SR fall-run Chinook, excluding area blocked by natural or manmade barriers such as Hells Canyon Dam. Critical habitat is designated in the North Fork Clearwater below the Dworshak Dam and elsewhere in the Snake River and its major tributaries in Idaho, Oregon, and Washington (**Figure 3**).

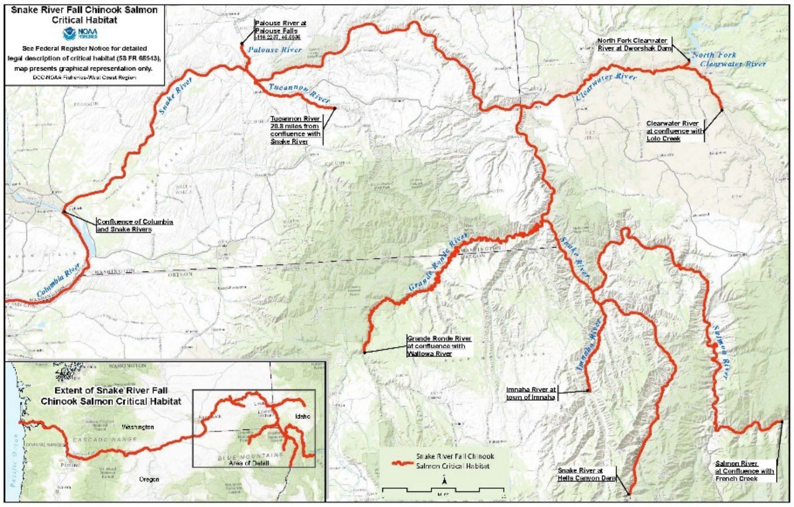


Figure 3. SR Fall Run Chinook Salmon Critical Habitat Designation. Source: NOAA

Primary Constituents Elements (PCE)

In 1993, NMFS determined that the critical habitat designations for SR fall-run Chinook salmon would focus on the physical and biological features of the habitat that are essential to the conservation of the species. In 2005, in designating critical habitat for SR Basin steelhead, NMFS focused on certain habitat features called “primary constituent elements” (PCEs) that are essential to support one or more of the life stages of salmon and steelhead. The 2005 designations also analyzed area that will provide the greatest biological benefits for listed salmon and balance the economic and other costs for area considered for designation. The species addressed in this document occupy the same geographic area and have similar life history characteristics and, therefore, require many of the same habitat functions provided by critical habitat. The critical habitat designation lists these critical functions as essential physical and biological features and the critical habitat designation lists these as PCEs; however, they function the same for all listed species. The PCEs identified for SR fall Chinook are listed below in **Table 9**.

Table 9. Primary constituent elements (PCEs) of critical habitats designated SR fall-run Chinook salmon and corresponding species life history events.

Primary Constituent Elements		Species Life History Event
Site	**Site Attribute**	
Spawning and juvenile rearing area	Cover/shelter Food (juvenile rearing) Riparian vegetation Space Spawning gravel Water quality Water quantity	Adult spawning Embryo incubation Alevin development Fry emergence Fry/parr growth and development Fry/parr smoltification Smolt growth and development

Juvenile migration corridors	Cover/shelter Food Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Fry/parr seaward migration Smolt growth and development Smolt seaward migration
Adult migration corridors	Cover/shelter Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult "reverse smoltification" Adult upstream migration

3.4 Steelhead, Snake River (SR) Basin

Description

Snake River (SR) Basin steelhead (*Oncorhynchus mykiss*) express a summer-run spawning migration strategy, and enter the Columbia River system from May to October, spawning during the following March to May. Two groups are identified, based on initial genetic stock identification studies and length (A-run are less than 78cm, B-run are more than 78cm). B-run steelhead are assigned to one of three categories depending on the contribution of fish exceeding the B-run size threshold (High >40%, Moderate 15-40%, Low <15%). Both A-run and B-run steelhead usually smolt as 2-year or 3-year-olds (Busby et al. 1996, BPA 1992, Hassemer 1992), and all steelhead are iteroparous, meaning they are capable of spawning more than once before death. However, there is likely genetic and life history diversity, and overlap of characteristics, within A-run and B-run fish.

The SR Basin steelhead ESU was listed as threatened on January 5, 2006 (NOAA 2006b).

Distribution

The Snake River flows through terrain that is warmer and drier on an annual basis than the upper Columbia Basin or other drainages to the north. Geologically, the landforms are older and much more eroded than other steelhead habitat in the Columbia basin or in coastal area. Collectively, the environmental factors of the Snake River Basin result in a river that is warmer and more turbid, with higher pH and alkalinity, than is found elsewhere in the range of inland steelhead. In many Snake River tributaries, spawning occurs at a higher elevation (up to 2,000 m) than for steelhead in any other geographic region.

This inland steelhead distinct population segment (DPS) occupies the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, includes all naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from the Snake River Basin and steelhead from certain artificial propagation programs.

Within the SR Basin steelhead DPS, there are five extant major population groups, including the Clearwater River, Salomon River, Grande Ronde River, Imnaha River, and Lower Snake River. The Clearwater River major population group is the nearest to the action area, which includes steelhead in the Lower Mainstem Clearwater. The Clearwater population group also would include the population within the North Fork Clearwater; however this population is extirpated due to the lack of fish passage above Dworshak Dam.

The SR Basin steelhead within the Lower Mainstem Clearwater are supplemented from ESU-listed steelhead from Dworshak National Fish Hatchery, located near the confluence of the North Fork Clearwater with the mainstem Clearwater. The hatchery is located 1.9 miles downstream of Dworshak Dam, and therefore, it is unlikely that any released juveniles make their way upstream against the current of the North Fork Clearwater, into the action area. Returning adult steelhead that pass the hatchery intake do occur within the action area, but are not expected to spawn within the action area.

Threats to Species

The longest consistent indicator of steelhead abundance in the Snake River Basin is derived from counts of natural-origin steelhead at the uppermost dam on the Lower Snake River. According to these estimates, the abundance of summer steelhead has declined from a four-year average of 58,300 in 1964 to a four-year average of 8,300 ending in 1998 (NMFS 2000). In general, steelhead abundance declined sharply in the early 1970s, rebounded moderately from the mid-1970s through the 1980s, and declined again during the 1990s. NMFS (1997) identified threats to steelhead include timber harvest, agriculture, mining, and urbanization that have degraded, simplified, and fragmented habitat.

Hydropower projects also create substantial habitat blockages in this ESU; the major ones are the Hells Canyon Dam complex (mainstem Snake River) and Dworshak Dam (North Fork Clearwater River). Minor blockages are also common throughout the region. Spawning area have been degraded by overgrazing, as well as by historical gold dredging and sedimentation due to poor land management.

Recovery Plans

NMFS released a recovery plan for SR steelhead in November 2017 (NMFS 2017a). Efforts are underway to conserve and enhance natural SR steelhead populations by improving seaward migration survival, restoring habitat, reducing harvest, and modifying hatchery operations to reduce negative effects on wild fish. The Dworshak National Fish Hatchery produces large B-steelhead trout to mitigate for habitat lost in the North Fork Clearwater River due to the construction of the dam. These hatchery B-run steelhead are listed in the SR steelhead ESU.

Critical Habitat

Critical habitat for SR steelhead was initially designated on February 16, 2000 (NMFS 2000), withdrawn in April 2002, and then re-designated on September 2, 2005. The initial designated habitat consisted of all river reaches accessible to listed steelhead in the Snake River and its tributaries in Idaho, Oregon, and Washington. Also included were river reaches and estuarine area in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to the confluence with the Snake River. Excluded were area above the Hells Canyon and Dworshak Dams and area above longstanding, naturally impassable barriers (e.g., Napias Creek Falls and other natural waterfalls in existence for at least several hundred years). The newly revised and accepted critical habitat (NMFS 2005a) includes 8,049 stream miles and four square miles of lakes.

There is no critical habitat designated for SR steelhead within the action area for the proposed action.

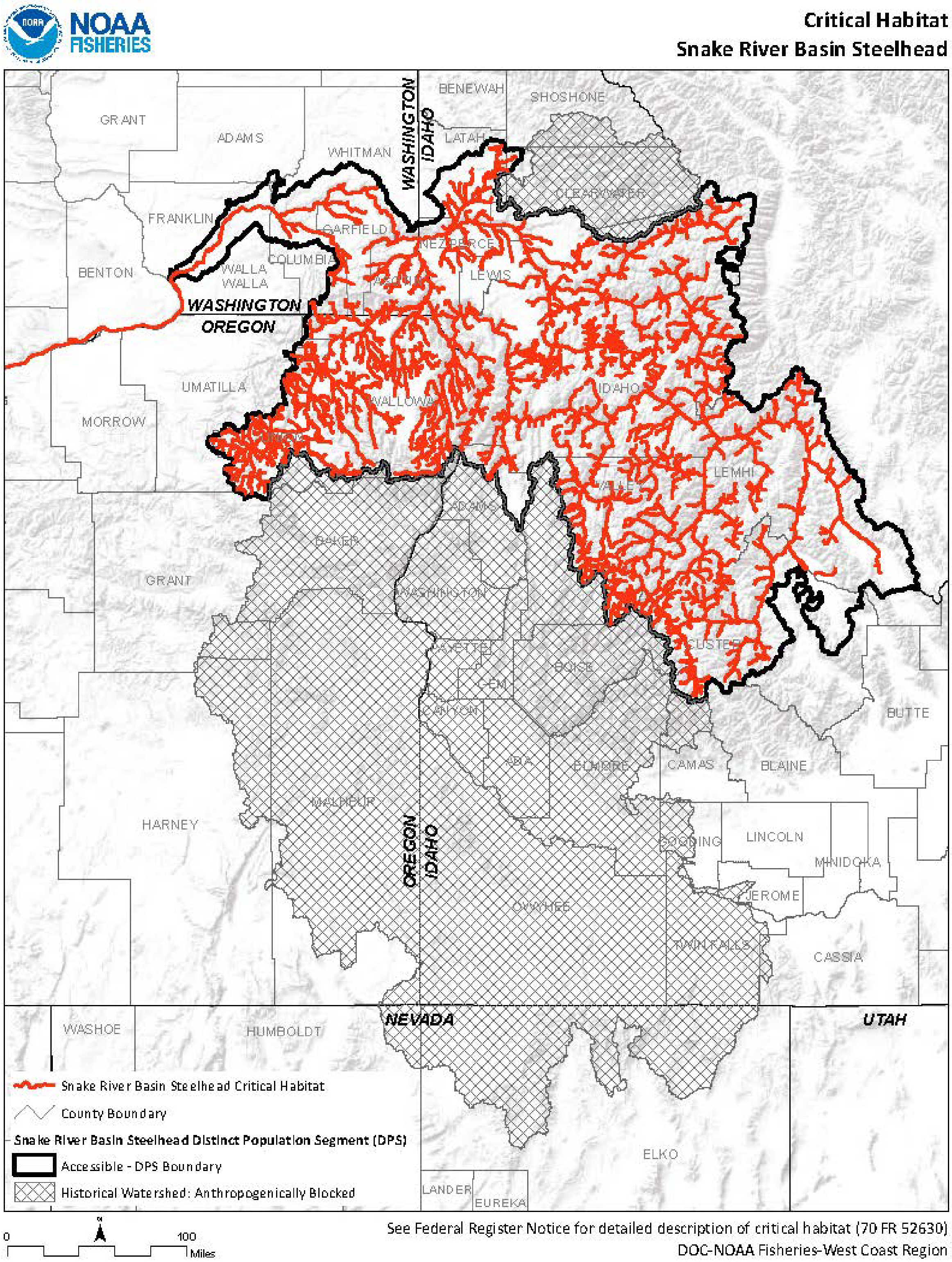


Figure 4. SR Steelhead Critical Habitat Designation

3.5 Bull Trout

Description

Bull trout (*Salvelins confluentus*) are located throughout the Columbia and Snake Rivers within the action area. The species can be found in streams, rivers, and lakes and depends on cold, clear water. Strong populations require high stream channel complexity. Channel stability, winter high flows, summer low flows, substrate, cover, temperature, and the presence of migratory corridors influence distribution and abundance of bull trout. Bull trout are seldom found in waters where temperatures are warmer than 15°C to 18°C (USFWS 2002a).

