UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

September 27, 2012

VIA ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Enloe Hydroelectric Project, FERC No. 12569-001

Dear Secretary Bose:

Enclosed is the Biological Opinion prepared by National Marine Fisheries Service (NMFS) regarding the Federal Energy Regulatory Commission's (FERC) proposed new license for the Enloe Hydroelectric Project on the Similkameen River in Okanogan County, Washington.

This document presents NMFS' Biological Opinion on the effects of the proposed Federal action on listed Upper Columbia River (UCR) steelhead in accordance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 *et seq.*). FERC requested formal consultation on the proposed action by letter dated May 16, 2011.

In this Biological Opinion, NMFS determined that the proposed action is not likely to jeopardize the continued existence of UCR steelhead or destroy or adversely modify designated critical habitat for this species.

Enclosed as Section 3 of this Biological Opinion is a consultation regarding Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). NMFS finds that the proposed action will adversely affect Chinook EFH and recommends that the terms and conditions of Section 2.8 of the Biological Opinion be adopted as EFH conservation measures. Pursuant to MSA (§ 305(b)(4)(B)) and 50 CFR 6000.920(j), Federal agencies are required to provide a written response to NMFS' EFH conservation recommendations within 30 days of receipt of those recommendations.

Comments or questions regarding this Biological Opinion and MSA consultation should be directed to Scott Carlon at 503.231.2379 (Scott.Carlon@noaa.gov) or Keith Kirkendall, FERC/Water Diversions Branch Chief, at 503.230.5431 (Keith.Kirkendall@noaa.gov)

Sincerely,

Bruce K Suzumoto for

William W. Stelle, Jr
Regional Administrator

Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Original Major License for the Enloe Hydroelectric Project
Public Utility District No. 1 of Okanogan County

FERC Project No. 12569-001

Similkameen River (6th Field HUC 170200070404)
Okanogan County, Washington

Action Agency: Federal Energy Regulatory Commission

NMFS Consultation Number: 2011/02038

Affected Species and Determinations:

ESA-Listed Species	Status	Is the Action Likely to Adversely Affect Species?	Is the Action Likely to Jeopardize the Species?	Is the Action Likely to Destroy or Adversely Modify Critical Habitat?
Upper Columbia River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	No

Fishery Management Plan that Describes EFH in the Action Area	Would the Action Adversely Affect EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon – Chinook	Yes	Yes

Consultation Conducted by: National Marine Fisheries Service, Northwest Region

Date Issued: September 27, 2012

Issued by:

William W. Stelle, Jr.
Regional Administrator

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Public Utility District No. 1 of Okanogan County	)))	**FERC Project No. 12569-001 (Enloe Hydroelectric Project)**
Application for Major License	))	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by electronic or first class mail, a letter to Kimberly D. Bose, Federal Energy Regulatory Commission, from the National Marine Fisheries Service, regarding National Marine Fisheries Service's Biological Opinion for Endangered Species Act Section 7 consultation for the Enloe Hydroelectric Project, FERC Project No. P-12596-001, and this Certificate of Service to each person designated on the official service list compiled by the Commission in the above captioned proceeding.

Dated on September 27, 2012

Bonnie J. Hossack

Bonnie J. Hossack
Administrative Assistant

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
BMP	Best Management Practice
°C	Celsius
CFS	Cubic Feet per Second
CHART	Critical Habitat Analytical Review Team
Colville Tribes	Confederated Tribes of the Colville Reservation
DO	Dissolved Oxygen
DPS	Distinct Population Segment
DQA	Data Quality Act
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FPS	Feet per Second
ICTRT	Interior Columbia Technical Recovery Team
ITS	Incidental Take Statement
kPa	Kilopascals
LWD	Large Woody Debris
left bank	Always implies left side of stream channel looking downstream
Mg/l	Milligrams per Liter
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
MW	Megawatt
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Units
Okanogan PUD	Public Utility District No. 1 of Okanogan County
Opinion	Biological Opinion
PAH	Polycyclic Aromatic Hydrocarbons
PCE	Primary Constituent Element
PME	Protection, Mitigation and Enhancement
Project	Enloe Hydroelectric Project
PVC	Polyvinyl Chloride
right bank	Always implies right side of stream channel looking downstream
RM	River Mile
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
7-DADMAX	7-Day Average of the Daily Max

TDG	Total Dissolved Gas
TMDL	Total Maximum Daily Load
TRG	Technical Review Group
UCR	Upper Columbia River
US	United States
USFWS	US Fish and Wildlife Service
VSP	Viable Salmonid Population
WDOE	Washington Department of Ecology
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources

1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

The biological opinion (Opinion) and incidental take statement (ITS) portions of this document were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402. Section 7(a)(2) of the ESA requires Federal agencies to ensure their actions avoid jeopardizing the continued existence of listed species or adversely modifying designated critical habitat. To “jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

NMFS also completed an essential fish habitat (EFH) consultation, prepared in accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801, et seq.) and implementing regulations at 50 CFR 600. Section 305(b)(2) of the MSA requires Federal agencies to consult with NMFS if their actions may adversely affect EFH.

The Opinion and EFH conservation recommendations are both in compliance with Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-544) (“Data Quality Act”) and underwent pre-dissemination review.

1.2 Licensing and Consultation History

The Federal Energy Regulatory Commission (FERC) proposes to issue a new Federal license to the Public Utility District No. 1 of Okanogan County (Okanogan PUD) for construction and operation of the Enloe Hydroelectric Project (FERC No. 12569, hereafter Project). The Project is located on the Similkameen River at river mile (RM) 8.8, near the City of Oroville, Okanogan County, Washington (Figure 1).

The Project was originally constructed between 1919 and 1923 and was acquired by Okanogan PUD in 1945. The Federal Power Commission issued Okanogan PUD an original license for the Project in 1956. However, the arrival of high-voltage transmission lines and lower cost power made it uneconomical to operate and power production was stopped in 1958. Okanogan PUD applied for a new license with FERC in 1981 and FERC subsequently issued a 50-year license with fish passage requirements in 1983. FERC rescinded the license in 1986 due to regional disagreement over fish passage at the Project. FERC stated that anadromous fishery issues had to be resolved before a licensing decision could be made.

In 1991, Okanogan PUD again filed a license application with FERC and a license was issued in September 1996. In August 1996, NMFS proposed to list the Upper Columbia River (UCR) distinct population segment (DPS) of steelhead (*Oncorhynchus mykiss*) under the ESA, which occur in the Similkameen River downstream of the Project. Because of the proposed listing, NMFS filed a motion with FERC to stay the license order until a more complete analysis of potential effects on this species could be conducted and a conference pursuant to Section 7 (a)(4) of the ESA completed. Okanogan PUD also filed a motion for stay of the license and FERC issued a stay order in June 1997. NMFS listed the UCR steelhead DPS as endangered in August 1997, and in May 1998, FERC requested formal consultation under Section 7(a)(2) with NMFS on issuance of a new Federal license for the Project.

NMFS issued its Opinion on the new license in November 1998. In the absence of a recovery plan for UCR steelhead, and to not foreclose any opportunity to promote recovery of this species, NMFS felt it prudent to require passage as a term and condition of the Opinion and new license. However, there was substantial opposition to passage from Canadian Tribes and the Provincial government of British Columbia, pointing to the paucity of evidence that anadromous fish historically passed Similkameen Falls just downstream of the Project. Citing the continued and significant disagreement over anadromous fish passage at the Project, FERC again rescinded the license.

In October 2007, NMFS announced that it had adopted a final recovery plan for the UCR steelhead DPS (UCSRB 2007). The recovery plan acknowledges that there is no substantial proof of historical anadromous fish passage over Similkameen Falls below the Project, and so does not identify fish passage at the Project as a necessary measure to recover UCR steelhead. In our filing of Federal Power Act (FPA) terms and conditions for a new license, we did not require fish passage under section 18 of the FPA.

Finally, on August 22, 2008, Okanogan PUD again filed a final application seeking a license from FERC to restore and operate the Project. FERC determined that licensing the Project is likely to adversely affect UCR steelhead. In addition, the Similkameen River below the Project supports summer Chinook salmon (*Oncorhynchus tshawytscha*), a species managed under the MSA, and is designated EFH for this species (PFMC 1999) and designated critical habitat for UCR steelhead (NMFS 2005a). Accordingly, on May 16, 2011, NMFS received a letter and draft environmental assessment (EA) from FERC requesting formal consultation under the ESA for UCR steelhead and under the MSA for summer Chinook salmon EFH. This Opinion is based on the information presented in the draft and final EAs, Okanogan PUD’s Final License Application and the published literature. A complete record of this consultation is on file at NMFS, Hydropower Division, Portland, Oregon.

1.3 Proposed Action

“Action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

1.3.1 Project Description and Operation

The proposed action is the issuance of a new Federal license for constructing and operating the Project. The license would be issued by FERC to Okanogan PUD, which proposes to construct a new power facility on the left bank (looking downstream) (Figure 1) of the Similkameen River.

The existing Project features include a 315-foot-long, 54-foot high concrete gravity arch dam; one woodstave penstock (one has been removed), two surge tanks and a powerhouse, all located on the right bank. The decommissioned powerhouse is roughly 900 feet downstream of the dam. The new facility would include the existing dam and 76.6 surface-acre impoundment with a storage capacity of 775 acre-feet at full pool; three 5-foot-high automated steel flap crest gates; a 190-foot-long intake canal on the left bank abutment of the dam; a 35-foot-long by 30-foot-wide penstock intake structure; two above-ground 8.5-foot-diameter, 150-foot-long steel penstocks; a powerhouse containing two vertical Kaplan turbines with a total installed capacity of 9.0 megawatts (MW); a 180-foot-long tailrace channel; about 1.5 miles of new and upgraded access roads and other appurtenant facilities. The Project would generate an average of 45 gigawatt-hours of electricity annually.

The Project would be constructed using various excavation techniques including blasting. The powerhouse location is sited in an alcove on the left bank of the Similkameen River about 230 feet downstream of the east abutment of Enloe Dam and 140 feet upstream of Similkameen Falls. A concrete training wall constructed on the riverside of the powerhouse would separate the powerhouse and tailrace channel from the stilling basin area downstream of Enloe Dam. The tailrace channel would convey water a distance of about 180 feet from the powerhouse to the river, downstream of Similkameen Falls. It would be an unlined steep-sided trapezoidal channel excavated in rock by blasting techniques. The channel width would taper from about 40 feet at the powerhouse to about 20 feet at a distance of about 75 feet downstream of the powerhouse. Downstream of this point to the river, the channel width would be 20 feet and the invert of the channel would be about 30 to 40 feet below the existing rock terrace on the left bank of the falls. The tailrace is designed to discharge into the pool of Similkameen Falls so that mixing occurs throughout the pool to protect the water quality in the portion of the pool located upstream from the tailrace.

Once constructed, the Project would be operated in a run-of-river mode where all Project inflow would approximate outflow at any point in time. The 5-foot high, automated crest gates would automatically adjust to regulate spill and maintain a nearly constant reservoir elevation relative to reservoir inflow. Except for minimum bypass flow (see section 1.3.3 below); there would be no spill at flows ≤1,600 cubic feet per second (cfs), which is the maximum hydraulic capacity of the powerhouse. This flow volume is estimated to occur approximately 70 percent of the time. During spill periods, which normally occur during the spring and early summer, the water surface elevation would be controlled by progressively lowering the crest gates. Once the crest gates are fully lowered the water surface elevation would be controlled by the stage discharge relationship of the spillway crest with the gates down. When inflow is ≤500 cfs, the Project would operate in run-of-river mode with one unit running.