Small bull trout eat terrestrial and aquatic insects but shift to preying on other fish as they grow larger. Large bull trout are primarily fish predators. Adult bull trout are usually small but can grow to 36 inches in length and up to 32 pounds. Bull trout reach sexual maturity at between four and seven years of age and are known to live as long as 12 years. Bull trout eggs require a long incubation period compared with other salmon and trout, hatching in late winter or early spring. After hatching, fry rear in low velocity water and find cover in substrate interstices associated with cobble and boulders or submerged fine debris to create visual isolation. Fry may remain in the stream gravels for up to three weeks before emerging (USFWS 2002a).

Bull trout exhibit two distinct life history forms, resident and migratory. Resident populations generally spend their entire lives in small headwater streams, while migratory bull trout rear in tributary streams for several years before migrating into large rivers or lakes. Bull trout spawn primarily in September and October and may spawn every year or in alternate years. Decreasing water temperatures may influence the onset of spawning. Hatching is completed in 100 to 145 days, usually at the end of January. Hatchlings emerge from the stream bed around April.

Distribution

The Columbia River population segment spans the northwestern United States and British Columbia, Canada. This population segment comprises 386 bull trout populations in Idaho, Montana, Oregon, and Washington, with additional populations in British Columbia. The Columbia River population segment includes the entire Columbia River Basin and all its tributaries, excluding the isolated bull trout populations found in the Jarbidge River in Nevada. Bull trout populations within the Columbia River population segment have declined from historic levels and are generally considered to be isolated and remnant as shown.

Within the Columbia River population segment is the Mid-Columbia Recovery Unit, located within the United States. There are 24 designated core areas within this recovery unit. Upstream of Dworshak Dam and the action area, is the North Fork Clearwater River core area, which is home to a isolated population of bull trout that reside in the Dworshak Reservoir and upstream. The North Fork Clearwater River downstream of Dworshak Dam is not included in this core area. In addition, the mainstem Clearwater upstream and downstream of the confluence with the North Fork is designated as foraging, migration, overwintering (FMO) habitat. The mainstem Clearwater provides access to core areas in the Clearwater Basin and provides habitat and connectivity but is not home to a local population of bull trout (USFWS 2015).

Therefore, there is not a resident population of bull trout that live within the action area. Individual adult bull trout may occur in the action area for activities related to foraging or overwintering (IDFG 2014), although it is not expected that juvenile bull trout would be found in the action area due to the distance from suitable spawning habitat.

Threats to Species

Bull trout are vulnerable to many of the same threats that have reduced salmon populations. Because of their need for very cold waters and long incubation time, bull trout are more sensitive to increased water temperatures, poor water quality, and degraded stream habitat than many other salmonids. Further threats to bull trout include hybridization and competition with nonnative brook trout, brown trout, and lake trout; overfishing; poaching; and man-made structures that block migration (USFWS 2002a).

In many areas, continued survival of the species is threatened by a combination of factors rather than one major factor. Historical habitat loss and fragmentation, interaction with nonnative species, and fish passage issues are identified as the most significant primary threat factors affecting bull trout (USFWS 2015). Dams and other in-stream structures, including Dworshak Dam, also affect bull trout by blocking migration routes, altering water temperatures, and killing fish as they pass through and over dams or are trapped in irrigation and other diversion structures (USFWS 2002a). Brook trout, introduced throughout much of the range of bull trout, easily hybridize with them, producing sterile offspring. Brook trout also reproduce earlier and at a higher rate than bull trout, so bull trout populations are often supplanted by these non-natives.

Additionally, past and continuing land management activities have degraded stream habitat, especially along larger river systems and streams located in valley bottoms. Degraded conditions have severely reduced or eliminated migratory bull trout as water temperature, stream flow, and other water quality parameters fall below the range of conditions that these fish can tolerate. In many watersheds, remaining bull trout are smaller, resident fish isolated in headwater streams.

Recovery Plans

The bull trout recovery plans for the Recovery Units aim to ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed across the species' range so that the species can be delisted. The following objectives for recovery have been identified:

- Geographically widespread distribution of bull trout across representative habitats and demographically stable;
- Conserve genetic diversity and diverse life history forms of bull trout; and
- Conserve and connect cold water habitats essential to bull trout (USFWS 2015).

Critical Habitat

Critical habitat was first designated for bull trout in the Columbia and Klamath River Basins on October 6, 2004 and revised on September 26, 2005 (USFWS 2005e). A final rule was issued on November 18, 2010. The critical habitat encompasses a total of 66,308 acres of lakes and reservoirs in

Washington, and 30,255 acres in Oregon including near the North Fork Clearwater River as shown in Figure 5.

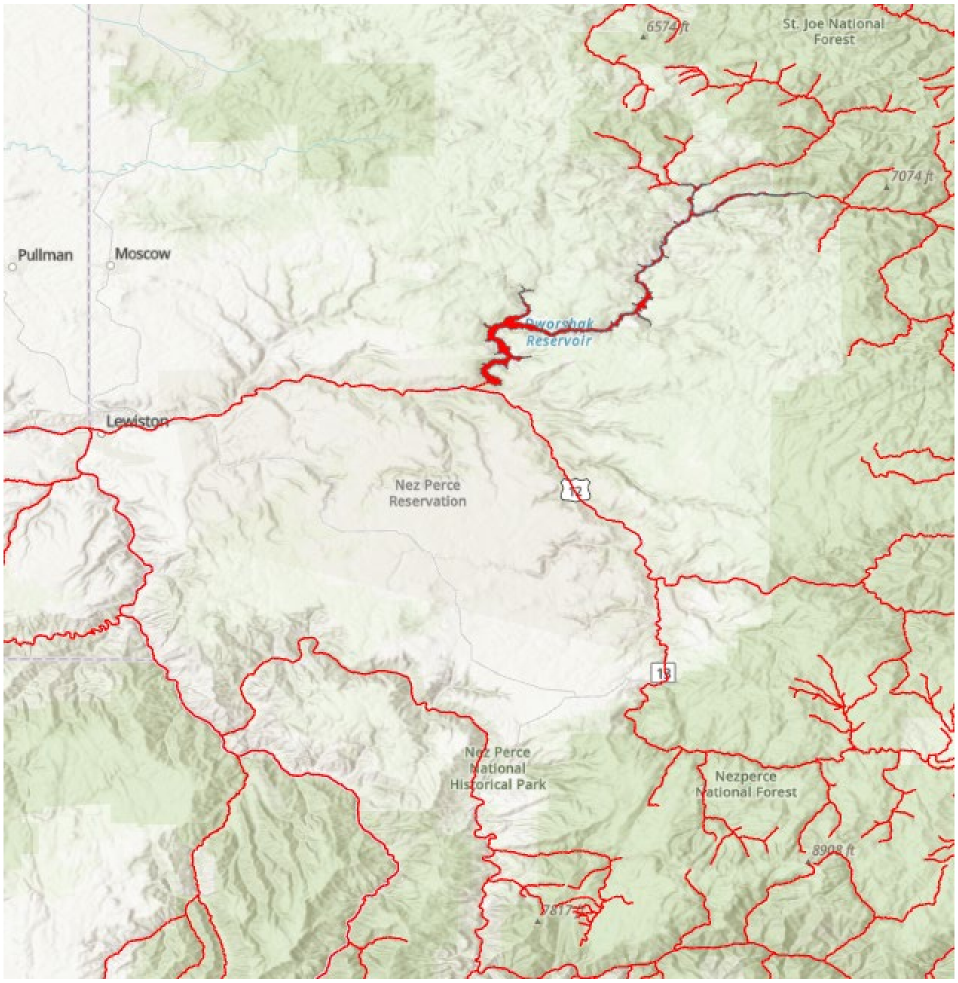


Figure 5 Bull trout Critical Habitat Designation Near Action Area

Primary Constituents Elements (PCE)

The PCE for bull trout that have been identified include:

- Springs, seeps, groundwater sources, and hyporheic flows to contribute to water quality and quantity and provide thermal refugia;
- Minimal migration impediments between the habitats that support the various life history stages;
- Abundant food base; complex river, stream, lake, reservoir, aquatic environments, and process;
- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes
- Water temperatures ranging from 2 to 15^{o}C, with adequate thermal refugia available for temperatures that exceed the upper end of this range;
- Spawning and rearing area with sufficient amount, size, and composition of substrate with minimal fine sediment;

- Natural hydrograph;
- Sufficient water quality and quantity; and
- Sufficiently low levels of nonnative predatory, interbreeding, or competing species

4 Description of the Environmental Baseline

The environmental baseline in the action area is described in detail in the 2020 CRS BiOps and 2020 CRS EIS. The additional information below supplements the environmental baseline from the 2020 CRS BiOps and 2020 CRS EIS with water quality data collected upstream of the facility, ambient flows and temperatures in the North Fork Clearwater River, and information on 303(d) listed impairments in the action area.

4.1 Influent data

There are limited data for water quality constituents in the North Fork Clearwater River. However, there is temperature and pH data collected in the receiving water downstream of the facility. The 95th percentile of maximum daily temperature and pH measured between 2016-2021 are summarized below in **Table 10**.

Table 10. Receiving Water Quality Data

Parameter	Percentile	Value
Max Daily Temperature[1]	95th	10°C
pH[2]	95th	7.89 s.u.
Source: 1. DART DWQI, 2016-2021; 2. Data collected USGS Gauge Station 13340000, 1973-2018		

Additionally, there are single samples of influent data collected upstream of the facility. **Table 11** includes influent data from the permit application.

Table 11. Influent Data from permit applications

pH	BOD (mg/L)	TSS	COD	TOC (mg/L)	Ammonia (mg/L)	Oil/Grease	PCB (mg/L)
7.76	<2.0	<1	<5	6.56	0.0594	ND	ND
Source: Dworshak Dam Permit Application, Submitted February 19, 2019							

4.2 Downstream Data

The outflow at the facility varies during the year. The 2016-2020 average hydrograph at the tailrace of the dam peaks at approximately 12 kcfs during April and July and August, and on average drops to 2 kcfs in September and October. In addition to flow variation within a given year, there is variation in outflow between years, as seen in **Figure 6.** Cold-water fish releases made at Dworshak contribute to high flows during the summer months. These cold water releases moderate temperatures downstream in the Snake River to protect fish habitat and upstream passage of salmon and steelhead species.

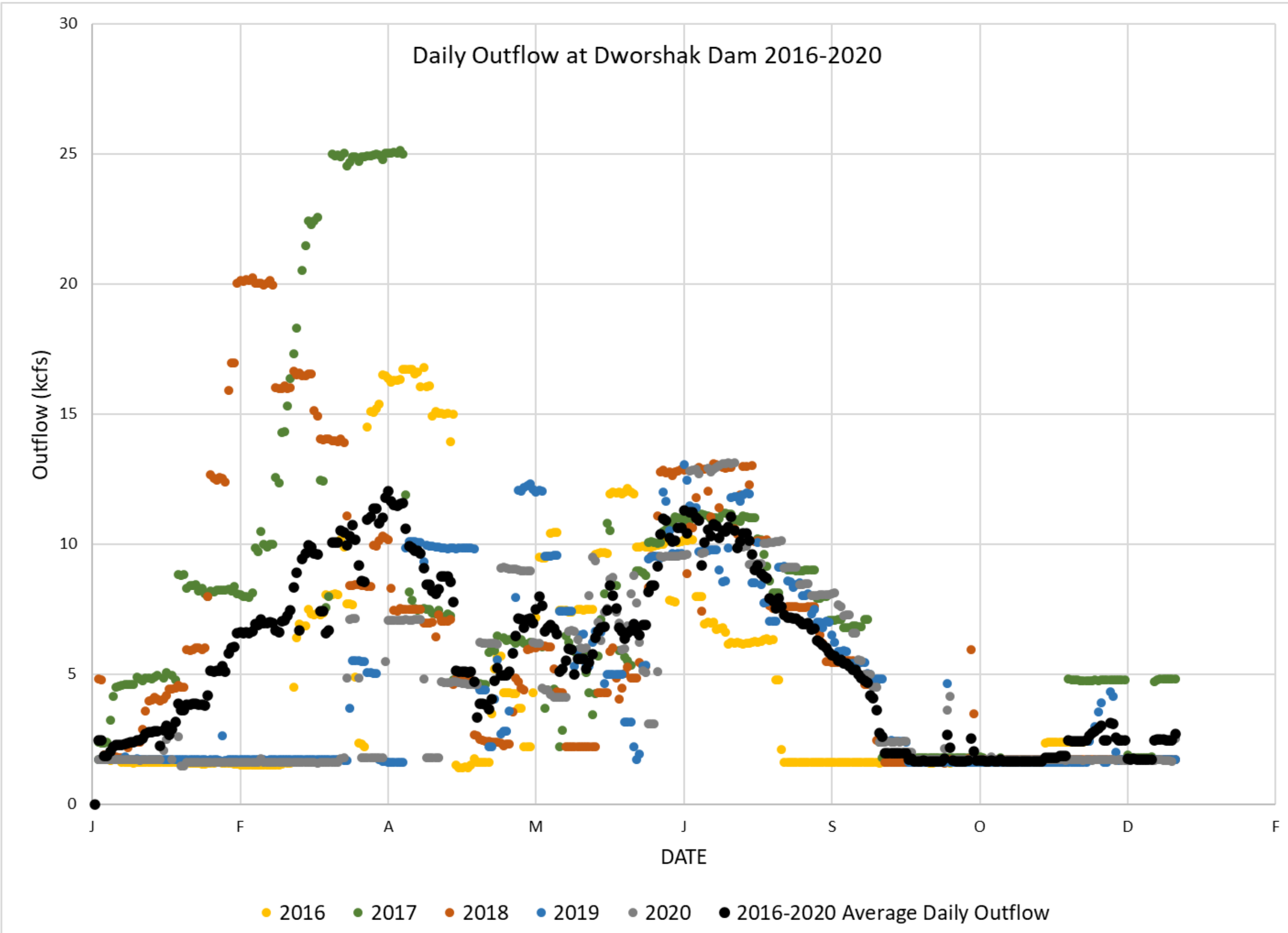


Figure 6. Average daily outflow, including spill, at Dworshak Dam between 2016-2020 (black), with each year plotted in color to illustrate variation between years. Data source: Columbia River Data Access in Real Time, Columbia Basin Research, University of Washington.

The temperatures both upstream of Dworshak Dam in Dworshak Reservoir and downstream of Dworshak Dam in the North Fork Clearwater vary during the year. The temperatures of the reservoir generally increase during summer and fall, then decrease during winter. The temperatures at the tailrace and further downstream are influenced by the cold water releases at the dam. The temperatures at the scroll cases of Dworshak between 2013 and 2022 are shown in **Figure 7**.

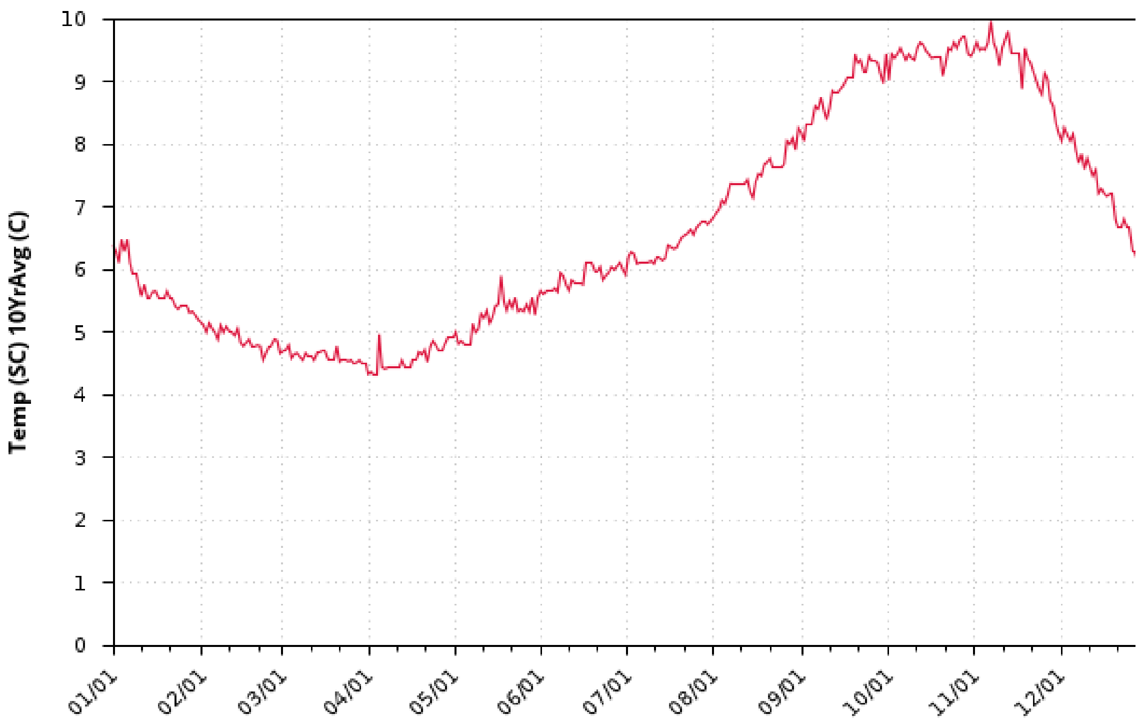


Figure 7. 10-Year Average Temperatures at Dworshak Scroll Case, 2013-2022[3].

4.3 Impairments

The facility discharges to Nez Perce tribal waters, to the North Fork Clearwater River. No Idaho tribes have 303(d) lists or TMDLS and the Nez Perce has not assessed this water. Therefore, there are currently no impairments within the action area for this facility.

5 Effects of the Action

5.1 Introduction[4]

The ESA Section 7 implementing regulations (50 CFR 402.02) define "effects of the action" as: all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

This BE analyzes the consequences of the proposed permit on ESA-listed and designated critical habitat in the action area for the following constituents: oil and grease, pH, heat, total suspended solids, and oxygen-demanding materials. The main steps to this analysis are: 1) determine the concentrations/standard units of pH, oil and grease, and heat from permitted discharges in the action area; 2) analyze the concentrations of total suspended solids and oxygen-demanding substances from

[3] Columbia River DART, Columbia Basin Research, University of Washington. (2023). River Environment Graphics & Text. Available from https://www.cbr.washington.edu/dart/query/river_graph_text
[4]

existing effluent data; 3) consider the additional conditions of the permit; 4) gather information on the pollutants of concern on ESA-listed species and designated critical habitat; and 5) assess the effects on ESA-listed species and designated critical habitat.

This BE concentrates on the protective measures afforded by the proposed permit. It is important to understand that the permit does not authorize noncompliance. Although it is possible that there may be situations where permittees are not in compliance with the permit, such situations are not authorized and not addressed in this BE. The analysis of effects in the BE assumes compliance with the proposed permit.

The objective of this section of the Biological Evaluation is:

- To determine whether the proposed permit for the facility is protective of listed species and their designated critical habitats in the action area

There are three possible determinations of effects under the ESA (USFWS and NMFS 1998). The determinations and their definitions are:

- **No Effect (NE)** - the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat.
- **May affect, is not likely to adversely affect (NLAA)** - the appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- **May affect, likely to adversely affect (LAA)** - the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent action, and the effect is not discountable, insignificant, or beneficial (see definition of “is not likely to adversely affect”). In the event there are some adverse effects, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires formal section 7 consultation.

For the purposes of Section 7 of the ESA, any action that is reasonably certain to result in “take” is likely to adversely affect a proposed or listed species. The ESA (Section 3) defines “take” as “to harass, harm, pursue, hunt, shoot, wound, trap, kill, capture, collect or attempt to engage in any such conduct.” Further, the term “harass” is defined as “an intentional or negligent act that creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering” (50 CFR 17.3). NOAA Fisheries has interpreted “harm” as “an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, feeding, or sheltering” (64 FR 60727). The USFWS (1994a) further defines “harm” as “significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.”

5.2 Characterization of Wastewater Quality and Permit Conditions

To characterize the effluent, EPA evaluated the facility's application form and additional data provided by the facility. The table below summarizes information from the permit application received in 2019. Data are limited, and there is one sample point per outfall. The ranges presented in **Table 12** reflect the samples at multiple outfalls.

Table 12. Summary of Pollutants Detected in Outfalls

Pollutant	Minimum	Maximum
Oil and grease	Non-detect	Non-detect
Total organic carbon (TOC)	2.25 mg/L	7.55 mg/L
Chemical oxygen demand	<5 mg/L	5.47 mg/L
Biochemical oxygen demand	<2 mg/L	2.48 mg/L
Temperature (summer)	7 °C	12 °C
pH	7.0 s.u.	8.5 s.u.
Source: Dworshak Dam Permit Application, Submitted February 19 2019		

In addition to the effluent limits for oil and grease and pH, the permit includes requirements that further minimize the impact of the permit on listed species. These additional requirements include the following:

- Monitoring requirements for flow, temperature, oil and grease, and pH
- BMP requirements to manage, minimize, and eliminate the use of petroleum-based lubricants including a BMP plan and annual BMP reports
- Prohibition of the use of toxics that will impair beneficial uses
- Prohibition of the use of PCBs
- The use of Environmentally Acceptable Lubricants (EALs), unless technically infeasible, including annual EAL reports
- Reporting/Recordkeeping requirements

5.3 Impacts of the Proposed Action on Receiving Water Quality

EPA determined the receiving water concentrations and amount of pollutant added from the discharges of oil and grease, pH, temperature, TSS, and oxygen-demanding substances in the proposed permit on the threatened and endangered species, critical habitat and essential fish habitat. EPA's draft permit proposes effluent limits that meet Idaho's water quality standards. These standards protect beneficial uses, including for aquatic life. Therefore, the permit, by meeting water quality standards, protects the threatened and endangered species in the action area. When discharges mix with the receiving water, the water further dilutes the concentrations of the discharges further reducing the impacts from the proposed action on the North Fork Clearwater River.

EPA used the proposed effluent limitations for pH, oil and grease, and heat and facility information such as discharge flows and dam configuration and receiving water information to determine the impact of the discharges on the action area. All information can be found in the Dworshak Dam NPDES Permit Fact Sheet (https://www.epa.gov/npdes-permits/draft-npdes-permit-dworshak-dam-idaho).

EPA modeled the dilution factor for discharges into the North Fork Clearwater River using the CORMIX[5] model to evaluate the amount of mixing that would occur in the North Fork Clearwater River.

Table 13 shows dilution factors used to calculate potential pollutant concentrations in the action areas. A dilution factor is the amount of dilution that occurs at a distance downstream of the point of discharge in the receiving water. The effluent concentration divided by the dilution factor reflects the effluent concentration after mixing with the receiving water. Therefore, the larger the dilution factor, the lower the effluent concentration will be downstream of the discharge. To evaluate the effects of the pollutants of concern, EPA considered the distribution of the effluent concentrations in the action area to evaluate acute and chronic exposures.

Table 13. Dilution Factors in the Action Area

Receiving Water	Distance downstream	Dilution Factors	Basis
North Fork Clearwater	1 meter	1	CORMIX modeling results
	10 meters	2	
	15 meters	3	
	100 meters	29	
	300 meters	56	
	471 meters	83	

Table 14 shows the facility flows compared to river flows. Although EPA used the CORMIX modeling results to calculate dilution in the North Fork Clearwater, **Table 14** provides another rough comparison of the flows in the North Fork Clearwater compared to the maximum flows that would be discharged if all outfalls were discharging at the same time at their design flow. The flows in the North Fork Clearwater are significantly higher than the discharges from Dworshak, and therefore provide significant dilution.

[5] The CORMIX model (Jirka et al, 1996) simulates the physical dispersion of the pollutant plume and calculates the amount of dilution from the discharge point. CORMIX inputs include effluent characteristics, outfall configuration and depth, pollutant level, direction of discharge compared to the direction of the receiving water, and distance to banks. Ambient water inputs include river velocity, temperature, and the physical geography of the river.