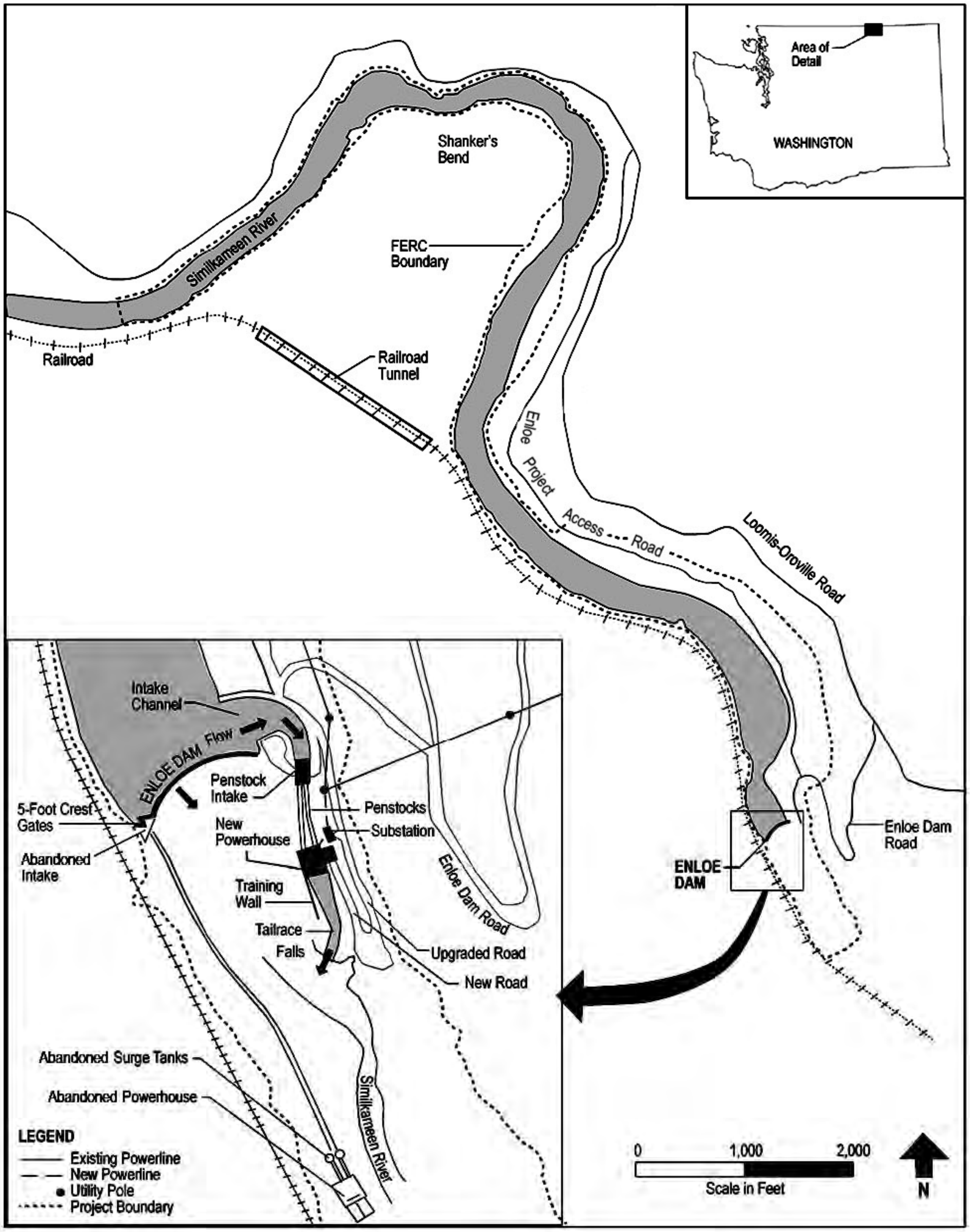

Figure 1. Location of the Enloe Hydroelectric Project and new facility arrangement (inset) (Source: FERC 2011).

1.3.2 Project Construction

This section provides additional detail regarding construction of the proposed Project. All of the information in this section is found in Okanogan PUD (2008a, 2008b, 2012a, 2012b).

<u>Access Road</u>
Okanogan PUD proposes to restrict the Enloe Dam Road from public use and provide public access by rehabilitating the Oroville-Tonasket Irrigation District Ditch Road. Okanogan PUD would maintain Enloe Dam Road for their use only. The ditch road would be improved to a single lane gravel road with several turnouts within line of sight for use by larger construction traffic and recreation vehicles.

Best Management Practices (BMP) such as silt fencing, check dams, straw bales and coir logs would be employed to limit the mobilization and transport of upland sediments into the Similkameen River during rehabilitation of the access roads. Nearly the entire down-gradient side of the roadway (between the roadway and the river) would contain a silt fence to intercept all potential flow paths to the river during construction activities. There would be no disturbance to sediments within the Similkameen River. A 6-inch depth of crushed rock base and crushed surfacing course would be applied. Areas of exposed soil and areas of cut-and-fill would be stabilized by mulching, seeding, and matting or netting. Stone or crushed rock may also be placed on disturbed areas during the construction phase.

<u>Staging and Storage</u>
Project construction would require temporary staging and storage of construction materials, equipment and temporary office buildings. The staging and storage areas will be sited to maintain a minimum 100-foot buffer from the edge of the river channel. All wetlands and sensitive areas will be delineated and protected. Construction equipment will be clean of grease prior to arriving on site and use biodegradable hydraulic fluid. BMPs such as silt fencing, coir logs, and plastic tarps will be used to limit mobilization and transport of sediments into the Similkameen River. It is not anticipated there will be any disturbance to sediments within the Similkameen River.

<u>Headworks</u>
The Project headworks would consist of the intake channel, penstock intake structure and two penstocks that would deliver water from the reservoir to the powerhouse. Excavation would be carried out behind a plug of native material left at the riverbank, allowing these Project features to be constructed in the dry.

Shallow overburden soil would be removed with excavators and loaded on to trucks for removal to spoil disposal areas that are alongside the access road to the northeast of the dam. The underlying rock layers would be broken up by ripping, excavator-mounted hoe-ram or controlled blasting. The methods employed would depend on the degree of weathering and foliation of the underlying rock. Controlled blasting involves drilling of closely spaced blast holes and either pre-shearing or cushion blasting using time delays to control the blast dynamics. This is necessary to limit shock waves and peak particle velocities and to reduce excavation over-break. Heavy blast mats are also used to contain the blast and control fly-rock.

Sediment barriers such as straw bale barriers, silt fences, or sandbags would be placed along the downslope edge of work area so that rock dust, rock fragments or other material subject to erosion will not impact surface water. If dust is generated during blasting and excavation activities, sprinkling or irrigation may be used to decrease the production of dust. Storm water entering the construction area from the east would be diverted to the temporary sediment barriers. Silt curtains or gunderbooms will be used to minimize the spread of construction-related turbidity. When necessary, excess water will be removed and discharged into an above ground containment structure.

When the intake structure, intake gates, and the tailrace channel are completed, the in-situ plug that forms the temporary cofferdam at the mouth of the intake channel would be removed and the entrance to the channel excavated. This work is expected be done during the fall or winter period when river flows are low. A floating silt curtain would be installed to act as a turbidity barrier between the excavation and the river. Excavated material would be temporarily stockpiled on the north side of the channel to drain to the sediment basin and then loaded on to haul trucks for disposal in designated spoil disposal areas adjacent to the main access road.

<u>Powerhouse and Tailrace</u>
The powerhouse and tailrace would be constructed in a bedrock terrace on the left bank of the river downstream of Enloe Dam. This area is scoured during annual floods so there is no significant accumulation of sediment.

<u>Training Wall</u>

Prior to excavation of the tailrace channel a permanent concrete training wall would be placed between the spillway plunge pool and the tailrace area on the left bank of the river downstream of the dam to direct spillway discharge away from the powerhouse and tailrace area. The training wall would be built during the annual low flow period in fall and early winter and behind a temporary cofferdam, thus work would be accomplished in the dry. Any seepage into the excavation area that is unsuitable for direct discharge by pumping to the river due to elevated turbidity would be pumped to a temporary settling tank prior to discharge. Some controlled blasting may be necessary to prepare the wall's foundation but most, if not all, of the rock excavation would be carried out using a hydraulic hoe-ram excavator.

<u>Tailrace Channel and Powerhouse</u>

Rock excavation for the tailrace channel and powerhouse would be carried out behind the training wall with a bedrock plug left in place at the outlet of the tailrace channel to isolate excavation work from the river. Rock would be fractured by either controlled blasting or hoe-ram excavators and removed with a hydraulic track-mounted excavator. Excavated rock would be disposed in designated spoil disposal areas located north of the Project. Seepage and storm water drainage entering the excavation area that is unsuitable for direct discharge to the river would be collected and pumped into either a nearby portable sedimentation tank or to the sedimentation basin located upstream of the dam for settling prior to discharge.

When the powerhouse and tailrace are completed and ready to take water, the rock plug at the end of the tailrace channel would be removed by controlled blasting and excavation. Removal of the upper part of the plug would be carried out in the dry above water level. However, excavation of the last 8 to 10 feet of the plug would be below water level. Before removing the plug, a floating silt curtain would be installed at the tailrace outlet and the channel flooded by to equalize the water level with that of the river. Excavated rock would be removed by excavators and allowed to drain before being hauled to designated spoil disposal areas. This work would be completed under low flow conditions and upstream of a barrier net placed across the river near the old powerhouse to exclude fish from swimming into the plunge pool below Similkameen Falls. Okanogan PUD would attempt to seine fish out of the plunge pool below the falls and release them downstream of the barrier net before blasting.

Upon completion of the tailrace channel, excavation of the plug, and removal of as much excavated material in the wet, as practical, the silt curtain would be gradually removed to allow water in the river and the tailrace channel to merge while avoiding a sudden increase in turbidity in the river.

Crest Gates

Okanogan PUD would install 5-foot gates on the crest of the dam to increase hydraulic head for power generation. The gates would be raised and lowered by air bladders placed between the gates and the dam's crest. Two concrete piers would be added to the crest to divide it into three gated sections. The gates would be installed during the low flow season and all water would be routed through the newly completed powerhouse. Construction would entail installing two reinforced concrete piers on the crest of the dam and pneumatic control piping and plates, which secure the gates to the crest of the spillway. The piers would be constructed and cured under dry conditions with the reservoir drawn down to just below spillway crest level.

1.3.3 Conservation Measures for Anadromous Fish

This section summarizes the conservation measures identified in Okanogan PUD's Final License Application (Okanogan PUD 2008a) and as modified by FERC's Final EA (FERC 2011). Only those measures designed to minimize effects on UCR steelhead are summarized here.

Development of the Biological Review Process

To provide for ongoing refinement and measure of effectiveness of the conservation measures, Okanogan PUD intends to establish a Biological Resources Program, Technical Review Group (TRG). The TRG would be composed of specialists from NMFS, US Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), Washington Department of Fish and Wildlife (WDFW), Washington Department of Ecology (WDOE), Washington Department of Natural Resources (WDNR), the Confederated Tribes of the Colville Reservation (Colville Tribes), and Okanogan PUD.

The TRG will be formed to: (1) provide agency and Tribal consultation on the design of management and monitoring plans, (2) review and evaluate data, and (3) develop resource management proposals and other recommendations. Okanogan PUD would prepare the agendas, conduct the meeting, and maintain and make public all records of consultation. Okanogan PUD would provide these records with any recommendations to the appropriate agencies. The TRG would establish communication protocols to facilitate interaction among members. Data and information from these programs will be used to examine long-term trends and make decisions regarding adapting the conservation measures to protect aquatic resources.

Construction Sediment Management Program

BMPs would be implemented that include preventative measures to minimize sediment disturbance and maximize sediment containment during construction. Construction near water bodies would be planned to occur during the low flow season to reduce the opportunity for sediment to enter the river. Also, a storm water runoff plan and a sediment management plan have been prepared and would be implemented. A sampling program would be applied to monitor compliance with water quality standards during construction. Monitoring also would be conducted during a gradual ramp-up of water diversion at the intake structure.

Standard erosion and sediment control measures would be used, and site-specific BMPs would be applied including: remove existing slide material; maintain access roads with crushed rock; construct check dams; install filter fabric fences; grade roads and construction areas toward ditches and sediment traps; mulch and hydro seed in disturbed areas; minimize ground disturbance in or near wetland and riparian habitats.

Okanogan PUD would prepare the final Construction Sediment and Management Plan after consulting with the TRG.

Erosion and Sediment Control Plan

Okanogan PUD would carry out BMPs for erosion control for both construction and post-construction operations. In brief, the following specific avoidance and minimization measures are proposed to avoid and minimize impacts to aquatic resources:

- The Project is designed so that most excavation will take place in dry areas away from the Similkameen River. Proposed sediment and erosion control measures are designed to prevent migration of soil into the river.
- Construction of the entrance to the intake channel and exit of the tailrace channel on the bank of the river would be conducted under low flow conditions to minimize entrainment of sediment. A silt curtain would be used in the reservoir adjacent to the mouth of the intake channel to contain turbidity.
- Excavation of bedrock at the exit on the tailrace channel would be scheduled for a period of low flow during fall or winter so that anadromous fish could be excluded from the area by nets. Installation of the proposed crest gates, which involves drilling and concrete work, would be conducted under dry conditions by bypassing flow through the completed powerhouse.

The Erosion and Sediment Control Plan would be prepared when designs have been finalized. This plan would address site-specific mitigation measures to minimize effects of construction, repair and operation of the dam and intake, penstocks, powerhouse, tailrace, impoundment, access roads, powerline and construction staging areas. Critical areas within the Project footprint identified as sensitive to erosion, slope failure and mass wasting would be identified and the plan would address potential effects from these areas. Okanogan PUD would prepare the final plan after consulting with the TRG.

Toxic Spill Plan
A spill prevention, containment, and clean-up plan would be prepared and implemented at Project initiation to reduce potential impacts from accidental spills when heavy machinery is operated near the river and reservoir.

Blasting Plan and Best Management Practices
The following measures would be completed to avoid and minimize the potential impacts associated with blasting to aquatic resources including UCR steelhead. Okanogan PUD would prepare the final plan after consulting with the TRG.

- The proposed Project is designed so that most facilities are located out of the present river channel. Rock excavation would be carried out in dry conditions.
- Proven controlled blasting techniques would be employed for rock excavation. This involves careful planning of the timing of blasting operations, use of special drilling patterns, and use of small charges that are set off with time delays to minimize peak vibration and pressure waves.
- Blasting pressure waves that could coincide with occupation of area by fish will be monitored using hydrophones. Pressure wave criteria that are potentially harmful to fish would be established and a contingency plan for construction would be developed if pressure wave criteria are exceeded.
- Impacts would be minimized by timing near- and in-water blasting to coincide with the lowest water levels combined with lowest potential for fish occupation in the area with a focus on periods where the numbers of Federally listed or sensitive salmonid species are low. Blasting adjacent to the stream will take place prior to spring high flow or during fall low flow.
- The amount of time that near or in water construction and blasting occurs would be minimized.
- Impacts would be minimized or avoided by removing as many fish as practical from the area adjacent to blasting and installing an exclusion barrier downstream of the affected area to prevent entry of additional fish into the area.
- Mechanical excavators with hydraulic rock hammer attachments would also be used in lieu of blasting to trim the excavation, excavate rock in areas unsuitable for blasting and to excavate loose rock. When removing materials from areas that are excavated through blasting, Okanogan PUD would remove residues from the blasting operation to the extent practical.

Minimum Bypass Flows
The bypass reach is a 370-foot long section of stream between Enloe Dam and Similkameen Falls. When inflow is ≤1,600 cfs, there would be no spill and except for some leakage at the dam, this reach would be dry. To protect resident fish species that would enter this reach over the top of the dam during spill, Okanogan PUD would provide a minimum flow of 30 cfs between July 15 and September 15 and 10 cfs during the remainder of the year.

Bypass flow would be delivered through the existing penstock intake in the right bank abutment at a depth of about 16 feet below the proposed normal water surface elevation. The outlet would be about 17 feet above the normal water level in the spillway plunge pool, and angled 30^{o} upward so that the flow trajectory would facilitate spreading and aeration of the discharge jet. Furthermore, bypass flow would be aerated at the ring jet valve where air would be entrained in the flow through the valve hood.

Temperature Monitoring

Water temperatures will be monitored at three locations for a period of 5 years to determine if the operation of crest gates causes an increase in water temperatures compared to upstream of the reservoir. Okanogan PUD would consult with the TRG in selecting the monitoring locations, documenting the results of monitoring and recommendations for the need for continued monitoring beyond the first 5 years.

Dissolved Gas Monitoring

At times total dissolved gas (TDG) measurements downstream of Similkameen Falls exceed the 110% saturation water quality criteria. Dissolved gas concentrations would be monitored at the Project intake and in the pool below the falls to determine TDG under Project operations. Okanogan PUD would consult with the TRG in selecting the monitoring locations, documenting the results of monitoring and recommendations for the need for continued monitoring beyond the first 5 years.

Dissolved Oxygen

Diverting water through the powerhouse that would otherwise flow over the dam and falls may reduce dissolved oxygen (DO) concentrations by about 1 milligram/liter. Okanogan PUD would install aeration capability to the new turbines. The aeration vents would be blocked during high spring flows when high TDG is a concern and DO concentrations are not. Adaptive management monitoring would be conducted during the first 5 years of Project operations to determine the optimal time to provide aeration in the flow tubes. Okanogan PUD would consult with the TRG in selecting the monitoring locations, documenting the results of monitoring and recommendations for the need for continued monitoring beyond the first 5 years.

Location of the Tailrace

To preserve water quality in the pool below the falls, the tailrace would be located such that the discharge circulates water to the pool preventing stagnation and consequent water quality degradation (i.e., high water temperatures and low dissolved oxygen) of the pool habitat.

Tailrace Net Barriers and Monitoring

Okanogan PUD would install conical net barriers at the draft tube exits to prevent UCR steelhead and other fish in the tailrace from swimming upstream into the draft tubes during periods of low flows. The net barriers would be monitored with suspended underwater video cameras. Observations would be made during periods of peak presence in the tailrace for each of the three anadromous salmonid species (UCR steelhead, summer-run Chinook salmon and sockeye salmon) during each of the first 2 years of operation. If fish are observed entering the openings, different materials could be attached to the downstream ends of the barriers to further discourage entry. Okanogan PUD would complete a final net barrier and operations and monitoring plan after consulting with the TRG.

Transport of Large Woody Debris

To prevent the loss of large woody debris (LWD) from downstream habitats, logs and other LWD will be allowed to pass over the spillway during the annual flood and will continue downstream naturally. If required, some LWD may be transported around the dam and placed in the river downstream of the dam. From there, the natural hydraulic force of the river will transport the LWD to downstream habitats. Okanogan PUD would consult with the TRG before determining when such transport would be required, the methods to be used for collection and transport of the wood, and the best locations for release of the woody debris downstream of the dam.

Side Channel/Off Channel Development/Enhancement

Okanogan PUD proposes to complete a side channel enhancement project focused on addressing two of the primary limiting factors for salmonids in the Similkameen River: high water temperatures during low flow periods and rearing habitat for salmon and steelhead. Potential project sites have been identified in the lower Similkameen River. Okanogan PUD would consult with the TRG and others as needed in sighting and designing a final enhancement Project.

A well would be constructed to extract cooler water flowing through the gravel of the streambed. This water would be pumped to perforated Polyvinyl chloride (PVC) pipe buried with spawning-sized gravel in a modified (but existing) side channel. Water would be pumped through the PVC pipe during critical warm water periods and would provide upwelling of the cooler water. A "low-technology" structure (e.g., boulders or log(s)) could be anchored at the head of the channel to allow water to enter the side channel during all flow conditions (low flow channel) while deflecting the larger flood flows back into the main channel.

The side channel enhancement would be accomplished in three phases. The first phase, already completed, involved augmenting existing information including by: (1) using existing data sources (e.g., Light Detection and Ranging topography, aerial photographs) to evaluate candidate channel construction sites, (2) identifying sources of cold water and pump house locations, (3) examining and comparing characteristics of known sites, and (4) the selection of one to three candidate project sites for further development and assessment. The second phase would include a more detailed examination of the channel stability, development of flow duration curves, choosing a site, and conducting preliminary design of the project. The last phase would be building, operating, and monitoring the project. It is assumed that monitoring would occur over a 5-year period and would be coordinated with other monitoring efforts in the basin. Fish distribution and relative abundance would be monitored in the enhanced side channel and at three other areas considered important spawning and rearing areas. Identified trends would be incorporated into the biological review process.

Gravel Augmentation

Okanogan PUD would place spawning gravel (1 to 3 inches in size) in the active flood plain of the Similkameen River between RM 5 and RM 6, upstream of Oroville. Gravel would be placed adjacent or slightly into wetted areas during low flow periods to facilitate downstream transport during high flows. This location is upstream of a 3-mile long reach known to be used by UCR steelhead for spawning.

The estimated volume of gravel to be placed would be 3,000 cubic yards. This amount would provide for approximately 5 percent coverage of the first mile of river channel downstream of the gravel stockpile. It may require 1 to 3 years to distribute the stockpiles. Gravel placement would begin post license at year 3 when the Project is constructed. The subsequent stockpiles would be placed every 5 years for the next 20 years (e.g., year 8, year 13, year 18 and year 23). Okanogan PUD would consult with the TRG before completing its gravel augmentation plan.

A baseline survey of gravel would be conducted the year prior to the first gravel stockpiling. The first gravel surveys would be conducted after the gravel is placed in year 3. Subsequent surveys conducted in years 4, 5 and 7 would map gravel distribution and compared to baseline conditions. After the initial round of gravel placement and monitoring, the results of the monitoring program would be presented to the TRG to review the effectiveness of the program and make recommendations regarding the next gravel augmentation in year 8. Monitoring surveys would be conducted in years 10 and 12. The results of the surveys would again be reviewed with the TRG that could recommend adjustments to the program for augmentation in year 13. Gravel would be placed in years 18 and 23. Surveys would be conducted the year before gravel placement in years 17 and 22 to provide an opportunity to make modification prior to placement.

Monitoring of gravel distribution and use by spawning salmonids will involve integration with and using habitat surveys and fish distribution methodologies currently being done as part of the Okanogan Basin Monitoring and Evaluation Project. After the gravel is placed in the river and flows have distributed the gravel downstream, habitat and fish use will be surveyed.

Okanogan PUD would provide an annual report to the TRG and each year that monitoring is conducted or gravel is deposited, describing the gravel distribution and the past year's success or failure with gravel use by salmonids; include recommendations for changes needed to achieve successful use by spawning steelhead and other salmonids.

<u>Development of a Fisheries Monitoring Data Base</u>
As part of the biological review process, Okanogan PUD would develop a central database for organizing and storing all monitoring data related to aquatic resources. Database format and development would be consistent with other aquatic data gathered in the Okanogan River basin. The monitoring programs that would be included in the biological review process are the tailrace barrier monitoring and side channel habitat monitoring program. Data and information from these programs will be used to examine long-term trends and make decisions regarding adapting the conservation measures to protect aquatic resources.

1.4 Action Area

The Action Area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02(d)). For the purposes of this consultation, the action area includes the head of the Project reservoir downstream to the confluence of the Okanogan and Columbia Rivers.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS, NMFS, or both, to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the USFWS, NMFS, or both provide an opinion stating how the agencies' actions will affect listed species or their critical habitat. If incidental take is expected, Section 7(b)(4) requires the provision of an ITS specifying the impact of any incidental taking, and including reasonable and prudent measures(RPMs) to minimize such impacts.

2.1 Introduction to this Biological Opinion

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

This Opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat (NMFS 2005b).

We will use the following approach to determine whether the proposed action described in Section 1.3 is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- *Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action*. This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. For listed salmon and steelhead, NMFS has developed specific guidance for analyzing the status of the listed species' component populations in a "viable salmonid populations" (VSP) paper (McElhany et al. 2000). The VSP approach considers the abundance, productivity, spatial structure, and diversity of each population as part of the overall review of a species' status. For listed salmon and steelhead, the VSP criteria therefore encompass the species' "reproduction, numbers, or distribution" (50 CFR 402.02). In describing the range-wide status of listed species, we rely on viability assessments and criteria in technical recovery team documents and recovery plans, where available, that describe how VSP criteria are applied to specific populations, major population groups, and species. We determine the rangewide status of critical habitat by examining the condition of its physical or biological features (also called "primary constituent elements" or PCEs in some designations) which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 2.2.