Table 14. Facility Discharge Flows Compared to River Flows

Receiving water	Total Maximum Daily Discharge to North Fork Clearwater (MGD)	Minimum Average Daily, North Fork Clearwater at Dworshak Dam Outflow (MGD) (2011-2016)	Percentage of discharges compared to North Fork Clearwater/Dilution Factor
North Fork Clearwater River	18	646	2.8 % Dilution Factor: 36

5.4 Determination of Species Presence and Exposure Pathways

The initial assessment of exposure consisted of mapping the location of the facility and determining whether any ESA-listed species or designated critical habitat are known to occur in the action area (Section 3). EPA then analyzed each species and the impacts of specific pollutants authorized under the proposed action. For each pollutant, EPA determined for which species would or would not be likely to be adversely affected. If one species were likely to be adversely affected by one pollutant, but not likely to be adversely affected by another pollutant, the overall determination is that the species is likely to be adversely affected.

This section describes the effects on species where the issuance of the permit is likely to adversely affect or unlikely to adversely affect species. These species are SR spring/summer-run chinook, SR fall-run Chinook, SR Basin steelhead, and bull trout.

5.5 Determination of Effects on Species of Concern

5.5.1 Oil and Grease

Oil and grease are a measure of a variety of substances including fuels, motor oil, lubricating oil, hydraulic oil, cooking oil, and animal- and plant-derived fats. The combined concentration of these substances is typically measured within a body of water. Most sources of oil and grease are insoluble in water. However, agitation can create a temporary emulsion with water. Fatty material from plant and animal sources are made up of lipids which are polar molecules and partially soluble in water.

Toxicity varies among different types of oils and greases. Refined oils are generally more toxic than crude oils. Various hydrocarbons found in fuels can pose a wide range of human health problems, adverse effects on organs such as the liver and kidneys to blood disorders. In addition, some hydrocarbons are carcinogens.

5.5.1.1 Oil and Grease Environmental Baseline

Oil and grease are not naturally occurring substances. There are no water quality impairments for oil and grease in the action area. The USACE collected influent data at the influent and at the forebay at four of the outfalls and submitted the data with the permit application. The influent oil and grease at Dworshak Dam resulted in a non-detect, as did the effluent sample for oil and grease. This represents a single data point but is the available data at this time. The environmental baseline is further described in **Section 4.**

The permit requires the facility to switch to using environmentally acceptable lubricants (EALs) wherever technically feasible, consistent with the other federal dam permits. However, at Dworshak Dam, this has already been achieved, and the facility has switched to EALs wherever technically feasible.

Oil and Grease Water Quality Standard

There are no numeric water quality criteria for oil and grease. However, narrative criteria in Idaho state water quality standards related to oil and grease including the following: “surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses (IDAPA 58.01.02.200.02); “surface waters of the state shall be free from deleterious materials in concentrations that impair designated beneficial uses” (IDAPA 58.01.02.200.02); and “surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses” (IDAPA 58.01.02.200.05).

5.5.1.2 Oil and Grease Effluent Limits

As described in **Section 2.1.3,** EPA interprets these narrative criteria as prohibiting a discharge to these waters that would cause an oil sheen. EPA has established daily maximum oil and grease limitations of 5 mg/L to represent the maximum concentration at which there is an oil sheen on surface waters. Limited monitoring indicates that current discharges are below this level. This limit is consistent with several NPDES permit issued in Washington at shipyards[6] where a 5 mg/L was established to control for no visible oil sheen. This concentration was based on best professional judgment and on the detection limit for oil and grease, which is 5 mg/L. A daily maximum effluent limit of 5 mg/L will ensure the narrative water quality standards for deleterious, aesthetic, and no visible oil sheen are met. EPA believes that this limit is a reasonable standard for facility that numeric effluent limits for oil and grease.

5.5.1.3 Oil and Grease Impacts to Organisms

Oil and grease can have acute and chronic effects on aquatic organisms. Petroleum oils from oil spills may harm aquatic life through ingestion, absorption or inhalation that may cause mortality or compromise the survival of wildlife (Ober 2010). Oil on waterfowl may reduce buoyancy, impair mobility, and decrease thermoregulation that increase their vulnerability to weather and predators. Fish can die if oil covers their gills and prevent them from breathing. Benthic invertebrates can be impacted by asphyxiation (EPA 1976; EPA 1986; National Academies of Science Engineering and Medicine 2003). Because of the broad category of chemicals under oil and grease, the toxicity among specific chemicals varies significantly. The toxicity of oil and grease on an organism also depends on its life stage. Eggs, larvae, and juveniles are more sensitive to oil and grease than adult fish (Irwin 1997). Oil from animals and vegetables are generally not toxic to aquatic life, while polycyclic aromatic hydrocarbons (PAHs) are considered to be toxic to aquatic life in small amounts (Meador 2003).

The development of a protective standard for oil and grease has been stymied by the wide range of constituents that may be contained within oil and grease. EPA’s national water quality criteria (Red Book, EPA 1976 and Gold Book EPA 1986) discusses the inability to establish a protective criterion of oil

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[6] Barnacle Point Shipyards WA-003099-6, Dakota Creek Industries WA-003141-1, Vigor Shipyards, Incorporated WA-000261-5, Everett Shipyard, Piers 1, 3 and Adjacent Area WA-003200-0.

and grease generally because of the wide range of individual compounds that may be contained in the oil and grease.

Toxicology studies have evaluated the lethal and acute impacts of exposure to oil and grease products for test species. Studies evaluating juvenile crayfish exposed to southern crude oil found a 96-hour LC50 of 89 mg/L with the LC10 estimated to be approximately 10 mg/L and no lethality at 1-3 mg/L (Barbee et al 2010). Based on this study, concentrations at 1-3 mg/L would be unlikely to cause acute lethality effects to individual fish. EPA also conducted an analysis on individual constituent compounds of oil and grease used at Chief Joseph Dam, Dworshak Dam, and Grand Coulee Dam (EPA 2022b). The most sensitive study was on Japanese Medaka with 24-hour and 48-hour exposure to a specific compound (2,6-Di-Tert-Butyl-P-Cresol) of oil and grease, which found LC50 concentrations of 5.3 mg/L, 13.5 mg/L, and 17.5 mg/L (Tsuji 1986). This specific compound would not be expected to comprise 100 percent of the oil and grease discharge. EPA's risk assessment methodology is to divide the LC50 by 2.27 to determine a concentration that would be unlikely to cause acute lethality to the test species. Taking the lowest LC50 of 5.3 mg/L from the study on Japanese Medaka and dividing it by 2.27 results in a concentration of 2.3 mg/L. EPA's Red Book discusses sublethal effects from oil and grease that would interfere with cellular and physiological processes such as feeding and reproduction but would not lead to immediate death of the organism. Studies on pink salmon egg and larvae were observed at 1.6 mg/L when exposed to Prudhoe Bay crude oil, where avoidance could affect their behaviors (Rice, 1973). Juvenile chinook salmon exposed to 5 and 10 mg/L of benzene were shown to have an initial increase in respiration (Brockson 1973).

Based on the studies above, **EPA is using a benchmark of 1 mg/L for oil and grease as a level where acute toxic effects in individual fish are unlikely due to short-term exposure**. Individual fish are not expected to reside in the action area for long periods of time that would result in chronic exposures, and therefore would not be subject to chronic effects (e.g., growth effects or toxic effects from extended exposure) from oil and grease. Small numbers of fish, however, may be expected in the action area for short periods of time. Therefore, EPA focuses its analysis on potential acute toxic effects from oil and grease.

5.5.1.4 Oil and Grease Effects Analysis

Important considerations for the impact of oil and grease on ESA species are the life phase and duration of time spent in the action area. ESA-listed species in the action areas are adults or juveniles rather than the more sensitive egg or larvae stage. As there is no fish passage above the dam, juvenile SR spring/summer chinook, juvenile SR fall chinook, and juvenile SR steelhead, migrate from tributaries and the mainstem Clearwater to downstream through the Clearwater, Snake, and Columbia Rivers, to the ocean. When they return as adults, they return to tributaries off the mainstem Clearwater River to spawn. The confluence of the North Fork Clearwater and the mainstem Clearwater River is 1.9 miles downstream of the dam. Juvenile SR spring/summer Chinook are not expected to be found in the action area, and few numbers of juvenile SR fall Chinook and SR Basin steelhead are expected to spend time in the action, although small numbers may be present in the action area for short periods of time.

Adult SR spring/summer Chinook may also be present within the action area for small periods of time in small numbers, but do not spawn within the action area and are therefore expected to spend little time in the action area before heading up the mainstem Clearwater to find suitable spawning habitat. Adult SR fall Chinook are similarly expected to spend little time in the action area. Returning adult SR

Steelhead are heading towards the Dworshak National Fish Hatchery, and those that are present in the action area have swam past the approximately 2 miles past the intake.

Individual adult bull trout may occur within the action area for short periods of time in small numbers, but it is not expected that juvenile bull trout would occur within the action area.

As previously explained in Section 2, 3, and 4, the draft permit includes conditions that seek to prevent and minimize oil and grease discharges and also shift the use of petroleum-based oil and grease products to biodegradable products that are less toxic. These conditions require the permittee to draft develop and implement a detailed BMP Plan to prevent and/or minimize oil and grease releases from Dworshak Dam and continue to use biodegradable environmentally acceptable lubricants (EALs) where feasible. Implementation of these plans are expected to prevent discharges of oil and grease. In addition, when outfalls are properly maintained and operated, there should be no releases of oil and grease. Therefore, EPA does not anticipate that individual SR spring/summer chinook, SR fall chinook, SR steelhead, or bull trout that are in the action area will be exposed to oil and grease on a regular basis.

However, in the event that oil and grease is discharged by Dworshak Dam, EPA assessed the impact of exposure for individual fish. To assess the impacts to SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout if oil and grease were discharged, EPA assumed an oil and grease concentration of 5 mg/L, the numeric effluent limit, to calculate the exposure concentration from the proposed discharge.

Table 15 shows the calculated oil and grease concentrations in the action area. If oil and grease were discharged, concentrations would significantly decrease quickly within the first 23 meters to the toxicity benchmark of 1 mg/L. After 23 meters, any oil and grease that would be discharged would rapidly decline further.

In addition, the dilution modeling in **Table 15** is conservative, assuming the maximum concentration of 5 mg/L is discharged when the largest outfall is operating at its maximum discharge. Further, the toxicity benchmark of 1 mg/L assumes traditional oil and grease discharges, not biodegradable environmentally acceptable lubricants (EALs), which are currently used at Dworshak Dam.

Table 15. Maximum Exposure Oil and Grease Concentrations in the Action Area from Proposed Action

Effluent Concentration based on Permit Limit (mg/L)	Distance downstream	Dilution Factors	Downstream Effluent Concentration (mg/L)
5	1 meter	1	5
	10 meter	2	2.5
	15 meters	3	1.667
	23 meters	5	1
	100 meters	29	0.172
	300 meters	56	0.089
	471 meters	83	0.060

In summary, only small numbers of ESA fish species are anticipated to be in the North Fork Clearwater River action area for short periods of time. When individual SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout are present, oil and grease may not be discharged at the same time, since oil and grease discharges are not expected to be regularly discharged due to permit conditions that prevent and/or minimize oil and grease releases.

However, if oil and grease were discharged and individual fish were present at the same time, they would be exposed to oil and grease concentrations of 1 mg/L at 23 meters from the discharge point. EPA considers 23 meters to be a reasonable representation of short-term exposure (e.g. 1 to 24 hours) to the discharge. Duration of exposure within 23 meters of the discharge point would likely be short and at a duration unlikely to cause a toxic effect. EPA also notes that the 1 mg/L benchmark is based off toxicity for juvenile fish, and is expected to be well below the benchmark toxicity for acute effects to adult fish.

Based on the above, EPA has determined that discharges of oil and grease **will result in discountable and insignificant effects for SR spring/summer chinook, SR fall chinook, SR fall chinook, and bull trout.**

5.5.1.5 Oil and Grease Habitat Effects

EPA has concluded that the oil and grease discharges **are not likely to adversely modify the critical habitat for SR fall chinook, SR fall chinook, SR steelhead, and bull trout.** Section 5.5.7 contains a more detailed discussion of the potential impacts from discharges on PCEs.