- *Describe the environmental baseline for the proposed action*. The environmental baseline includes the past and present impacts of Federal, state, or private actions and other human activities *in the Action Area*. It includes the anticipated impacts of proposed Federal projects that have already undergone formal or early Section 7 consultation and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 2.3 of this opinion.

- *Analyze the effects of the proposed actions*. In this step, NMFS considers how the proposed action would affect the species' reproduction, numbers, and distribution or, in the case of salmon and steelhead, their VSP characteristics. NMFS also evaluates the proposed action's effects on critical habitat features. The effects of the action are described in Section 2.4 of this opinion.

- *Describe any cumulative effects.* Cumulative effects, as defined in NMFS' implementing regulations (50 CFR 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate Section 7 consultation. Cumulative effects are considered in Section 2.5 of this opinion

- *Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.* In this step, NMFS adds the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to assess whether the action could reasonably be expected to: (1) appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2). Integration and synthesis occurs in Section 2.6 of this opinion.

- *Reach jeopardy and adverse modification conclusions*. Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 2.7. These conclusions flow from the logic and rationale presented in the Integration and Synthesis section (2.6).

- *If necessary, define a reasonable and prudent alternative to the proposed action.* If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action in Section 2.8. The RPA must not be likely to jeopardize the continued existence of ESA-listed species nor adversely modify their designated critical habitat and it must meet other regulatory requirements.

2.2 Rangewide Status of the Species and Critical Habitat

This section describes the status of the UCR steelhead DPS and its designated critical habitat, both of which occur in the geographic area of this proposed action and are considered in this Opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designation published in the Federal Register (Ford 2011, Good *et al*. 2005, NMFS 1996, 1997, 2005a, 2005c, and 2006).

To be considered viable (i.e., with a negligible risk of extinction due to threats from demographic variation, local environmental variation, and genetic diversity changes over the long term), a DPS should have the following characteristics. It should contain multiple populations so that a single catastrophic event is less likely to cause the species to become extinct, and so that the DPS may function as a metapopulation as necessary to sustain population-level extinction and recolonization processes. Multiple populations within a DPS also increase the likelihood that a diversity of phenotypic and genotypic characteristics will be maintained, thus allowing natural processes to operate and increase the species' long-term viability. Some of the DPS populations should be relatively large and productive to reduce the risk of extinction in response to a single catastrophic event that affects all populations. If a DPS consists of only one population, that population must be as large and productive (i.e., resilient) as possible. Some populations in each DPS should be geographically widespread to reduce the risk that spatially correlated environmental catastrophes could drive the species to extinction. Other populations in the same DPS should be geographically close to each other to increase connectivity between existing populations and encourage metapopulation function. Populations with a diversity of life histories and phenotypes should be maintained in each DPS to reduce the risk of correlated environmental catastrophes or changes in environmental conditions that occur too rapidly for natural processes to operate within a DPS. Finally, evaluations of a species' status should take into account uncertainty about DPS-level processes. Our understanding of spatial and temporal processes is limited such that the historical number and distribution of populations serve as a useful goal in maintaining viability of ESUs and DPS' that were likely self-sustaining historically.

Status of UCR Steelhead DPS

The UCR steelhead DPS was listed as endangered in 1997 (NMFS 1997) and its status was upgraded to threatened in 2006 (NMFS 2006). This species includes all naturally spawned steelhead populations below natural and manmade impassable barriers in streams in the Columbia River basin upstream from the Yakima River (excluded), Washington, to the U.S.-Canada border, and progeny of six artificial propagation programs. The Interior Columbia

Technical Recovery Team (ICTRT) identified four independent populations of UCR steelhead. These are the Wenatchee, Entiat, Methow, and Okanogan basin populations (ICTRT 2003). All extant populations are considered to be at high risk of extinction (Ford 2011). NMFS (2011) concluded that UCR steelhead should remain listed as threatened.

Life History. Life history characteristics for UCR steelhead are similar to those of other inland steelhead DPSs. However, smolt age is dominated by 2- and 3-year-olds and some of the oldest smolt ages for steelhead, up to 7 years, are reported from this DPS. Available data suggest that Steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow River steelhead primarily return after two years in salt water. Similar to other inland Columbia River basin steelhead DPSs, adults typically return to the Columbia River between May and October and are considered summer-run steelhead. Adults may remain in fresh water up to a year before spawning. Most UCR steelhead migrate relatively quickly up the Columbia River to their natal tributaries, but a portion of the returning run overwinters in the Columbia reservoirs, passing over the mid-Columbia River dams in April and May of the following year. Unlike Chinook salmon or sockeye salmon, steelhead adults may attempt to migrate back to the ocean after spawning. These fish are known as kelts, and those surviving will return from the ocean to spawn again.

Steelhead enter the Similkameen as early as mid July and may remain until mid May of the following year. Adults will typically hold in deeper pools, including the pool immediately below Similkameen Falls, and other cool-water habitat downstream of the Project until temperatures decrease to a suitable level and they can move to spawning areas. Spawning generally occurs throughout the mainstem Okanogan and Similkameen Rivers from March through May with the peak spawning period occurring from late March to early May. Steelhead do not spawn in the immediate Project area but redds have been observed within about 0.8 miles downstream. The highest density of redds occur in the lower 5 miles of the Similkameen River and downstream of Zosel Dam on the Okanogan River where better quality spawning gravels are common and the majority of hatchery releases are focused. Steelhead redds were commonly observed near these stocking locations (Arterburn et al. 2007 and 2010, Okanogan PUD 2008a, Miller et al. 2011).

Limiting Factors**.** The UCR steelhead DPS continues to have problems including genetic homogenization from hatchery supplementation (reducing genetic variations from levels that support viability), and the degradation of freshwater habitats within the region (negatively affecting spatial structure and productivity), especially the effects of grazing, irrigation diversions, and hydroelectric dams (Good *et al*. 2005, Ford 2011). Limiting factors identified for UCR steelhead include: (1) Mainstem Columbia River hydropower system mortality, (2) reduced tributary streamflow, (3) tributary riparian degradation and loss of in-river wood, (4) altered tributary floodplain and channel morphology, and (5) excessive fine sediment and degraded tributary water quality (NMFS 2005c).

UCSRB (2007) identify the limiting factors and threats to the UCR steelhead DPS and include: (1) mainstem Columbia River hydropower related adverse effects; (2) impaired tributary fish passage; (3) degraded freshwater habitat (floodplain connectivity and function, channel structure and complexity, riparian areas and large woody debris recruitment, stream flow, and water quality have been degraded as a result of cumulative impacts of agriculture, forestry, and development); (4) effects of predation, competition, and disease mortality; (5) hatchery-related effects; and (6) harvest-related effects.

Abundance and Productivity. In spite of higher abundance in all four independent populations of the DPS since the last status review in 2005, natural-origin returns remain well below the minimum abundance thresholds that the Interior Columbia Basin Technical Recovery Team (ICTRT) has identified as necessary for viability (Table 1, Ford 2011). The modest improvements in natural returns in recent years are probably the result of several years of relatively good natural survival in the ocean and tributary habitats. Overall, the new information considered does not indicate a change in the biological risk category since the last status review in 2005 (Ford 2011).

Table 1**.** Abundance and viability risk assessment for UCR steelhead.

Population	Natural Spawning Abundance (10-year Geometric Mean for 2000-2009)	Minimum Abundance Threshold[1]	Risk for Abundance and Productivity[2]
Wenatchee Basin	795	1000	High
Entiat Basin	112	500	High
Methow Basin	468	1000	High
Okanogan Basin	147	750	High

[1]Abundance threshold for viability based on historic intrinsic potential (UCSRB 2007).
[2]Risk of extinction over a 100-year timeframe; a *High* risk represents a >25 percent chance of extinction.

Spatial Structure and Diversity. With the exception of the Okanogan population, the Upper Columbia populations are rated as “low” risk for spatial structure (Ford 2011). The “high” risk ratings for diversity were driven by the high levels of hatchery spawners within natural spawning areas and lack of genetic diversity among the populations. Hatchery origin returns continue to make up a high fraction of total spawners in natural spawning areas for this DPS, although estimates of natural origin spawner abundance are higher for the most recent cycle. The proportion of natural origin fish was the highest in the Wenatchee River and extremely low in both the Methow and Okanogan rivers. Chronic high levels of hatchery spawners within natural spawning areas and lack of genetic diversity among the populations largely drive the “high” risk ratings for diversity.

Status of Critical Habitat

Critical habitat includes the stream channels to the lateral extent defined by the ordinary high water mark (33 CFR 319.11). In 2005, NMFS designated only those habitats that were occupied and contained certain habitat attributes called “primary constituent elements” (PCEs) that are essential to support one or more life stages. The 2005 designation also analyzed areas that will provide the greatest biological benefits for listed salmon and balanced the economic and other costs for areas considered for designation. The PCEs are identified in the documents designating critical habitat and listed below in Table 2 (NMFS 2005a).

Table 2. Types of sites and essential physical and biological features designated as PCEs

Site	Essential Physical and Biological Features	Species Life Stage
Freshwater spawning	Water quality, water quantity and substrate	Spawning, incubation and larval development
Freshwater rearing	Water quantity and floodplain connectivity	Juvenile growth and mobility
	Water quality and forage	Juvenile development
	Natural cover	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity and natural cover	Juvenile and adult mobility and survival

The UCR steelhead DPS's range includes 42 watersheds. The Critical Habitat Analytical Review Team (CHART) assigned low, medium, and high conservation value ratings to three, eight, and 31watersheds, respectively. In addition, the CHART rated the conservation value of the Columbia River rearing/migration corridor downstream of the spawning range as high.

Many factors, both human-caused and natural, have contributed to the decline of UCR steelhead over the past century, as well as the conservation value of essential features and PCEs of designated critical habitat. Steelhead habitat has been altered through activities such as urban development, logging, grazing, power generation, and agriculture. These habitat alterations have resulted in the loss of important spawning and rearing habitat and the loss or degradation of migration corridors. The following are the major factors limiting the conservation value of critical habitat for UCR steelhead:

- Columbia River hydropower system mortality (freshwater migration corridors without obstructions).

- Reduced tributary stream flow (freshwater spawning sites with water quantity conditions supporting spawning, incubation and larval development; freshwater rearing sites with water quantity to form and maintain physical habitat conditions that support juvenile growth and development).

- Degraded tributary riparian condition and loss of in-channel large wood (freshwater rearing sites with natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams to form and maintain physical conditions that support juvenile growth and development).

- Altered tributary floodplain and channel morphology (freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development; freshwater rearing sites with floodplain connectivity to form and maintain physical habitat conditions that support juvenile growth and development).

- Excessive sediment in tributaries (spawning sites with substrate to support egg incubation and larval growth and development; juvenile migration corridors and rearing sites with forage to support juvenile growth and development).

- Degraded tributary water quality (spawning sites with water quality to support egg incubation and larval growth and development; juvenile rearing sites and migration corridors with water quality supporting juvenile growth and development).

Climate Change. Throughout Washington, salmonids and their habitat are likely affected by climate change. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin et al. 2007; ISAB 2007). While the intensity of effects will vary by region (ISAB 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathe 2009) – changes that will shrink the extent of the snowmelt dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

In Washington State, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures in Washington State are likely to increase 0.1-0.6ºC per decade (Mote and Salathe 2009). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing stream flow timing and increasing peak river flows, which may limit salmon survival (Mantua et al. 2009). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which scour the streambed and destroy salmon eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality. Higher ambient air temperatures will likely cause water temperatures to rise (ISAB 2007). Salmon and steelhead require cold water for spawning and incubation. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon and steelhead with patches of suitable habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold-water refugia (Mantua et al. 2009).

Climate change is expected to make recovery targets for these salmon populations more difficult to achieve. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

In summary, UCR steelhead populations have increased in natural origin abundance in recent years, but productivity levels remain low. The proportions of hatchery origin returns in natural spawning areas remain extremely high across the DPS, especially in the Methow and Okanogan River populations. The modest improvements in natural returns in recent years are probably primarily the result of several years of relatively good natural survival in the ocean and tributary habitats. Tributary habitat actions called for in the Upper Columbia Recovery Plan are anticipated to be implemented over the next 25 years and the benefits of some of those actions will require some time to be realized. Overall, the new information considered does not indicate a change in the biological risk category since the time of the last status review in 2005.

2.3 Environmental Baseline

The environmental baseline includes the past and present impacts of all Federal, state or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The Similkameen River begins in Canada west of the Okanogan Basin, draining the eastern slopes of the Cascade Mountains in southern British Columbia and northern Washington. About 78 percent of the Similkameen Basin lies in Canada and it runs nearly 122 miles before entering the Okanogan River roughly 7 miles south of the United States (US) border with Canada, near the City of Oroville, Washington. The Okanogan River originates in Canada near Armstrong, British Columbia and flows south through a series of three large lake systems before reaching the US. From the US border, the Okanogan flows about 65 miles before entering the Columbia River at river mile 533 (Harris et al. 2001 and NPCC 2004). Like the Similkameen Basin, most of the Okanogan Basin (74 percent) lies in Canada. Nearly 75 percent of the flow contributed to the Okanogan River within the US is supplied by the Similkameen River.

Overall, the UCR steelhead DPS has been dramatically affected by hydroelectric and water storage development both in the US and Canada. Access to a substantial portion of historical habitat is blocked by Chief Joseph and Grand Coulee Dams on the Columbia River. Across the DPS there are habitat problems related to irrigation diversions, degraded riparian and instream habitat from urbanization, land conversion to crops and orchards, livestock grazing, and timber harvest (Busby et al. 1996, NMFS 1996, BRT 1997 and 2003).

The major land uses in the US portion of the Okanogan Basin are forestry, range and croplands. The valley bottom lands are dominated by agriculture including fruit crops, grain and hay production. Livestock grazing dominate the bench lands and hay production and most of the lower to mid-upper elevation forests have been harvested for timber and used for livestock grazing (NPPC 2001). The NPCC (2004) identifies the following main threats to fish and aquatic habitats in the Okanogan Basin: (1) residential development, (2) agricultural development, (3) livestock grazing, (4) exotic species, (5) hydropower development and operation, and (6) wildfire suppression. Other factors affecting aquatic habitats in the basin include channelization of the mainstem Okanogan River from the outlet at Osoyoos Lake to the confluence with the Columbia River, withdrawal of water for irrigation and poor water quality.

Reaches of both the Okanogan and Similkameen Rivers are listed on the 2008 Clean Water Act Section 303(d) list of water quality impaired water bodies for elevated stream temperatures (WDOE 2011). The aquatic life maximum water temperature criterion set by WDOE to protect this use is 17.5 degrees Celsius (°C), measured by the 7-day average of the daily maximum temperatures (7-DADMax). Both the Similkameen and Okanogan River water temperatures often exceed lethal tolerance levels for salmonids in the mid-to late summer months (Okanogan PUD 2008a). In addition, Ecology has identified the Similkameen River below Enloe Dam as a water body requiring special protection for spawning and incubation and set the maximum 7-DADmax criterion of 13°C from February 15 through June 15 annually (WDOE 2011 and 2012). Maximum daily water temperatures in the Similkameen River can exceed the spawning temperature criterion of 13.0°C below the falls and at the Oroville Bridge (Okanogan PUD 2008a).

In summary, water impoundments in the Okanogan Basin in both Canada and the US over the past century have changed the functioning of this ecosystem. Dams and water withdrawals for municipal use, irrigation and flood control have altered the flow regime and created impassable obstacles to anadromous fish stocks including UCR steelhead. Water diversions on the US side have left reaches of tributaries to the Okanagan River dry during summer months (Harris et al. 2001). While modest improvements in natural returns to spawning areas have occurred in recent years, it has not been enough to change the species' biological risk. The fraction of hatchery-origin spawners in natural spawning areas remains high, particularly in the Okanogan and Similkameen Rivers. This serves to stifle genetic diversity and keep this species at high risk.

2.4 Effects of the Action on the Species and its Designated Critical Habitat

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those caused by the proposed action and are later in time, but still are reasonably certain to occur. During consultation, neither the action agency nor NMFS identified any interrelated or interdependent actions.

Effects on UCR Steelhead

This section provides a description of potential effects related to Project construction, Project operation, and proposed protection, mitigation and enhancement (PME) measures. Construction of the new facilities and PME measures necessitates the use of heavy equipment both in and adjacent to the river channel. Land disturbing activities can result in: (1) increased suspended sediment and turbidity from in-river and upslope construction work and storm water runoff from construction sites and staging areas; and (2) leaks or spills of chemical contaminants and hazardous material (gasoline, oil, grease and concrete) from use of heavy equipment in or near the river channel.

Potential direct and indirect effects to UCR steelhead and critical habitat from Project operations include: (1) injury or mortality from contact with turbine runners; (2) temporary reduction in downstream flow due to emergency powerhouse shutdown; (3) decreased dissolved oxygen levels in the lower river; (4) elevated total dissolved gas in the lower river from spill; and (4) leaks and spills of chemical contaminants or hazardous materials.

Construction activities are expected to occur over a period of about 4 years. UCR steelhead are known to hold in the pool below Similkameen Falls and spawn and rear in the Similkameen River downstream of the Project. NMFS assumes that one or more life stage (e.g., adults, juveniles, alevins) of this species will be present in the river below the Project year-round.

Total Suspended Solids (Sediment and Turbidity)

During project construction and post-construction periods, ground disturbance and use of heavy machinery in or near water, or in upslope locations that run off into stream reaches or the reservoir, may cause fine sediment to be released into the Similkameen River. Construction areas and bare soils are prone to erosion and increased surface runoff until vegetative ground cover is re-established and minimizes erosion. Salmonid survival depends on many factors, including food availability, predator avoidance, and immune system health and reproduction. Stressful conditions are known to reduce the adaptive responses of salmonids to natural environmental fluctuations and increase their susceptibility to disease and predation (Spence et al. 1996). Effects from suspended solids on salmonids may include physiological stress, increase maintenance energy, reduced feeding and growth (juveniles), respiratory impairment and possibly gill damage (Redding et al. 1987, Lloyd et al. 1987, Servizi and Martens 1991). Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991).

The extent and duration of turbidity plumes created by the use of heavy equipment in or near the stream would depend on local conditions and the type of sediment at the site. BMPs (see section 1.3.3) would be employed to minimize sediment input to the stream and all in-water work (removing earthen plug at Project headworks, construction of training wall, and removal of rock plug at the end of the tailrace channel) would be carried out during the annual low flow season (fall and winter) to further minimize impacts to water quality. Real-time turbidity monitoring would be performed during in-water construction at selected locations upriver to measure background and at a downstream point to determine compliance with Washington State water quality standards.[1] Any time turbidity exceeds water quality standards, Okanogan PUD would suspend construction until compliance with turbidity standards is achieved. If necessary, adjustments would be made to construction methods or BMPs to reduce water quality impacts from fine sediment disturbance before construction is resumed. During upland construction, turbidity monitoring would be conducted daily. Water quality monitoring will also be conducted prior to discharge from a siltation pond or settling tank.

Due to possible suspended sediment and turbidity in the stream, minimal to moderate sublethal effects may occur, but fish mortality is not expected. This is because:

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[1] Washington State turbidity standards for salmonid spawning, rearing and migration: turbidity shall not exceed 5 nephelometric turbidity units (NTU) over background when the background is 50 NTU or less; or no more than a 10 percent increase in turbidity when background turbidity is more than 50 NTU.

- Most of the ground disturbing activities would be carried out in the dry, out of the stream channel, and BMPs for arresting upslope sediment inputs would minimize impacts to water quality and UCR steelhead.
- Implementation of BMPs for in-water work, timing of in-water work to coincide with annual low flows, and real-time monitoring to determine when impacts exceed state water quality criteria would be protective of UCR steelhead.
- Salmonids will avoid, if possible, heavy plumes of suspended solids and have been observed to move laterally and downstream to avoid turbid plumes (Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Steelhead that are immediately present below the Project during times when fine sediment is released to the stream would be able to move away from any plumes.

Contaminant Spills and Leaks

Use of heavy equipment and concrete in and around the waterway increases the potential for contaminants to enter fish habitat. Accidental releases of fuels, lubricants and other construction-related chemical contaminants from equipment and uncured concrete could negatively affect water quality and thus habitat. Petroleum-based contaminants contain polycyclic aromatic hydrocarbons (PAHs), which can be readily absorbed by fish and other aquatic animals during exposure to contaminated food, water, and sediments (Tuvikene 1995). Uncured concrete or concrete wash entering the stream can readily raise pH to lethal levels.

Okanogan PUD would keep hazardous spill containment equipment and materials on site. Equipment storage and fueling areas would be located at least 100 feet from the stream and all fuel tanks would be stored within a secondary containment. All equipment would be inspected routinely for leaks and spills, including any incoming vehicles. A Spill Response Plan has been developed and establishes procedures, methods, equipment, and other measures to prevent the discharge hazardous materials to water bodies or upland areas during construction; and details material handling and storage, spill management, and spill notification responsibilities (Okanogan PUD 2008c).

Construction using concrete within the stream channel would be isolated from the water until the concrete has cured for at least 7 days. This would ensure no contact between uncured concrete and the stream. In the event that storm water contacts newly poured concrete, pH sampling would be conducted at discharge points after each 24-hour rainfall event of 0.5 inches or greater, or if construction site discharge is observed.

NMFS does not anticipate that any significant effects to UCR steelhead would occur because:

- The majority of construction work would occur outside of, and isolated from, the active stream channel, minimizing the likelihood of accidental spills or leaks from entering the stream.
- Well established BMPs would be in place to prevent spills of toxicants and contain spills should they occur.

- Concrete work in the river channel would be isolated from flow and allowed to cure before contact with water and any release of uncured concrete would be quickly diluted in the river.
- Okanogan PUD would monitor for presence of hazardous materials in the stream and will monitor pH levels in the river concurrent with storm events and concrete construction in the active river channel.

Mechanical Excavation

The use of excavators and other large equipment would create visual, noise, and vibration disturbances in the riparian area and stream. Effects of these disturbances include frightening juvenile and adult fish, which may temporarily displace them from preferred habitat, exposing juvenile fish to predation and potentially reduced feeding. All excavation is proposed to take place during the low flow period of fall, winter and early spring (before spring runoff) and would be completed in one season. NMFS assumes that some number of juvenile or adult steelhead would be present in the pool below Similkameen Falls. Because excavation is occurring during fall and winter months, the river would be cooler, allowing steelhead to freely exit the pool and move downstream to other areas if frightened by noise and vibration. Thus, NMFS anticipates that effects on steelhead from use of mechanical excavators (e.g., hoe-ram excavator) would be minor since steelhead can escape the immediate construction area to downstream rearing and holding habitat.

Explosives

High instantaneous peak pressures followed by rarefaction from detonation of high explosives can traumatize and kill fish. The rapid oscillation of waveform from high overpressure and quick falloff to below ambient hydrostatic pressure causes swift contraction and overextension of the swimbladder resulting in internal damage and mortality (Keevin and Hempen 1997, Wright and Hopky 1998). The degree of damage is related to type of explosive, size and pattern of the charge, method of detonation, distance from the point of detonation, water depth, type of species, and fish size and life stage.