5.5.2 pH

5.5.2.1 pH Introduction

The definition of pH is the negative logarithm of the hydrogen “activity” (APHA 1998). In dilute solutions, hydrogen ion activity is approximately equivalent to the molar concentration of hydrogen ions (APHA 1998). According to APHA (1998), pure water has a pH of 7.0 standard units (s.u.), but in equilibrium with atmospheric carbon dioxide, the pH of distilled water is approximately 5.6 s.u. Solutions with a pH above 7 indicate that the solution is alkaline, while a pH below 7 indicates that the solution is acid.

The pH of natural waters is a measure of the acid-base equilibrium achieved by the various dissolved compounds, salts, and gases in the water and is an important factor in the chemical and biological systems of natural waters. The principal system regulating pH in natural waters is the carbonate system which is composed of carbon dioxide, carbonic acid, bicarbonate ion, and carbonate ions. Stumm and Morgan (1970) have described the interaction and kinetics of this system. Because of the nature of the chemicals causing alkalinity, and the buffering capacity of carbon dioxide in water, very high pH values are seldom found in natural waters.

pH is an important factor in the chemical and biological systems of natural waters. The degree of dissociation of weak acids or bases is affected by changes in pH This effect is important because the toxicity of many compounds is affected by the degree of dissociation.

5.5.2.2 pH Baseline

There are no water quality impairments for pH in the action area. The environmental baseline is described in Section 4. The influent pH at Dworshak Dam was sampled at 7.0 s.u., and the effluent at 8.5 s.u. This represents a single data point but is the available data at this time.

5.5.2.3 pH Quality Standard

The water quality criterion for pH in Idaho is found in IDAPA 58.01.02.250.01a and states that for all aquatic life designated uses, pH shall be within the range of 6.5 to 9.0.

5.5.2.4 pH Effluent Limits

The permit proposes pH limits not less than 6.5 and not more than 9.0 standard units to ensure that surface waters do not exceed this range as a result of discharges from the facility.

5.5.2.5 pH Toxicity Benchmark

Most studies examining the effects of pH on salmonids have focused on adults, while the life stages most sensitive to pH are egg incubation and alevin/fry development. Data regarding the effects of pH on the aquatic biota are limited and dated.

In the development of USEPA's criteria, (USEPA 1986) two bioassay references on freshwater fish showed a lower pH limit of about 6.5 for normal development (EIFAC 1969; Mount 1973). Vulnerable life stages of chinook salmon are sensitive to pH values below 6.5 and possibly at pH values greater than 9.0 (Marshall et al. 1992). Rombough (1983) reported that low pH decreases chinook egg and alevin survival, but specific values are lacking. Adult salmonids seem to be at least as sensitive as most other fish to low pH including rainbow, brook, and brown trout and chinook salmon (ODEQ 1995). In studies of biological changes with surface water acidification, Baker et al. (1990) found that decreased reproductive success may occur for highly acid-sensitive fish species (e.g., fathead minnow, striped bass) at pH values of 6.5 to 6.0. At pH values between 6.0 and 5.5, Baker et al. (1990) found decreased reproductive success in lake trout. The lower critical pH value for rainbow trout is approximately 5.5 (Baker et al. 1990). Based on the USEPA criteria documents and Baker et al. (1990), the low-end of Idaho's pH standard of 6.5 is considered protective for salmonids.

At the higher end of the pH scale, even less is known regarding effects on fish. In USEPA's review for water quality criteria development, the upper limit of 9.0 was obtained from only one reference (EIFAC 1969). Though no recent data have been generated, studies conducted earlier in the 20th century show salmonids, including both trout and salmon species, to be sensitive to pH values in the range of 9.2 to 9.7 (ODEQ 1995). Non-salmonid fish are, with some exceptions, more tolerant of high pH, with sensitivity appearing at or over pH 10 for most species tested (EIFAC 1969). Levels of pH greater than 9.0 may adversely affect benthic invertebrate populations, thereby altering the food base for salmonids (ODEQ 1995). Based on these studies, **the pH range of 6.5 to 9.0 in Idaho's water quality standards in the North Fork Clearwater is considered protective for salmonids.**

5.5.2.6 pH Analysis

The proposed permit limits are Idaho's water quality standards for pH which are within the pH toxicity benchmarks.

Therefore, EPA has concluded the pH of permitted discharges **will be insignificant for SR fall chinook, SR spring/summer chinook, SR steelhead, and bull trout.**

5.5.2.7 pH Critical Habitat Effects

EPA has concluded that pH discharges **are not likely to adversely affect SR fall Chinook critical habitat.** See Section 5.5.7 for a more detailed discussion of the potential impacts of the proposed action on the PCEs of designated critical habitats in the action area.

5.5.3. Heat

5.5.3.1 Temperature Introduction

Water temperature has a significant effect on aquatic organisms that live or reproduce in the water, particularly cold-water fish such as salmon, bull trout, and steelhead and some amphibians (frogs and salamanders). When water temperature becomes too warm, salmon and trout suffer a variety of ill effects ranging from decreased spawning success to death.

Coldwater fish such as salmon need cold waters during various stages of their lives. When temperatures increase above optimum ranges for these sensitive species, a variety of stresses can occur. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards summarized the research on thermal impacts to salmonids. Temperatures below 18°C are preferable and minimize adverse effects for migrating juvenile and adult salmon and steelhead. Exposure to temperatures above 18°C increase disease risk and stress. Lethal impacts occur to juvenile salmon and steelhead at 23-26°C temperatures and to adult salmon and steelhead at 21-22°C temperatures with continuous (1-week) exposure. Short term exposure (less than 10 seconds) to 32°C temperatures can cause instantaneous lethality to salmonids. Salmonids can also experience short term thermal shock from a sudden change in temperatures from preferable temperatures (15-18°C) to stressful temperatures (26-30°C). Migrating adult and sub-adult bull trout prefer temperatures below 15°C. Colder water holds more dissolved oxygen than warmer water, so as stream temperatures increase, the amount of dissolved oxygen available for fish and other aquatic organism's decreases. Thermal stress can also make fish more susceptible to toxic substances that may be present. Warmer water can also lead to algal blooms that can further deplete the water's dissolved oxygen and cause changes in stream pH.

Thermal discharges from Dworshak Dam point sources are from cooling water. Cooling water receives heat from equipment that is being cooled, and through this exchange, heat is added to cooling water from Dworshak Dam point source discharges. It is possible that small amounts of cooling water may enter drainage sumps. However, compared to maintenance, leakage, and other water sources, cooling water is insignificant in the sumps. Therefore, drainage sumps are expected to discharge little heat above influent water temperatures above influent water temperatures.

5.5.3.2 Temperature Environmental Baseline

Temperature varies depending on the time of day and time of year. The North Fork Clearwater is not impaired for temperature in the action area. Upstream temperatures within Dworshak Reservoir vary by depth as well as time of year. A variable height intake at the dam allows operators to select the appropriate water temperature and corresponding depth at which to intake water through the turbines, to provide cold water releases when necessary for downstream conditions. Cold water releases from Dworshak Dam in the summer reduce temperatures in the Clearwater, Snake, and Columbia Rivers to reduce potential negative effects of increased water temperature on ESA listed species. These releases are beneficial to migrating salmon in the Snake River, particularly when river temperatures are the highest in late summer. Due to this variability, upstream temperatures are not available or relevant to the temperatures released downstream of Dworshak Dam, the environmental baseline is best described by the North Fork Clearwater temperatures from 2017-2021 in the tailrace (downstream) of Dworshak Dam as described in Section 4.2. The maximum temperatures in the North Fork Clearwater occur around early October and stay under 11ºC.

Effluent temperatures from the cooling water discharges are limited to one sample per outfall. The temperature samples are 6.9 ºC at Outfall 001 and 12.1 ºC at Outfall 003 (turbine non-contact cooling water), 7.3 ºC at Outfall 005 (maintenance-related discharges, equipment and floor drain discharges, unwatering sump flows), and 7.1 ºC at Outfall 006 (sump and dam leakage flows). Outfall 002 and 004 were not discharging at the time of sample collection. EPA used a temperature of 12.1 ºC, the highest temperature measured from cooling water and associated with the generators, in its analysis of temperature effects on fish to provide a high-end representation of effluent temperatures that SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout would be expected to be exposed to at the times they are present near the outfalls of Dworshak Dam.

5.5.3.3 Temperature Water Quality Standard

The Idaho water quality standard for temperature in Idaho surface waters for cold water communities is 22°C or less with a maximum daily average of no greater than 19°C, while it is 13°C or less with a maximum daily average no greater than 9°C in salmonid spawning habitat (IDAPA 58.01.02.250.02b and IDAPA 58.01.02.250.02fii, respectively).

5.5.3.4 Temperature Benchmark

Based on the information in the Region 10 temperature guidance (USEPA 2003), EPA considers the chronic threshold to be 18 ºC and the acute threshold to be 32 ºC for the instantaneous lethality, and a sudden increase of 10 ºC to 25 ºC or above for thermal shock. EPA also considers a source impact of 0.1 ºC or less after mixing with the river to have an insignificant effect on salmonoids and other aquatic life when temperatures are above the temperature. These temperature benchmarks apply year-round.

5.5.3.5 Temperature Analysis

As previously explained, the North Fork Clearwater is not impaired for temperature below the facility. However, since the river is impaired for temperature downstream of the dam, the permit requires continuous effluent temperature monitoring to allow for further evaluation of temperature discharges from the permitted outfalls for the next permit issuance.

The temperatures of the North Fork Clearwater remain under 11°C year-round, well under the 18°C temperature benchmark. Since the temperature of the cooling water was measured at a maximum of 12.1°C, the cooling water does not increase the river above this benchmark. In addition, the difference between the minimum outfall temperature measured of 6.9°C and the maximum river temperature of 11°C is 4.1°C , which is not enough difference to cause thermal shock impacts.

Due to the cold water released by the facility, and the small difference in temperature between the cooling water and the river temperatures, the impact of the minimal temperature change due to the cooling water is discountable and insignificant for all juvenile and adult fish present in the action area.

In summary, there are no instances where heat discharges would trigger acute or chronic temperatures. Therefore, EPA has concluded that discharges of heat **are insignificant and discountable for SR steelhead, SR spring/summer Chinook, SR fall Chinook, and bull trout.**

5.5.3.6 Temperature Critical Habitat Effects

For the same reasons described above, EPA has concluded that temperatures from Dworshak Dam point sources are **not likely to adversely modify the critical habitat for SR steelhead, SR spring/summer Chinook, SR fall Chinook, and bull trout**

Section 5.5.7 contains a more detailed discussion of the potential impacts from discharges on PCEs.

5.5.4 TSS

5.5.4.1 TSS Introduction

Total suspended solids (TSS) include both organic and inorganic particulate matter in water and refer to the portion of total solids retained on a 2 micron (or smaller) filter (APHA, 1998). Particulate matter is ubiquitous in natural surface waters, originating from both biological and non-biological sources. Biological particulate matter includes dead cellular material and other organic matter. Non-biological particulate matter is typically sediment washed off the land surface or resuspended from the water-body bottom. Suspended solids concentrations in natural waters vary: the TSS of Lake Superior is about 0.5 mg/L (Chapra 1997); during floods on the Missouri River in 1993, TSS concentrations exceeded 2000 mg/L (Holmes 1996). TSS levels in the Snake River are often less than 10 mg/L but may be as high as 60 mg/L (Normandeau 1999).

Toxicity studies on suspended solids suggest that solids can directly cause toxicity to aquatic biota or can settle to the bottom of the receiving water body and cause toxicity to the benthic community that serves as a prey base for other aquatic biota. Suspended sediment also reduces the clarity of water (increases turbidity), and thus can interfere with the ability of predator species to find prey. However, this can be beneficial to out-migrating juvenile salmon to escape predators. Turbidity refers specifically to the extent to which light is scattered by suspended particulates and soluble material in the water. High turbidity levels would be measured in a cloudy or muddy water body, whereas low turbidity levels would be measured in clear water.