Steelhead possess a physostomous swimbladder; that is, the swimbladder is connected to the esophagus by a pneumatic duct. Salmonids can regulate gas in their bladder by either gulping air from the surface or expelling it through the esophagus, or gases can be exchanged through blood permeating the bladder wall. Teleki and Chamberlain (1978) suggest that physostomus species are less sensitive to blast pressures than physoclistous species (swim bladder attached to the circulatory system allowing slow change in bladder pressure) because they can release air from the bladder more quickly. However, the pneumatic duct of physostomous species is small and cannot pass a significant amount of gas during the transit of pressure waves that occur in milliseconds (Christian 1973, Baxter et al. 1982). While heart, kidney, blood vessels, spleen, liver, and gonads may be injured, the swim bladder is the most sensitive to pressure change and can experience trauma ranging from slight tissue strain to complete rupture leading to massive internal hemorrhaging. Mortality is caused either directly by trauma or indirectly through loss of equilibrium resulting in increased susceptibility to predation or inability to feed. Studies indicate that an overpressure in excess of 100 kilopascals (about 14.5 pounds per square inch) can result in these effects (Wright and Hopky 1998).

Okanogan PUD proposes to take a number of safeguards including careful planning for timing, special drilling patterns, and use of small charges that are set off with time delays to minimize peak vibration and pressure waves (Okanogan PUD 2009). Okanogan PUD would also include the following measures to minimize the effects of blasting.

- Blasting pressure waves that could coincide with occupation of area by fish would be monitored using hydrophones. The creation of pressure waves exceeding 100 kilopascals (kPa or about 14.5 pounds per square inch) would be avoided, as practical.
- Near and in-water blasting would be timed to coincide with the lowest water levels (low flows) combined with lowest potential for fish occupation in the area. Scheduling would avoid periods where steelhead are present.
- Excavation of bedrock at the exit of the tailrace channel (area with the highest impact on adult and juvenile steelhead in the pool below the falls) would be scheduled for a period of low flow during fall or winter so that anadromous fish can be excluded from the area. During this period, construction activities would be expedited to reduce the amount of time fish may be exposed to the effects of blasting activities.
- Impacts would be minimized or avoided by removing as many fish as practical from the area adjacent to the proposed blasting and installing an exclusion barrier downstream of the potentially affected area to prevent entry of additional fish into the affected area.

Before any blasting occurs, Okanogan PUD would erect a barrier net near the old powerhouse, about 475 feet downstream of Similkameen Falls, to prevent steelhead and other species from accessing the pool during blasting. Okanogan PUD would also remove as many steelhead as possible from the pool for transport to a location downstream of the barrier net. Because of the depth and rough contour of the pool below the falls, it is unlikely that every individual steelhead would be trapped and moved downstream, so a small number of juvenile and adult steelhead may be in the pool when explosives are used.

The in-water blasting for the Project intake would occur above Enloe Dam, roughly 400 feet upstream from the Similkameen Falls pool where steelhead may be present (steelhead are not present above the dam). Furthermore, blasting used during excavation for the penstocks, powerhouse and most of the tailrace channel would not be in-water. Thus, NMFS expects that peak pressure waves would be significantly weakened by the time they reach the pool. Blasting, if needed, for construction of the training wall would be done in the dry but would be located just upstream of the falls where peak pressure waves may have more effect in the pool. However, the highest potential for injury or mortality from blasting would occur during excavation of the tailrace plug that would be adjacent to the pool below the falls.

Based on the proposed timing, techniques, fish evacuation and exclusion, monitoring and finally the location (most would occur out of the water); NMFS anticipates that potential effects from blasting have been practicably minimized. Most, if not all, of the take occurring would be in the form of harassment. NMFS expects that only a few individual steelhead would be present in the pool during blasting activities. A portion of these individuals could be killed from the blasting used to remove the tailrace plug.

Project Operations

Okanogan PUD expects to take about 4 years after license issuance to complete Project construction. Several measures are proposed to minimize effects on steelhead and its critical habitat. A discussion of possible effects from Project operations follows.

Flow. Some common impacts from hydroelectric developments similar to the proposed Project is the interruption of downstream flow either by (1) excessive ramping rates (usually measured in inches/hour) where flow is reduced at too high of a rate downstream of a project, or (2) mechanical or electrical disruption that results in an abrupt and significant reduction in downstream flow. The typical effects from either of these is the potential dewatering of redds and stranding of juveniles which can result in mortality on a large number of fish in just one event.

The proposed Project would be designed and operated as a run-of-river facility. That is, Project outflow would approximate Project inflow in real time, so there would essentially be no interruption of flow during normal operation. The rated hydraulic capacity of the two vertical Kaplan turbines is 800 cfs each. Each turbine is expected to operate down to about 100 cfs at which point the efficiency of the unit rapidly decreases and must be shut down. During low flow conditions (less than 500 cfs), the powerhouse would operate with one unit running. Under these conditions, the rate of change of outflow would follow the natural rate of change of inflow to the reservoir. In addition, based on the period from 1928 to 2006 the minimum-recorded daily average flow is 110 cfs. Given the operating range of the turbines, there should be no need to shut down the generating units due to low flow conditions under any historically recorded flow. Okanogan PUD expects that it would be able to operate at least one of their turbines all of the time (except for mechanical or electrical outages) and thus keep flow moving through the Project at a constant rate.

In the event of a mechanical breakdown or electric transmission outage affecting both units, the automatic control system would put the units into *sluice mode*. This would maintain flow through the turbines while opening the crest gates on the spillway. As flow over the spillway increases, flow through the turbines would be decreased in proportion until the spill entirely replaces turbine outflow and is about equal to reservoir inflow. Headwater and tailwater levels and flow through the generating units would be monitored by the control system to provide feedback to the control system. During startup, the process of balancing flow between the spillway and power plant would be reversed to transfer reservoir outflow to the power plant while maintaining stable flow in the downstream reach.

Lastly, Okanogan PUD proposes to restrict ramping rates to 1 inch per hour during the steelhead fry season and 2 inches per hour outside of that season. More restrictive ramping rates may be used if determined appropriate by the TRG.

NMFS finds that the measures and operational procedures proposed by Okanogan PUD to protect against sudden or excessive loss of downstream flow should be protective of UCR steelhead in the Similkameen River.

Tailrace Operation and Draft Tube Exclusion. The powerhouse tailrace would discharge flow into the pool below Similkameen Falls. Water velocities in the tailrace channel are expected to run between 2 and 4 feet per second (fps), so adult steelhead attracted to this flow could readily swim into the tailrace channel and possibly continue into the draft tubes, potentially impacting the runner blades. This could result in injury or mortality. Modeling conducted by Okanogan PUD shows that when river flow is ≤50 percent exceedence (≥793 cfs), the mean axial velocity of flow exiting the turbines would be about 25.5 fps. At 90 percent exceedence, river flow would be about 366 fps and the velocity exiting the turbine (only one turbine would be operating under this flow) would be about 12 fps. Water velocity drops off sharply as it travels the 40-foot length of the draft tubes, exiting into the open tailrace channel at 1-2 fps.

Burst speeds between 13.7 and 26.5 fps have been observed in adult steelhead over 24 inches in length. Burst speed depends on size and condition of fish, water temperature, dissolved oxygen levels and other water quality parameters (Bell 1991). Adult steelhead can cruise for hours at speeds up to 4 fps, so they would be able to access and possibly remain for some time in the tailrace channel. However, the draft tube would be a dark, 40-foot tunnel and fish may be reluctant to enter it or swim very far into it. Those that do would quickly encounter water velocities that require a large amount of energy to overcome; and within about 15 to 20 feet before reaching the runners, most fish would encounter water velocities they could not overcome under most flow conditions.

To prevent fish from entering the draft tubes during periods of reduced turbine flows, when river flow is greater than 50 percent exceedence, and during planned shut-down and start-up, Okanogan PUD would deploy a conical-shaped barrier net at the outlet of each draft tube. The proposed barriers would be made of conventional heavy-duty fishnet with one-inch mesh. The downstream end of each net would be comprised of a short tube with an exit at the apex to allow small debris and resident fish that pass through the turbine to escape. The escape exit would be made of dark material and have a narrow flexible opening with trailing streamers to discourage fish from attempting to enter. Fish already present in the lower reaches of the draft tube when the barrier net is installed would be able to escape through the net opening. The barrier nets would not be deployed during high turbine flow conditions, when river flow is less than 50 percent exceedence. In the event of an unplanned shutdown, the barrier nets would be deployed before restarting, depending on flow conditions and fish presence.

To ensure the barrier nets work as intended, Okanogan PUD would suspend video equipment underwater near the nets to observe fish behavior and determine if fish are entering, and if entering, safely leaving the net. Monitoring would be conducted during periods of peak presence of adult steelhead during each of the first two years of operation. Results of the monitoring would be provided to the TRG in a yearly report.

The combination of high water velocities in the upstream half of the draft tubes and deployment of barrier nets for river flows less than 50 percent exceedence, as well as shut-down and start-up, is expected to prevent most steelhead from reaching the turbine runners. Given the conical shape of the net, the small size of the mesh openings, and the streamer attachments to the net outlet, it is unlikely that adult steelhead would swim upstream through the barrier net and into the draft tube. Lastly, the proposed monitoring would help Okanogan PUD and the TRG determine if the barrier nets work as intended, and help determine what adjustments are needed if the nets do not prevent adult steelhead from entering the draft tubes.

Temperature. The reservoir behind Enloe Dam occupies a narrow, channelized basin. The average hydraulic residence time under existing conditions is about 2.4 hours for the mean annual flow, 45 minutes for the mean annual peak flow of 16,100 cfs, 7.3 hours for the mean September flow of 596 cfs, and over 20 hours at flows less than 200 cfs. Thermal stratification has not been observed at any flow level.

Temperature monitoring carried out by Okanogan PUD in 2006 (existing conditions) showed that maximum daily water temperatures in the Similkameen River exceeded the spawning temperature criterion of 13.0°C between June 7 and June 15 below the falls and downstream at the Oroville Bridge. However, the 7-DADMax temperatures showed that water temperature did not increase through the Project area by more than 0.1°C during this period. Furthermore, maximum daily water temperatures exceeded the 17.5°C criterion both upstream and downstream of the Project from late June through mid-September in 2006. The highest temperature of 26.9°C was recorded both at China Rock upstream from the Project and at the Oroville Bridge downstream, demonstrating that water temperature in the Project area did not go beyond the Washington State exceedence criteria of 0.3°C at any time. The 7-DADMax temperatures decreased through the Project area after August 4, at times by more than 1.6 °C (Okanogan PUD 2008a). The cooling effect observed in August 2006 was further examined by Okanogan PUD (2008a) and it was determined that warmer surface water was mixing with deeper, cooler water in the reservoir and was not due to shading.

Under the proposed Project, the reservoir's surface area would increase by about 12 percent, the average depth would increase by nearly 20 percent, and the total reservoir volume would increase by roughly 21 percent. The increase in surface area could increase heating from direct sunshine and result in more heat loss through advection (e.g. wind-driven evaporative cooling). Because deeper waters will have less penetration of solar radiation and because larger water volumes require more heat input to effect a change in temperature, a net incremental increase water temperature is not expected (Okanogan PUD 2008a).

Water temperatures could increase in the bypass reach during the summer months (July-early September) as the minimum bypass flows traverse the bypass channel. However, any potential increase is not expected to be more than 0.1°C. Therefore, NMFS does not expect that the proposed Project would significantly increase water temperatures in the Similkameen River. To ensure that this is the case, Okanogan PUD would monitor water temperature for a period of 5 years to determine (1) if the operation of crest gates causes an increase in the 7-DADMax water temperatures in the Similkameen River compared to upstream of the reservoir, and (2) the effectiveness of instream flow releases on water quality compliance within the bypass reach. This monitoring will occur at four locations: upriver, forebay, bypass reach, and downstream from Similkameen Falls.

Dissolved Oxygen. Measurements taken above the Project at China Rock in September 2006, under low flow conditions (236 cfs to 255 cfs) showed that DO concentrations were above the state minimum standard of 8.0 milligrams per liter (mg/L). Measurements take below the Project showed no reduction in DO. This is, of course, expected since all flow drops over the dam and again over the falls. Under the proposed Project, there would be less aeration and entrainment of DO than occurs presently because water would be diverted around the dam and through the powerhouse when flows are less than 1,600 cfs. To offset the reduced aeration, the powerhouse draft tubes would be equipped with aeration vents and operated to increase DO during critical periods if monitoring shows that it is needed. The minimum bypass flows would receive some aeration as it is spilled from the end of the supply pipe into the bypass reach.