The deposition and accumulation of organic material from municipal, industrial, and agricultural sources can result in a decrease in dissolved oxygen in bottom sediments and other chronic effects which are detrimental to a freshwater ecosystem. The adverse effects of sludge deposits can occur independently of the condition of the overlying water. Anaerobic sediments will kill benthic organisms that require oxygen in the sediments to survive. If bottom deposits become anaerobic, hydrogen sulfide, methane and carbon dioxide gases can be produced. These ebullient gases can cause unstable bottoms and raise mats of decaying organic matter, which are odiferous and aesthetically unpleasing. In addition to sulfides, ammonia is produced from the decomposition of protein and both these materials may be toxic to aquatic life.

Filling in of aquatic environments by sediments and the release of nutrients by decomposition contribute to eutrophication. Low dissolved oxygen concentrations in sediments can kill the eggs of important fish that deposit them on the bottom (such as salmon and trout) or build nests (such as bass and bluegills). Suspension of organic sediments of oxygen demanding sludge during rainfall and increasing river velocities and turbulence, can exert an oxygen demand on the overlying waters and may result in massive fish kills. Sludge deposits also can harbor pathogenic microorganisms that may increase in numbers because of growth supported by organic nutrients in the decaying deposit.

Suspended solids in water can cause turbidity and interfere with salmonid migration and growth, although turbidity can also provide cover to smolts from predators. In Dworshak Dam, water originates from the upstream river which may contain solids that pass through the operation. TSS may be present in sumps and floor drains, where they may accumulate. However, the BMP plan requires that the facility minimize pollutants entering the drainage sump, which should help reduce TSS being discharged from the drainage sump outfall. Cooling water intakes have strainers which help to remove most sediment.

5.5.4.2 TSS Baseline

The environmental baseline for TSS is described in **Section 4**. The Corps collected TSS samples at the forebay and at each outfall for the permit application. TSS was reported as <1 mg/L in all of the influent and effluent samples, which is insignificant. No other data were available on the TSS baseline. The North Fork Clearwater River in the action area is not impaired for total suspected solids.

5.5.4.3 TSS Water Quality Standard

The Idaho water quality standards have narrative criteria that apply to TSS: "Surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses (IDAPA 58.01.02.200.05)."

5.5.4.4 TSS Effluent Limits

EPA has determined that TSS limits and monitoring are not needed for TSS because there are no known sources of TSS that would be added or accumulated from the facility. The BMP Plan requires the facility to clean intake screens and racks to reduce sediment that may enter the project, so the permit limits sediment accumulation.

5.5.4.5 TSS Toxicity Benchmark

USEPA's (1986) Quality Criteria for Water includes qualitative assessment of the potential toxicity of total suspended solids (TSS). Four types of toxicity were observed in toxicity tests using suspended solids (USEPA, 1986):

- Mortality, reduced growth rate, and reduced resistance to disease in fish;
- Reduced success in development of fish eggs and larvae;
- Changes in natural movement and migration of fish; and
- Reduced abundance of prey items for fish.

Although USEPA reports that these types of toxicity were observed, the report does not identify the concentrations that caused the toxicity.

The potential effects of suspended solids on rainbow trout survival, gill health, and fin health were studied by Herbert and Merkens (1961). Suspended solids of size ranging from 0.46 µm to 17.5 µm were added to aquarium water at various concentrations. Concentrations of 270 mg/L were found to result in more fin rot and much lower survival of rainbow trout, compared to controls. Somewhat lower survival compared to controls was observed at a concentration of 90 mg/L, but no effects on gill health or fin health were observed at this concentration. At 30 mg/L suspended solids, survival did not differ from controls and gill effects were not observed. From these data, a NOEC of 30 mg/L can be established for survival, gill effects, and fin effects in rainbow trout. TSS in the North Fork Clearwater were measured at <1 mg/L.

Herbert et al. (1961) studied the potential effects of suspended solids on brown trout abundance at several stations. At each station, the concentrations of total suspended solids and particle size distribution were measured throughout the duration of the study. At the majority of the stations, the median concentrations of TSS ranged from 934 mg/L to 7470 mg/L; however, at one station, the median concentration was 58.6 mg/L. Particle sizes were generally less than 60 µm. Fish counts at each station were made using a cat-effort method and a recapture of introduced fish method. The results of the survey indicated that concentrations of TSS above 1000 mg/L were associated with markedly reduced abundance of brown trout, whereas concentrations of about 60 mg/L had no adverse effect on brown trout abundance. Therefore, 60 mg/L represents a NOEC for survival in brown trout.

In 1992, Servizi and Martens (1992) reported the results of a similar study, in which biological and behavioral indicators were measured in fish exposed to TSS concentrations ranging from 20 mg/L to 2550 mg/L. At concentrations of 240 mg/L to 2550 mg/L, cough frequency and avoidance were greater than controls. At concentrations of 530 mg/L to 1360 mg/L, glucose levels were not different from controls, but at concentrations of 1530 to 1630, glucose levels were greater than controls. At 20 mg/L, cough frequency was not different from controls. From these findings, EPA selected the lowest TSS concentration exposure and selected a NOEC of 20 mg/L of TSS.

NOECs from the studies described above range from 20 mg/L to 60 mg/L. **The downstream concentrations are well below the 20-60 mg/L for SR fall Chinook, SR spring/summer Chinook, SR steelhead, and bull trout.**

5.5.4.6 TSS Effects Analysis

The TSS concentrations measured at Dworshak Dam are <1 mg/L for all measured outfalls. TSS would not be expected to accumulate in the facility, expect possibly in the drainage sump. The BMP plan requires the facility to minimize pollutants entering the drainage sump, including TSS. Therefore, it is unlikely that large amounts of TSS would accumulate and be discharged from the drainage sump outfall. Even if some TSS were released, it is unlikely to be at levels as high as 20-60 mg/L. Therefore, EPA has concluded that discharges of TSS **will have insignificant effects on SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout.**

5.5.4.7 TSS Critical Habitat Effects

The critical habitat includes the action area and areas beyond the action area that will have even lower TSS from Dworshak Dam as point source discharge impacts dissipate with distance. For this reason and the reasons described above, EPA has concluded that TSS from Dworshak Dam **are not likely to adversely modify the critical habitat for SR fall Chinook, SR spring/summer Chinook, SR steelhead,**

and bull trout. Section 6.1.5 contains a more detailed discussion of the potential impacts from discharges on PCEs.

5.5.5 Oxygen-demanding materials

5.5.5.1 Oxygen-demanding materials Introduction

Biochemical oxygen demand (BOD) and chemical oxygen demand (COD) are measures of the amount of degradable material that may deplete oxygen within a waterbody.

Chemical oxygen demand (COD) is the measure of the oxygen equivalent of the organic matter in a sample that is susceptible to oxidation by a strong chemical oxidant. The result is expressed as a concentration of oxygen consumed. The COD is a purely chemical oxidation test devised as an alternative method of estimating the total oxygen demand of a wastewater. Since the method relies on the oxidation-reduction system of chemical analyses rather than on biological factors, it is more precise, accurate, and rapid than the BOD test. The COD test is widely used to estimate the total oxygen demand (ultimate rather than 5-day BOD; BODR5R) to oxidize the compounds in a wastewater. COD is a more inclusive measure of oxygen demand than is BODR5R and will result in higher oxygen demand values than will the BODR5R test.

BOD is the quantity of oxygen required for the biological and chemical oxidation of waterborne substances under ambient or test conditions. Materials that may contribute to the BOD include carbonaceous organic materials usable as a food source by aerobic organisms; oxidizable nitrogen derived from nitrites, ammonia and organic nitrogen compounds which serve as food for specific bacteria; and certain chemically oxidizable materials (e.g., ferrous iron, sulfides, sulfite, etc.) which will react with dissolved oxygen or are metabolized by bacteria. The BOD in most effluents is derived principally from organic materials and from ammonia (which is itself derived from animal or vegetable matter).

The COD and BOD in effluent affects the dissolved oxygen resources of a body of water by reducing the oxygen available to fish, plant life, and other aquatic species. Oxygen-demanding materials lower the concentration of dissolved oxygen (DO) in water, and toxicity could occur as a result of insufficient concentrations of DO. The reduction of dissolved oxygen can be detrimental to fish populations, fish growth rates, and organisms used as fish food.

Water with high levels of oxygen-demanding materials indicate the presence of decomposing organic matter and associated increased bacterial concentrations that degrade its quality and potential uses. A by-product of high BOD concentrations can be increased algal concentrations and blooms which result from decomposition of the organic matter, and which form the basis of algal populations (USEPA 1976).

To the degree that pollution contributes oxygen-demanding organic matter (e.g., sewage, lawn clippings, soils from streambank and shore erosion, and agricultural runoff) or nutrients that stimulate growth of organic matter, pollution causes a decrease in average DO concentrations. If the organic matter is formed in the lake, for example by algal growth, at least some oxygen is produced during growth to offset the eventual loss of oxygen during decomposition. However, in lakes and reservoirs where a large portion of the organic matter is brought in from outside the lake, oxygen production and consumption are not balanced, and low DO may become even more of a problem.

Oil and grease are oxygen-demanding substances. Sumps may also concentrate oxygen-demanding substances that may be present in pass-through water. Therefore, BOD and COD could be present in sump discharges and, to a lesser degree, dewatering and cooling water discharges. BOD and COD is also present in influent water, so may be part of the pass-through and leakage water. The permit does not address the pass-through water.

5.5.5.2 Oxygen-demanding materials Environmental Baseline

The environmental baseline for BOD and COD is described in Section 4. Oil and grease were not detected in effluent from Dworshak Dam. The BOD and COD sample values are described in the table below.

Table 16. BOD and COD Effluent Concentrations

Outfall	Outfall Description	BOD (mg/L)	COD (mg/L)
001	Bearing and Non-Contact Cooling Water	2.48	< 5
003	Bearing and Non-Contact Cooling Water	< 2	5.5
005	Unwatering Sump	< 2	< 5
006	Skeleton Bay	< 2	< 5

5.5.5.3 Oxygen-demanding materials Water Quality Standards

BOD and COD are measures of the amount of degradable material that may deplete oxygen. The Idaho water quality standard for dissolved oxygen should exceed 6 mg/L at all times for cold water communities (IDAPA 58.01.02.250.02a). Other than narrative criteria stating that Idaho surface waters “shall be free from oxygen-demanding materials in concentrations that would result in an anaerobic water condition (IDAPA 58.01.02.200.07),” there are no water quality standards in Idaho for BOD or COD.

5.5.5.4 Oxygen-demanding materials Effluent Limits

There are no effluent limits for BOD and COD. BOD and COD concentrations detected in Dworshak Dam outfalls are relatively very low, compared to technology-based BOD effluent limits of 30 mg/L and 45 mg/L allowed to be discharged by wastewater treatment plants. These levels of BOD discharge are generally not expected to deplete DO. BOD and COD levels detected at Dworshak Dam are much lower than these levels. Operations at Dworshak Dam are not expected to add significant amounts of oxygen-demanding substances that would require permit effluent limitations. Dworshak Dam had samples of BOD with a maximum of 2.48 mg/L, and COD measurements of a maximum of 5.5 mg/L. The concentrations of COD are likely higher since more materials can chemically oxidize compared to those that can biologically oxidize. Oxygen-demanding substances from Dworshak Dam may arise from oil and grease, for which the permit has effluent limitations, monitoring, tracking, and minimization requirements. The permit also requires total suspended solids or detritus, to be minimized. As a result, EPA is not proposing limits or monitoring for oxygen-demanding substances.

5.5.5.5 Oxygen-demanding materials Toxicity Benchmarks

Verta et al. (1996) observed no toxicity to *Pseudomonas putida*, *Vibrio fisheri*, zebrafish (*Brachydanio rerio),* or the green alga *Selenastrum capricornutum* when these organisms were exposed to effluents containing 310 mg/L COD or less. **Since COD is a more fully encompassing value for oxygen demanding materials, EPA has used 310 mg/L as the toxicity benchmark for oxygen-demanding materials.**

5.5.5.6 Oxygen-demanding materials Effects Analysis

EPA used the maximum BOD and COD measured in any outfall and applied these to all outfalls for the facility.

Table 17. Maximum BOD Exposure Concentrations in Action Area from Proposed Action

Maximum Observed Concentration (mg/L)	Distance downstream	Dilution Factor	Downstream Concentration[1] (mg/L)
2.48	1 meter	1	2.48
	10 meters	2	1.24
	15 meters	3	0.827
	100 meters	29	0.086
	300 meters	56	0.044
	471 meters (max dilution)	83	0.030

1. Assuming a BOD concentrations of 0 in the influent

Table 18. Maximum COD Exposure Concentrations in Action Area from Proposed Action

Maximum Observed Concentration (mg/L)	Distance downstream	Dilution Factor	Downstream Concentration[1] (mg/L)
5.5	1 meter	1	5.5
	10 meter	2	2.25
	15 meters	3	1.833
	100 meters	29	0.190
	300 meters	56	0.098
	471 meters (max dilution)	83	0.066

1. Assuming a COD concentration of 0 in the influent

Table 21 and **Table 22** show the calculated BOD and COD concentrations in the action area. These show rapid dilution within the action area. These highest concentrations of BOD and COD at 1 meter is much lower than benchmark levels. In addition, low DO does not tend to be a problem at Dworshak Dam, since the dam aerates outflows through turbulence and plunging flows that occur with spill (NMFS 2021). Therefore, EPA has concluded that discharges of BOD and COD **will have insignificant effects on SR fall Chinook, SR spring/summer Chinook, SR steelhead and bull trout.**

5.5.5.7 Oxygen-demanding materials Critical Habitat Effects

The critical habitat includes the action area and areas beyond the action area that will not be affected by oxygen-demanding materials discharged from Dworshak Dam, as point source discharge impacts dissipate with distance. EPA has concluded that oxygen-demanding materials from Dworshak Dam is not likely to adversely affect the critical habitat for **SR fall Chinook, SR spring/summer Chinook, SR steelhead, and bull trout.**

Section 6.1.5 contains a more detailed discussion of the potential impacts from discharges on PCEs.

5.5.6 Entrainment and Impingement on Cooling Water Intake Structures (CWIS)

Fish and organisms can become impinged on or entrained through CWIS when a facility extracts water for cooling water. The permit seeks to minimize adverse effects from CWIS on fish in compliance with Section 316(b) of the Clean Water Act as discussed in Section 1. This permit applies the CWA statute and use best professional judgment to determine BTA. The statute requires BTA standards to reduce impingement and entrainment of aquatic organisms at existing power generating and manufacturing facility. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system.

The permit requires the proper operation and maintenance of grates and strainers over the two cold water intake structure pipes at Dworshak Dam. The grates mounted over the CWIS intake pipes have spaces of 1”x1/4” and 1”x1/2”, and the basket strainers on the headers before the pump have 1/8” openings. Using the maximum daily flow of Generator Unit 1 (900 GPM) and Unit 2 (900 GPM) that are fed by one CWIS, the velocity across the CWIS is 1.25 ft/sec. The velocity across the second CWIS that feeds Unit 3 (maximum daily flow of 2100 GPM) is around 1.45 ft/sec[7].

The basket strainers are regularly checked and cleaned of moss and algae buildup. It is assumed that fish and other organisms rarely become impinged on the CWIS grates, if ever, but there is no information to demonstrate this since the access to the intakes while in operation is difficult. To provide further information, the permit requires a CWIS Evaluation Report that must include the locations of the cooling water intake structures, an evaluation of strainers and fish presence, information on current fish impingement and entrainment, and an evaluation of additional operations or technologies to minimize fish impingement and entrainment. The report must also provide information on cooling water use relative to waterbody flows. This report will provide additional information for the next permit and confirm the absence of impinged and entrained organisms within the CWIS.

[7] Correspondence with M. Drumheller, August 3 2022.

In addition, the location of the CWIS in the tailrace near the dam outfalls makes it less likely that fish will become impinged on the CWIS. The volume of water discharged from the dam outfalls is much greater than the volume of water flowing into the CWIS, which pushes fish downstream of the dam outfalls and away from the CWIS. At the facility, the minimum outflow of the dam into the North Fork Clearwater between 2016-2020 on record is 1.00 kcfs, or 646 MGD. The maximum CWIS intake is 17.9 MGD, or 2.8% of the river flow. In addition, according to the operators at Dworshak Dam, any fish that swim up to the dam tailrace are drawn towards the turbine water as they return upstream instead of the CWIS.

EPA evaluated the effects on ESA listed species in the Dworshak Dam tailrace where the CWIS is located. SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout reside downstream of Dworshak Dam may occur in the action area and possibly near the CWIS. The large size of adult fish of these species makes it unlikely that they will be impinged or entrained on the CWIS due to the size of the grates and relatively small water intake. As described previously, it is unlikely that any juvenile fish are present in the action area. Any juvenile fish that are found within the action area are unlikely to travel close enough to the CWIS to become impinged or entrained, since the current in the river near the CWIS is dominated by the outflows from the turbines in a downstream direction. The permit requires proper maintenance and operation of the intake structure to minimize impingement and entrainment of organisms.

Therefore, EPA has concluded that permit conditions related to CWIS **will have insignificant effects on SR spring/summer chinook, SR fall chinook, SR steelhead, and bull trout.**

5.5.7 Critical Habitat

Critical habitat has been designated in the action area for SR fall run chinook and bull trout. In designating critical habitat, the Services focused on certain habitat features, Primary Constituents Elements (PCE), that are essential to support one of more of the life stages of these species. The determination of effect of the proposed eight individual NPDES permit on the critical habitat of the above species will be based on effect of the permit on PCEs.

The permit will may affect PCEs pertaining to water quality and food sources. Other PCEs would not be impacted by the discharges and BMPs. Determining the impact of the proposed effluent limits on PCEs for water quality, food sources, and temperature, EPA draws on the analysis completed in Section 5.5 of the impacts of the same pollutants on salmonids and other fish species. EPA determined that the discharges and BMPs are not likely to adversely affect salmon, steelhead, and bull trout.

EPA believes the same analyses and conclusions can be applied to determining the impact of the discharges and BMPs on PCEs related to water quality and aquatic based food sources. For example, the oil and grease toxicity benchmark for species is a reasonable surrogate for toxicity effects on food sources. Therefore, we have concluded that the action is not likely to adversely affect critical habitat for SR fall chinook and bull trout.
Table 23 and **Table 24** summarize the determinations on SR fall chinook and bull trout.

Table 19. Effects on PCEs of SR fall Chinook Critical Habitat

Primary Constituent Elements		
Site	**Site Attribute**	**Effect**
Spawning and juvenile rearing area	Cover/shelter	No Effect
	Food (juvenile rearing)	Not Likely to Adversely Affect
	Riparian vegetation	No Effect
	Spawning gravel	No Effect
	Water quality	Not Likely to Adversely Affect
	Water quantity	No Effect
Juvenile migration corridors	Cover/shelter	No Effect
	Food	Not Likely to Adversely Affect
	Riparian vegetation	No Effect
	Safe passage	No Effect
	Space	No Effect
	Substrate	No Effect
	Water quality	Not Likely to Adversely Affect
	Water quantity	No Effect
	Water temperature	Not Likely to Adversely Affect
	Water velocity	Not Likely to Adversely Affect
Adult migration corridors	Cover/shelter	No Effect
	Riparian vegetation	No Effect
	Safe passage	No Effect
	Substrate	No Effect
	Water quality	Not Likely to Adversely Affect
	Water quantity	No Effect
	Water temperature	No Effect
	Water velocity	No Effect

Table 20. Effects on PCEs of Bull Trout Critical Habitat

Site Attribute (PCE)	Effect
springs, seeps, groundwater sources, and hyporheic flows to contribute to water quality and quantity and provide thermal refugia	No Effect
minimal migration impediments between the habitats that support the various life history stages	No Effect
abundant food base	Not Likely to Adversely Affect
complex river, stream, lake, reservoir, aquatic environments and process;	No Effect
water temperatures ranging from 2 to 15C, with adequate thermal refugia available for temperatures that exceed the upper end of this range;	Not Likely to Adversely Affect

Spawning and rearing area with sufficient amount, size, and composition of substrate with minimal fine sediment;	No Effect
Natural Hydrograph	No Effect
Sufficient water quality and quantity	Not Likely to Adversely Affect
Sufficiently low levels of nonnative predatory, interbreeding, or competing species	No Effect

5.6 Summary of Determinations

A summary of the effects determinations for the ESA-listed species and designated critical habitat addressed in this BE is summarized in **Table 25** below. If any of the permit conditions caused a likely to adversely affect determination, then the overall determination is likely to affect.

Table 21. Summary of Effects Determination on T&E Species and Critical Habitat

Species	**Status**	**Critical Habitat**	**Effects Determination**	**Critical Habitat Effects**
FISH				
Bull Trout (Salvelinus confluentus)	Threatened	Yes	NLAA	NLAA
Chinook Salmon, SR Fall run (Oncorhynchus tshawytscha)	Threatened	Yes	NLAA	NLAA
Chinook Salmon, SR Spring/Summer run (Oncorhynchus tshawytscha)	Threatened	No	NLAA	N/A
Steelhead, SR (Oncorhynchus mykiss)	Threatened	No	NLAA	N/A

6 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private action on endangered or threatened species or critical habitat that are reasonably certain to occur in the action area considered in this BE. Future federal action or action on federal lands that are not related to the proposed action are not considered in this section.

Future anticipated nonfederal actions that may occur in the action area include timber harvest, grazing, mining, agriculture, urban development, municipal and industrial wastewater discharges, road building, sand and gravel operations, aquaculture, off-road vehicle use, fishing, hiking, and camping. These non-federal actions are likely to continue having adverse effects on the endangered and threatened species, and their habitat.

There are also nonfederal actions that may in or near the Clearwater River or Snake River and their tributaries that are likely to have beneficial effects on the endangered and threatened species. These include implementation of riparian improvement measures, best management practices associated with timber harvest, grazing, agricultural activities, urban development, road building and abandonment, recreational activities, and other nonpoint source pollution controls.

Interdependent actions are defined as actions with no independent use apart from the proposed action. Interrelated actions include those that are part of a larger action and depend on the larger action for justification. To the extent that operations of the Dworshak Dam are considered to or lead to interdependent/interrelated effects, those are considered and addressed in the 2020 CRS BiOps.

7 Essential Fish Habitat Analysis

7.1 Essential Fish Habitat Background

In this section, Essential Fish Habitat (EFH) is assessed for potential adverse impacts from EPA's issuance of the Dworshak Dam NPDES permit covering the hydroelectric generating facility discharge of wastewaters to the North Fork Clearwater River.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic area and their associated physical, chemical, and biological properties that are used by fish and may include aquatic area historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity and covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of action (50 CFR 600.810).

The objective of this EFH assessment is to determine whether or not the proposed action "may adversely affect" designated EFH for federally managed fisheries species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action.

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally managed Pacific salmon: Chinook, coho, and Puget Sound pink salmon. Freshwater

EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except area upstream of certain impassable man-made barriers identified by the PFMC, and longstanding, naturally-impassable barriers.

7.2 Description of the Action/Action area

See Section 2 for a description of the action and the action area. Chinook EFH covers the entirety of the action area.

7.3 Potential Adverse Effects of Proposed Project on Salmon EFH

The action area below Dworshak Dam lies within Essential Fish Habitat (EFH) for chinook salmon **(Figure 8**), including habitats for migration, spawning, and rearing.

Figure 8. Essential fish habitat designated for Chinook salmon by NMFS

Water quality is an important component of EFH for chinook salmon. The Dworshak Dam NPDES permit covers the discharge of wastewater from the facility and not the flow of generating water through the turbines. The effects of discharges authorized by the permit on chinook salmon EFH are the same as those described for ESA-listed species and designated critical habitat covered in Section 5. A summary of the effects determinations made for ESA-listed species and designated critical habitat is found in **Table 25** in Section 6.2. Effluent limitations, BMPs, and CWIS requirements provide restrictions that are sufficient to prevent harm to the life states of threatened and endangered species and critical habitat in the action area. The issuance of the permit was found not likely to adversely affect any of the listed salmon or their critical habitat. Therefore, EPA has determined the permit will not adversely affect EFH for Pacific coast salmon.