Dissolved Oxygen levels in the Similkameen River typically stay above the 8.0 mg/L standard, so artificial aeration by the Project would probably not be needed. However, if DO monitoring shows levels immediately downstream of the Project dropping below 8.0 mg/L, Okanogan PUD would begin aerating flow though the draft tubes to bring the levels above the standard.

***Total Dissolved Gas*.** During peak runoff (typically late May and early June) under existing conditions, TDG levels can exceed the state standard of 110 percent saturation below Similkameen Falls. Water overtopping the dam can cause a minor increase in TDG saturation, but there is no plunging flow until water drops into the pool below the falls where the exceedence occurs. The proposed Project is not expected to increase TDG levels from current conditions and may slightly reduce the level of supersaturation because the water diverted through the powerhouse would reduce the volume of water that now plunges over the dam and Similkameen Falls. This would likely create a small benefit over existing TDG conditions but would not eliminate it. Okanogan PUD would monitor TDG at the Project intake and in the pool below Similkameen Falls to determine TDG under Project operations. NMFS expects that TDG would still exceed 110 percent during periods of high runoff but the supersaturation occurs from the plunging in the pool below the falls and not from spill over the dam.

<u>Conservation Measures</u>

Okanogan PUD proposes several habitat improvement projects designed to benefit UCR steelhead and other anadromous fish species that occur in the lower Similkameen River. A discussion of possible effects from these actions follows.

***Large Woody Debris*.** LWD is important element of fish habitat. Dams and reservoirs can block the downstream passage of LWD that is beneficial for fish habitat. LWD is an integral part of fish habitat because it (1) provides shelter where fish can avoid predation, (2) provides habitat for macroinvertebrate species which juvenile steelhead prey on, (3) alters river hydraulics resulting in creation of pools and gravel bars, and (4) can provide refuge from high flows (Spence et al. 1996).

Both the upper (within the U.S.) and lower Similkameen River have limited deposits of LWD (Okanogan PUD 2008a). This is an arid region with little large wood growth in the riparian area. However, any LWD that is transported into the Project could hang up in the reservoir or on the new crest gates. To prevent the loss of LWD from downstream habitats, logs and other LWD would be allowed to pass over the spillway during the annual flood and allowed to continue downstream naturally. If needed, some LWD would be transported around the Project and placed in the river downstream of the falls. From there, the natural hydraulic force of the river would transport the LWD to downstream habitats.

Okanogan does not propose to artificially place or anchor LWD, but would consult with the TRG before determining when such transport would be required, the methods to be used for collection and transport of the wood, and the best locations for release of the woody debris downstream of the dam. There could be some effects to individual steelhead from placing LWD due to disturbance from frightening fish from cover or feeding areas. Disturbance would likely occur if fish are present but it would be a small, localized, temporary occurrence. Injury or mortality is not expected to result from impact because it is very likely that the disturbance would frighten fish from the immediate area.

Side Channel Enhancement. This proposed conservation measure is described in section 1.3.3 above. The side channel would be designed as a riffle and run type of habitat with no deep pools so that juvenile fish could emigrate from the area as flows drop due to naturally descending flows or in case the well pump malfunctions. The project design would also include lowering the elevation of the side channel where it re-enters the main Similkameen River, reducing the potential for stranding.

Construction of the side channel enhancement would be done in the dry during summer low flows to prevent negative effects to fish and habitat. As with all construction activities involving heavy equipment, fuel spills and leaks can occur. BMPs would be in place to avoid, minimize and clean up any spills should they happen. Short-term turbidity plumes and sedimentation could occur in the main Similkameen River when water is turned into the dry channel following construction. The long-term benefit of the proposed side channel enhancement would be to provide cool water rearing habitat for juvenile salmonids during summer, thus potentially increasing survival and production.

Okanogan PUD would consult with the TRG in development of the side channel enhancement project. This would ensure that the resource agencies and Tribes are satisfied with the plans, location and timing before construction begins. NMFS does not expect any injury or mortality to occur from this action. Construction work would be carried out during the month of August when river flows are low and water temperatures are elevated; so it is unlikely that steelhead would be in the area during construction activities. If any steelhead are present, they could be disturbed and frightened from the area due to noise and vibration from heavy equipment. These fish would probably move quickly to other areas of cover and shelter, so the disturbance would be temporary.

Gravel Supplementation. Dams normally arrest the downstream migration of gravel and can create a deficit in downstream spawning and rearing habitat. The Project would continue to trap gravel in the reservoir. The proposed gravel supplementation program (see section 1.3.3) should increase the amount of gravel in the lower river and should improve spawning and rearing habitat, possibly providing some increase in overall production in the Similkameen River.

There would be few, if any, steelhead present in the gravel deposition area. Each gravel deposit would be completed during the month of August, during summer low flows and high water temperatures. Noise and vibration from heavy equipment operating on the shoreline would probably result in harassment by frightening fish out of the area. Deposition of the gravel into the wetted channel would likely cause short-term turbidity plumes and sedimentation downstream.

Effects on UCR Steelhead Critical Habitat
The action area encompasses designated critical habitat for UCR Steelhead and the proposed action may affect the PCEs identified in this portion of critical habitat, including sites used for spawning, rearing, and migration. The specific attributes of designated critical habitat affected by the proposed action are water quality, substrate, forage, and floodplain connectivity.

Water Quality

Total Suspended Solids. The proposed action is anticipated to result in some fine sediment delivery to the Similkameen River. Most of the ground disturbing activities would occur in the dry, behind earthen plugs left in place at the head of the intake canal and at the tailrace exit. The greatest potential for turbidity to exceed the state water quality standard would likely occur when these plugs are removed and the headworks and tailrace are completed. However, the combination of BMPs and in-water excavation during periods of lower flows should significantly reduce the volume of fine sediment entering the stream. Furthermore, it is expected that sediment that is released into the stream would quickly disperse.

The placement of gravel in the lower Similkameen River would likely stir up fine sediment from the river bottom. This would be a temporary event done during summer low flows and it is expected that any sediment that becomes suspended would quickly dissipate. Lastly, some sediment would probably be suspended when flow is released into the newly restored side channel. Again, this would be a temporary event and is not expected to significantly impact water quality.

Contaminants. NMFS does not expect water quality to be degraded from toxic materials. The majority of the work with heavy equipment would be outside of, and isolated from, the active stream channel. BMPs would be in place to prevent accidental spills and leaking of toxicants from both the isolated work area and work in the water. The most probable occurrence of fuel or other toxicants entering the stream would be from equipment leaks, which would be quickly diluted by the stream flow.

Water Temperature. The proposed action is not expected to result in any significant increase in water temperature (see discussion under section 2.4). During the summer months (July through early September), flow traversing the bypass reach could experience a slight increase in temperature. However, the potential increase is not expected to be more than 0.1°C. Okanogan PUD would monitor water temperature for a period of 5 years to determine (1) if the operation of crest gates causes an increase in the 7-DADMax water temperatures in the Similkameen River compared to upstream of the reservoir, and (2) the effectiveness of instream flow releases on water quality compliance within the bypass reach. This monitoring will occur at four locations: upriver, forebay, bypass reach, and downstream from Similkameen Falls. Thus, NMFS does not expect that the proposed action would significantly increase water temperatures in the Similkameen River.

***Dissolved Oxygen*.** Dissolved Oxygen levels in the Similkameen River normally stay above the state standard of 8 mg/L. The proposed Project's draft tubes would be equipped with aeration capability if monitoring shows DO levels dropping below 8 mg/L. Also, the minimum bypass flows would receive some aeration as it is spilled from the end of the supply pipe into the bypass reach. It is expected that DO levels would remain adequate for salmonid production naturally, but the proposed Project could supplement DO levels if it becomes necessary.

***Total Dissolved Gas*.** The proposed Project is not expected to increase TDG levels from current conditions (see discussion under section 2.4) and may slightly reduce the level of supersaturation because the water diverted through the powerhouse would reduce the volume of water that now plunges over the dam and Similkameen Falls. This would likely create a small benefit over existing TDG conditions but would not eliminate it. Okanogan PUD would monitor TDG at the Project intake and in the pool below Similkameen Falls to determine TDG under Project operations. NMFS expects that TDG would still exceed 110 percent during periods of high runoff due to plunging in the pool below the Similkameen Falls.

Substrate

The proposed Project construction, gravel augmentation and side channel enhancement actions would likely result in some increase in total suspended solids in the Similkameen River. Elevated and chronic sources of suspended fine sediment that settle out in low velocity areas can cause habitat impacts such as the loss of interstitial spaces and cover, spawning habitat, increased channel gradient and width, decreased depth, and increased bank erosion. Sediment-related habitat degradation effects can cause reductions in fish survival and recruitment, as well as reductions in stream carrying capacity (Spence et al. 1996).

Some fine sediment from Project construction activities could settle in existing spawning areas but it is not expected to impact natural production because (1) the release of sediment would be temporary and not a constant or continuing impact, (2) the combination of BMPs and in-water work during lower flow periods would significantly limit the volume of suspended sediment reaching the stream, (3) current steelhead spawning areas occur nearly 1 mile downstream of the Project and most, if not all, of the suspended sediment would dissipate before reaching these areas, and (4) if the Washington state standard for turbidity is exceeded, construction would be suspended until turbidity drops below the standard.

The gravel augmentation and side channel enhancement measures could result in a modest volume of suspended sediment from the placement of gravel in the riverbed and from flow passing through the improved side channel area for the first time. These would be single events (gravel augmentation would be done once every 5 years over a period of 20 years) and is expected to result in only minor amounts of fine sediment being suspended and resettling in the riverbed. In the case of gravel augmentation, the fine sediment that is suspended would be from existing riverbed material and not an additional source.

Forage

Continuous high levels of fine sediment input can change the natural assemblage of fauna. Many benthic invertebrates are grazers and depend on periphyton for food. Any changes in suspended sediment concentration that adversely affects algal growth, biomass, or species composition can adversely affect secondary production. Other invertebrates are filter feeders. Increases in suspended sediment levels tend to clog feeding structures, reduce feeding efficiency, and therefore reduce growth rates or stress or kill these organisms (Newcombe and McDonald 1991, Spence et al. 1996, Wood and Armitage 1997).

The natural variability of river flow from the extremes of flood to low flows results in variations in the concentration of suspended solids and their deposition, and benthic faunal communities normally persist under natural short-term increases in suspended and benthic sediments. However, human disturbances tend to be permanent or very long-term, rather than transient like most natural disturbances. Human induced disturbances can disjoin the important ecological processes that link ecosystem components within a watershed. Conversely, additions of fine particulate material due to human disturbance over a short duration can result in a rapid recovery of benthic fauna (Wood and Armitage 1997), and this is expected to be the case for sediment released into the Similkameen River from the proposed action. The short duration and limited extent of sediment releases are not anticipated to meaningfully alter existing forage in the action area.

Floodplain Connectivity

The proposed Project would be located in a canyon reach and would not affect any floodplain contiguous with UCR steelhead critical habitat. The proposed side channel enhancement would be an improvement over existing floodplain function in the lower Similkameen River.

Summary of Effects on PCEs. As described above, the proposed action would likely have some adverse effects on water quality and forage. These effects would be short-term and episodic and are not expected to result in any appreciable, long-term reduction in the conservation value of the Similkameen River and the action area.

2.5 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Cumulative effects, when combined with baseline effects and effects of the action, may increase the likelihood that the proposed action will result in jeopardy to a listed species, or in destruction or adverse modification of designated critical habitat.

As part of the Court-ordered collaboration process for the 2008 Federal Columbia River Power System (FCRPS) Biological Opinion (NMFS 2008), the State of Washington provided information on various ongoing and future or expected projects that NMFS has determined are reasonably certain to occur and will affect recovery efforts in the action area (see Chapter 17, Table 17-4i in Corps 2007 [FCRPS Comprehensive Analysis]). All of these actions are either completed or ongoing and are thus part of the environmental baseline, or are reasonably certain to occur. They address protection and restoration of existing or degraded fish habitat, instream flows, water quality, and watershed or floodplain conditions that affect stream habitat.