7.4 EFH Conservation Measures

Conservation measures in the permit include, but are not limited to:

- Numeric effluent limits on discharges for oil, grease, pH;
- Narrative effluent limits restricting visible oil sheens, floating and suspended, submerged matter, and toxics;
- The use of environmentally acceptable lubricants (EALs), unless technically infeasible; and

- Technologies and operations that minimize the impingement and entrainment of fish in cooling water intake structures (CWIS).
- Monitoring requirements for flow, oil, grease, pH, temperature, total suspended solids;
- A detailed best management practices (BMP) plan and BMP annual report to prevent and minimize oil releases, including oil accountability tracking;
- An EAL annual report to inventory equipment where EALs may be used and to report when and where EALs have been implemented;
- A CWIS annual report to report on the implementation of technologies to meet CWIS permit conditions; and
- A PCB Management Plan and PCB Annual Report to inventory past action to reduce/remove PCBs, identify potential current sources, and describe action to reduce those sources.

In addition, the facility must ensure the proper operation and maintenance of water management and wastewater treatment systems to control the discharge or potential release of pollutants to the receiving water. This permit does not regulate the river flow through the turbines or spill over the dams and do not authorize oil spills.

7.5 Conclusions

Based on the data available and analyses conducted, **EPA has determined the proposed action is not likely to adversely affect designated EFH within the action area.**

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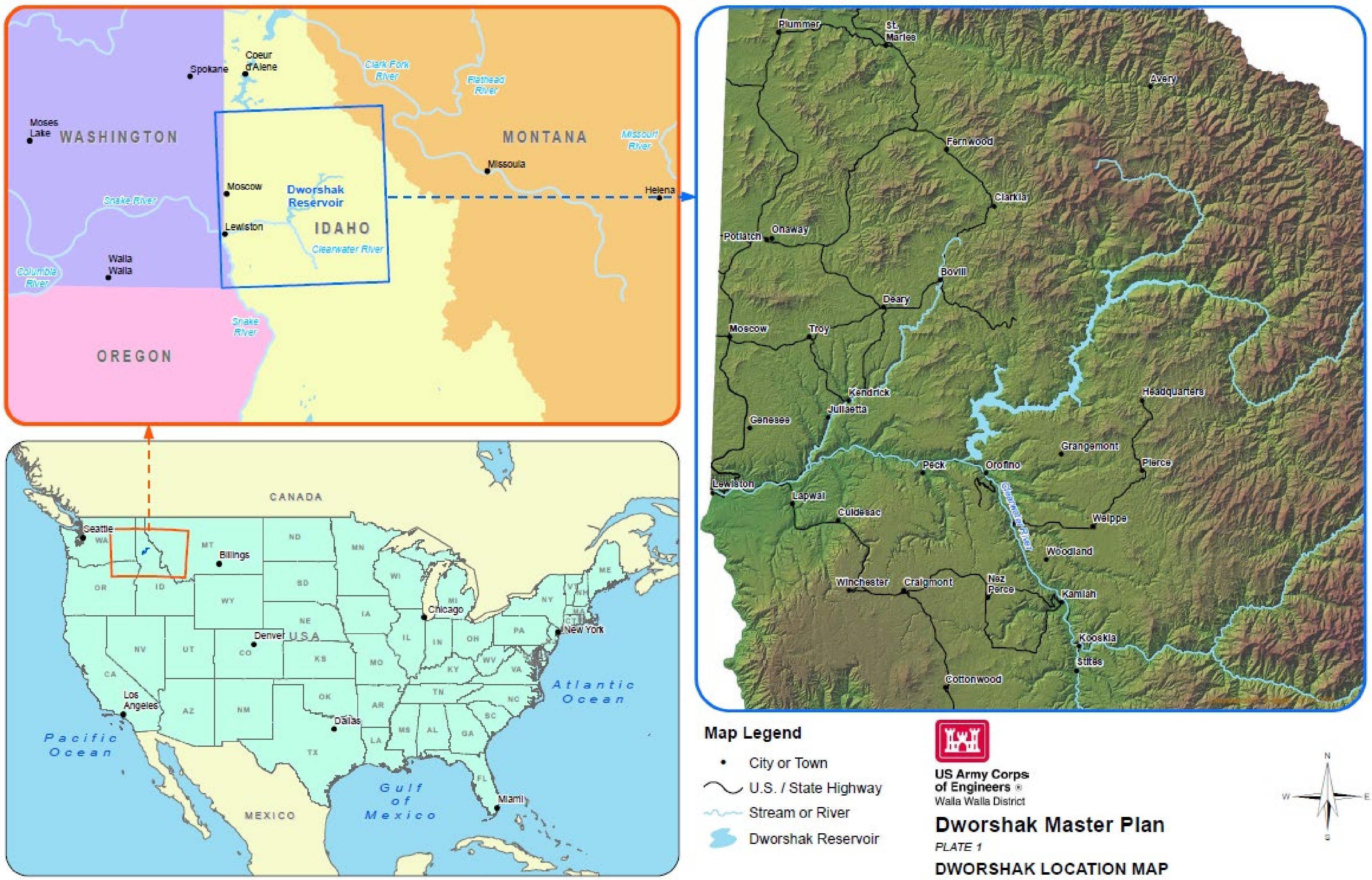
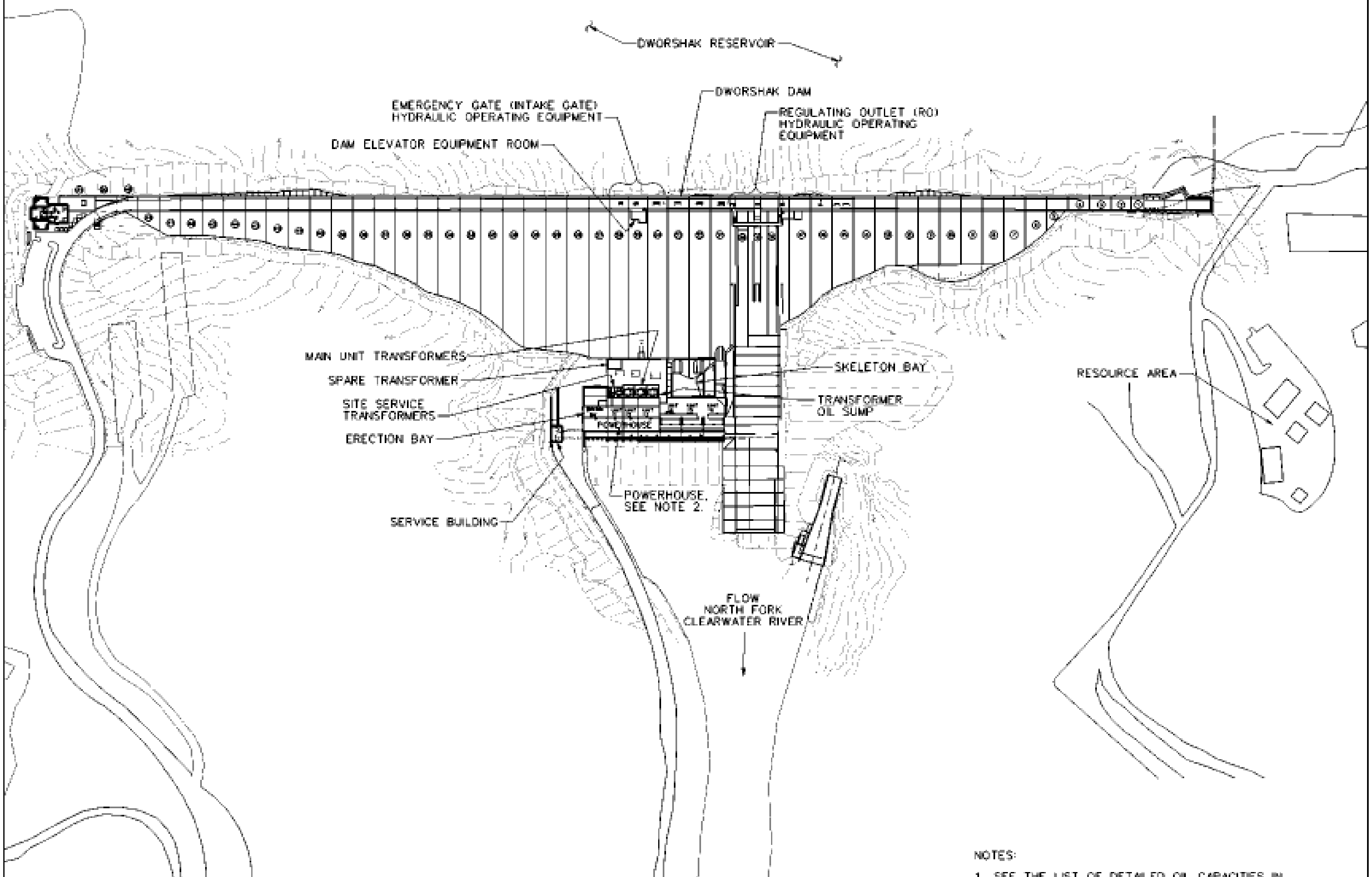
APPENDIX A

Facility Locations and Diagrams





DWORSHAK FACILITY LAYOUT DIAGRAM

NOT TO SCALE

NOTES:

1. SEE THE LIST OF DETAILED OIL CAPACITIES IN THE FOLLOWING TABLE AND SPECIFIC LOCATIONS OF THE VARIOUS AREAS IN THE DRAWINGS CONTAINED IN THIS APPENDIX.
2. THE POWERHOUSE CONTAINS THE OIL STORAGE AND PURIFICATION ROOMS, TURBINE RELATED OIL RESERVOIRS, OIL TRANSFER STATION, AND THE UNWATERING AND DRAINAGE SUMP.

APPENDIX B

Dworshak Dam Permit Application Data

Outfall Number	Outfall 001	Outfall 003	Outfall 005	Outfall 006
Description	Bearing and Non-Contact Cooling Water	Bearing and Non-Contact Cooling Water	Unwatering Sump	Skeleton Bay
Discharge Flow Rate (MGD)	1.296	2.02	1.08	1.92
Max Discharge Flow Rate (MGD)	1.3	3.0	4.3	5.8
Max Daily BOD (lbs/day)	26.81	0u	0	0
Max Daily BOD (mg/L)	2.48	<2	<2	<2
Avg Daily BOD (lbs/day)	2.48	0	0	0
Avg Daily BOD (mg/L)	2.48	<2	<2	<2
Max Daily TSS (lbs/day)	0	0	0	0
Max Daily TSS (mg/L)	<1	<1	<1	<1
Avg Daily TSS (lbs/day)	0	0	0	0
Av Daily TSS (mg/L)	<1	<1	<1	<1
Max Daily COD (lbs/day)	0	91.9	0	0
Max Daily COD (mg/L)	<5	5.5	<5	<5
Avg Daily COD (lbs/day)	0	91.9	0	0
Avg Daily COD (mg/L)	<5	5.5	<5	<5
Max Daily TOC (lbs/day)	52.53	127.11	40.53	169.1
Max Daily TOC (mg/L)	4.86	7.55	2.25	3.52
Max Daily TOC (lbs/day)	52.53	127.11	20.27	56.37
Avg Daily TOC (mg/L)	4.86	7.55	2.25	3.52
Max Daily Ammonia as N (lbs/day)	0.82	0	0	2.45
Max Daily Ammonia (mg/L)	0.076	0	0	0.051
Avg Daily Ammonia (lbs/day)	52.53	0	0	0.815
Avg Daily Ammonia (mg/L)	0.076	0	0	0.051

Max Daily Oil and Grease (lbs/day)	0	0	0	0
Max Daily Oil and Grease (mg/L)	0	0	0	0
Avg Daily Oil and Grease (lbs/day)	0	0	0	0
Avg Daily Oil and Grease (mg/L)	0	0	0	0
Max Daily TRC (lbs/day)	0	0	0	0
Max Daily TRC (mg/L)	0	0	0	0
Avg Daily TRC (lbs/day)	0	0	0	0
Avg Daily TRC (mg/L)	0	0	0	0
pH	7-8.5	7.0-8.5	7.0-8.5	7.0-8.5
Temperature	6.9	12.1	7.3	7.2