Significant actions and programs include growth management programs (planning and regulation), a variety of stream and riparian habitat projects, watershed planning and implementation, support of voluntary measures to restore instream flows and to protect sensitive areas, storm water and discharge regulation, and Total Maximum Daily Load (TMDL) implementation. Responsible entities include the Washington Department of Ecology, Washington Department of Fish and Wildlife, Okanogan County, and the Cities of Oroville, Tonasket and Okanogan. Many of these actions will have positive effects on the viability (abundance, productivity, spatial structure, and/or diversity) of UCR steelhead and the functioning of PCEs in designated critical habitat. These activities are likely to have cumulative effects that will improve conditions for UCR steelhead over the long-term. These effects can only be considered qualitatively.

2.6 Integration and Synthesis

This section is the final step of NMFS' assessment of the risk posed to species and critical habitat as a result of implementation of the proposed action. In this section, we add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

The threatened status of UCR steelhead is largely driven by low abundance, productivity, and diversity among the various component populations. Spatial structure is also compromised for the Okanogan population of UCR steelhead. The proposed action is not expected to affect diversity or spatial structure in this population. The action could injure or kill a limited number of juvenile fish due to blasting activities, but this would have an imperceptible effect on abundance for the Okanogan population of UCR steelhead. The death of a small number of juveniles is not expected to meaningfully affect adult returns and therefore effects to productivity will be indiscernible. Therefore, the proposed action would not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution.

Similarly, even though the status of critical habitat in the action area is degraded, the total effects from the proposed action are of insufficient magnitude to reduce the value of designated critical habitat for the conservation of the species. This is due to the combination of proposed conservation measures, which would provide and improvement over exiting conditions, and the location and operation of the proposed Project. The Project would be located above a natural migration barrier and would be a run-of-river operation.

2.7 Conclusion

After reviewing the current status of UCR steelhead, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, NMFS determined that the proposed action would not adversely affect the population viability of UCR steelhead. Since the action is not expected to reduce species numbers, reproduction, distribution, or the conservation value of the action area, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of UCR steelhead or to destroy or adversely modify its designated critical habitat.

2.8 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered.[2] Section 7(b)(4) and Section 7(o)(2) provide that taking that is incidental to an otherwise legal agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this ITS.

2.8.1 Amount or Extent of Take

Elements of the proposed action are expected to result in some incidental take of UCR steelhead as described in Section 2.4. Table 3 summarizes the allowed take for each element of the proposed action. Despite the use of best available scientific and commercial data, estimating the specific number of animals injured or killed by the proposed activities is difficult, if not impossible, because of the range of effects under a variety of environmental conditions and the subsequent array of responses that individual fish would have to the activities. Okanogan PUD (2011) provided an estimate of take for both juvenile and adult steelhead life stages for the various proposed activities. These estimates are based on the number of steelhead observed in the action area during stream surveys conducted by Okanogan PUD.

[2] NMFS has not adopted a regulatory definition of harassment under the ESA. The World English Dictionary defines harass as "to trouble, torment, or confuse by continual persistent attacks, questions, etc." The U.S. Fish and Wildlife Service defines harass in its regulations as: an intentional or negligent action or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The interpretation we adopt in this consultation is consistent with our understanding of the dictionary definition of harass and is consistent with the U.S. Fish and Wildlife interpretation of the term.

Table 3. Total allowed take of UCR steelhead for specific elements of the proposed action.

Element of Proposed Action	Total Allowed Fry and Juvenile Take[1]	Total Allowed Adult Take	Temporal Extent of Take
Project Construction[2]	50	20	Annually until construction is complete
Gravel augmentation	100	10	Until the new Federal license expires[3]
Large wood placement	50	15	Until the new Federal license expires
Project operations	50	15	Until the new Federal license expires

[1] Take is shown as estimates of fish mortality, injury, or harassment; injury is considered sufficient to reduce individual fitness; the preponderance of take will be harassment, which is not anticipated to reduce individual fitness.
[2] Project construction includes the headworks, power canal and penstocks, powerhouse, training wall, tailrace, new spillway crest gates, fish seining and exclusion, and side channel enhancement measure.
[3] See section 1.3.3. Gravel augmentation is proposed to stop after the fifth occurrence; however, should augmentation be extended we are providing an allowed take for the total of the license period.

2.8.2 Effect of the Take

In this Opinion, NMFS determined that the level of anticipated take associated with the construction and operation of the Project would not be likely to jeopardize the continued existence of UCR steelhead. FERC's proposed action to grant a license to Okanogan PUD for the Project incorporates design elements and conservation measures that are expected to reduce permanent effects to habitat and avoid and minimize impacts during both construction and operation.

The incidental take described in Table 3 is the maximum amount of incidental take that NMFS determined could occur as a result of the proposed action. This incidental take, which is exempted by this statement, would be exceeded if the licensees fail to carry out measures in strict accordance with the proposed action. If take exceeds an amount or extent specified here, NMFS will evaluate the best science available and determine whether reinitiation of consultation is required.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

Reasonable and prudent measures (RPM) are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). Terms and conditions implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

The following RPMs are necessary and appropriate to minimize the effect of anticipated incidental take of UCR steelhead. FERC must require the licensee to minimize incidental take by:

1. Minimize take from the unexpected discharge of excess sediment, hazardous substances, toxics, and other materials into the Similkameen River during construction activities, including gravel placement and side channel development.
2. Minimize take from use of explosives.

3. Minimize take from the unexpected discharge of excess sediment, hazardous substances, toxics, and other materials into the Similkameen River during Project operations.

4. Prevent take of adult steelhead from contact with turbine runners.

5. Ensure completion of an annual monitoring and reporting program to confirm that the measures required for the purpose of avoiding and minimizing incidental take are effective.

To be exempt from the prohibitions of Section 9 of the ESA, FERC must ensure that Okanogan PUD fully complies with the conservation measures described as part of the proposed action. FERC must include in the license the following terms and conditions that carry out the RPMs listed above. Partial compliance with these terms and conditions may result in more take than anticipated, and invalidate this take exemption. These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

To carry out RPM #1, FERC or its Licensee must undertake the following:

1. Ensure compliance with State of Washington water quality standards under Washington Administrative Code 173-201A for salmonid rearing, spawning and migration.

2. Carry out the following plans, including plan monitoring and reporting requirements, during Project construction, gravel augmentation and side channel development:
    a. Construction Sediment Management Program (Okanogan PUD 2012a),
    b. Erosion and Sediment Control Plan (Okanogan PUD 2008b),
    c. Spill Response Plan (Okanogan PUD 2008c),
    d. Storm Water Pollution Prevention Plan (Okanogan PUD 2008d), and
    e. Construction Water Quality Assurance Project Plan (Okanogan PUD 2012b).

To carry out RPM #2, FERC or its Licensee must undertake the following:

1. Complete a plan for use of explosives for review and approval by NMFS before Project construction begins. The plan shall include, at a minimum, the following measures:
    a. All practical measures shall be taken to limit blasting pressure waves in the pool and stream below Similkameen Falls;
    b. instrumentation capable of recording pressure waves shall be used to monitor blasting effects in the pool and river below Similkameen Falls;
    c. to the maximum extent practical, peak pressure waves shall be limited to ≤100 kilopascals (about 14.5 pounds per square inch);
    d. prior to blasting near, and at, the exit of the tailrace channel, a barrier net shall be erected downstream of the pool to prevent steelhead access to the pool area; and

e. the pool below Similkameen Falls shall be seined to collect as many steelhead as possible before blasting near, and at, the exit of the tailrace channel.

To carry out RPM #3, FERC or its Licensee must undertake the following:

1. Ensure compliance with State of Washington water quality standards under Washington Administrative Code 173-201A for salmonid rearing, spawning and migration.

2. Carry out the following plans, including plan monitoring and reporting requirements, during Project construction:
    a. Operations Quality Assurance Project Plan, Water Quality Monitoring (Okanogan PUD 2012c), and
    b. Water Quality Management Plan (Okanogan PUD 2012d),

3. Complete a Spill Prevention and Countermeasures Plan, in consultation with NMFS, prior to the start of Project operations.

To carry out RPM #4, FERC or its Licensee must undertake the following:

1. Final design of the barrier nets shall be reviewed and approved by NMFS.

2. A plan describing how and when the barrier nets are to be deployed shall be developed in consultation with NMFS, and approved by NMFS, before the Project starts operating.

3. Monitor barrier net performance and report results to NMFS on, at a minimum, an annual basis.

To carry out RPM #5, FERC or its Licensee must undertake the following:

1. Okanogan PUD shall compile all draft monitoring and evaluation reports, as described in the various plans included in this ITS, and allow NMFS and other resource agencies 30 days to review and comment the drafts prior to their filing at FERC.

2. Okanogan PUD must report all observations of dead or injured juvenile and adult steelhead coincident with carrying out the terms and conditions of this ITS (noting whenever possible the species of these individuals) to NMFS within 2 days of their observance, and include a concise description of the causative event (if known), and a description of any resultant corrective actions taken (if any) to reduce the likelihood of future mortalities or injuries. Reports of dead or injured salmon or steelhead should be sent to:

Keith Kirkendall
Chief, FERC and Water Diversions Branch
National Marine Fisheries Service
1201 NE Lloyd Blvd., Suite 1100
Portland, Oregon 97232

2.9 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS recommends that Okanogan PUD carry out the following conservation measure:

- As proposed in its Final License Application, form a Technical Review Group (TRG) to review and evaluate data and develop resource management proposals and other recommendations.

- The TRG should be composed of members from NMFS, USFWS, BLM, WDFW, WDOE, Colville Tribes, and Okanogan PUD.

- Okanogan PUD should provide a neutral, non-voting Facilitator to prepare agendas and conduct meetings. Okanogan PUD should provide the members with draft meeting minutes for review and approval before filing any minutes for the record. The TRG would establish communication protocols to facilitate interaction among members.

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

In instances where the amount or extent of incidental take is exceeded, FERC and Okanogan PUD must consult with NMFS to determine whether specific actions will be taken to address such events including but not limited to ceasing or modifying the causal activity.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION

The consultation requirement of Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. The MSA (Section 3) defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the FERC and descriptions of EFH for Pacific coast salmon (PFMC 1999) contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Department of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The PFMC designated EFH for Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in Sections 1.3 and 1.4 of this document. The action area includes areas designated as EFH for adult, fry, juvenile, and smolt life history stages of Chinook salmon *(Oncorhynchus tshawytscha)*.

3.2 Adverse Effects to Essential Fish Habitat

Based on information provided and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have the adverse effects on EFH designated for Pacific Coast salmon described in Section 2.4 (Effects of the Action).

3.3 Essential Fish Habitat Conservation Recommendations

NMFS expects that the conservation measures required in our ITS (Section 2.8 above) are necessary and sufficient to conserve EFH. Consequently, NMFS adopts these terms and conditions as our EFH conservation recommendations.

NMFS expects that full implementation of these EFH conservation recommendations will protect, by avoiding or minimizing the adverse effects described in Section 3.2 above, in the Similkameen River and Okanogan River for habitat used by summer Chinook salmon.

3.4 Statutory Response Requirement

As required by Section 305(b)(4)(B) of the MSA, the Federal agency (in this case FERC) must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation from NMFS. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH conservation recommendations, unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigation, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS' Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(l)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

FERC must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(l)].

4. DATE QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (the Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

4.1 Utility

This document records the results of an interagency consultation. The information presented in this document is useful to two agencies of the Federal government (NMFS and FERC); and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information is beneficial to citizens of Snohomish County because the underlying project affects natural resources at a site within that county. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

This consultation will be posted on the NMFS Northwest Region website. The format and naming adheres to conventional standards for style.

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

<u>Information Product Category:</u> Natural Resource Plan.

<u>Standards:</u> This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

<u>Best Available Information:</u> This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this biological opinion/EFH consultation contain more background on information sources and quality.

<u>Referencing:</u> All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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