UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

F/NWR

VIA ELECTRONIC FILING

October 12, 2006

Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Biological Opinion for ESA Section 7 Consultation for the Condit Hydroelectric Project (FERC No. 2342). NOAA Fisheries Consultation No. 2002/00977

Dear Secretary Salas:

Enclosed is the Biological Opinion prepared by the National Marine Fisheries Service (NMFS) on the Federal Energy Regulatory Commission's (FERC) proposed decommissioning of the Condit Hydroelectric Project (FERC No. 2342). This document represents NMFS' opinion of the effects of the proposed action on listed species in accordance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et seq.).

The proposed action analyzed in the enclosed biological opinion is the result of an agreement known as the "Condit Hydroelectric Project Settlement Agreement" entered into by various parties including NMFS in 1999, as filed with the Commission by letter of October 21, 1999. At that time, only PacifiCorp, the current licensee, had evidenced any formal interest in operating and relicensing the project. Thus, the enclosed opinion is directed solely to PacifiCorp's proposal, the particular action contained in the settlement agreement.

Subsequently, NMFS has become aware of local discussions regarding the possibility of some other entity seeking to acquire, license, and operate the project rather than decommissioning it as proposed in the 1999 settlement agreement. Various questions have been raised as to whether NMFS participation in the settlement agreement, or NMFS issuance of the enclosed biological opinion would impair, preclude, or bias NMFS' consideration of another proposal.

Notwithstanding the settlement agreement, NFMS retains a legal obligation to fully and fairly consider the effects of any proposed action that comes before it. Nothing in the settlement agreement or the enclosed Biological Opinion should be taken as indicating any conclusion by NMFS regarding the biological effects or acceptability of some other proposal.

Section 2.3 of the settlement agreement provides that the agreement shall not be construed to limit any government agency, including NMFS, from complying with its obligations under applicable laws. Section 5.2 provides for the withdrawal of any party from the agreement, upon appropriate notice and a good faith attempt to resolve the cause of the withdrawal. In the event that another proposal is presented to which NMFS is obligated to respond, NMFS will use its authorities and its rights under these sections to assure that the new proposal receives full and fair consideration.

There are 13 species of salmon listed under the ESA that are potentially affected by the proposed action (see Biological Opinion, Table 1-1). NMFS has determined that the proposed action is not likely to jeopardize the continued existence of these species, or destroy or adversely modify designated critical habitat. Our conclusion is primarily based on the fact that the action will be limited in both time and space. NMFS expects that there will be both lethal and non-lethal take of individuals; however, this would not likely occur at an amount that would appreciably reduce the reproduction, numbers, or distribution of these species at the Evolutionarily Significant Unit or Distinct Population Segment scale.

Enclosed as Section 11 of the 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 EFH for Chinook salmon and coho salmon and recommends that the terms and conditions of Section 9 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 these recommendations.

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

Sincerely,

D. Robert Lohn

D. Robert Lohn
Regional Administrator

Enclosure

cc. Service List

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

PacifiCorp	)	**Condit**
	)	**Hydroelectric Project**
	)	**FERC No. 2342**

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by electronic mail, a letter to Magalie R. Salas, Federal Energy Regulatory Commission, from the National Marine Fisheries Service regarding Biological Opinion for ESA Section 7 Consultation for the Condit Hydroelectric Project (FERC No. 2342) and this Certificate of Service has been served to each person designated on the official service list compiled by the Commission in the above captioned proceeding.

Dated on October 12, 2006

Bethany Downs

Bethany Downs

Endangered Species Act
Section 7 Consultation

Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act Consultation

Interim Operation, Decommissioning, and Removal of the Condit Hydroelectric Project FERC No. 2342
Skamania and Klickitat Counties, Washington

Action Agency:	Federal Energy Regulatory Commission
Consultation Conducted by:	National Marine Fisheries Service Northwest Region Hydropower Division
NMFS Log Number:	2002/00977
Date Issued:	October 12, 2006

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TERMS AND ABBREVIATIONS

BMP	Best Management Practices
BRT	Biological Review Team
cfs	cubic feet per second
CHART	Critical Habitat Analytical Review Team
CR	Columbia River
cy	cubic yards
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FCRPS	Federal Columbia River Power System
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
ft	foot, feet
HUC5s	Hydrologic Unit Code at the fifth field scale
IC-TRT	Interior Columbia Technical Recovery Team
kcfs	1,000 cubic feet per second
LCR	Lower Columbia River
MCR	Middle Columbia River
mcy	million cubic yards
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MW	megawatt
NMFS	National Marine Fisheries Service
Opinion	this Biological Opinion
PCE	primary constituent element
ppm	parts per million
Project	Condit Hydroelectric Project (FERC No. 2342), including the reservoir, dam, and tailrace
RM	river mile
SR	Snake River
tailrace	The body of water immediately downstream of the powerhouse
TSS	Total suspended solids
USBR	U.S. Bureau of Reclamation
UCR	Upper Columbia River
UWR	Upper Willamette River
USFWS	U.S. Fish and Wildlife Service
VSP	Viable salmonid populations
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
WLC-TRT	Willamette/Lower Columbia Technical Recovery Team

1. INTRODUCTION

1.1 Background

The Condit Hydroelectric Project (hereinafter referred to as the Condit Project or the Project) was completed in 1913 on the White Salmon River in south-central Washington State in Skamania and Klickitat Counties, near the town of White Salmon (Figure 1). The Project is owned and operated by PacifiCorp and is licensed by the Department of Energy through the Federal Energy Regulatory Commission (FERC). Pursuant to the Federal Power Act, Public Utility Regulatory Policies Act, Energy Policy Act, and the Electric Consumers Protection Act, FERC regulates non-Federal hydroelectric projects via issuance of licenses and permits, or through other processes, and therefore has discretionary authority regarding conditions under which hydroelectric projects are operated.

Hydroelectric project licenses typically have terms of 30 to 50 years, and at the end of the term an applicant must determine whether to apply for a new license or offer to surrender the license. PacifiCorp filed an application with FERC for a new license for the Condit Project in 1991. The license expired in 1993 and the Condit Project continues to operate under an annual license. The conditions attached to each annual license are the same as those associated with the license before expiration. FERC issued a Final Environmental Impact Statement (FEIS) in October 1996 recommending PacifiCorp's proposed operating conditions, but with modifications recommended by FERC staff. The preferred alternative included the construction and operation of both upstream and downstream fish passage facilities and several other aquatic resource related measures. PacifiCorp concluded that the new license conditions proposed in the 1996 FEIS would render the Condit Project uneconomic to operate, and in 1997 petitioned FERC to suspend the proceeding and entered into discussions with license interveners regarding potential settlement.

Settlement negotiations concluded in September 1999 and resulted in an agreement that stipulated dam removal beginning in October 2006. In October 1999, PacifiCorp filed an application with FERC requesting an amendment to the existing license to extend the term to October 1, 2006 and to incorporate the terms of the Settlement Agreement requiring dam removal in 2006 into the license. FERC completed a Draft Supplemental FEIS in January 2002, which brought current the 1996 FEIS and evaluated the potential effects of implementing the Settlement Agreement, as proposed, and the agreement with modifications recommended by FERC staff. A preferred alternative was not proposed, but instead two alternatives were put forth by its staff for the FERC's consideration: (1) adopt the Settlement Agreement with the staff modifications, should FERC choose to require dam removal or (2) issue a new license, should FERC elect to do so, as prescribed in the 1996 FEIS preferred alternative. In a February 14, 2002, letter to the National Marine Fisheries Service (NMFS), FERC requested consultation with

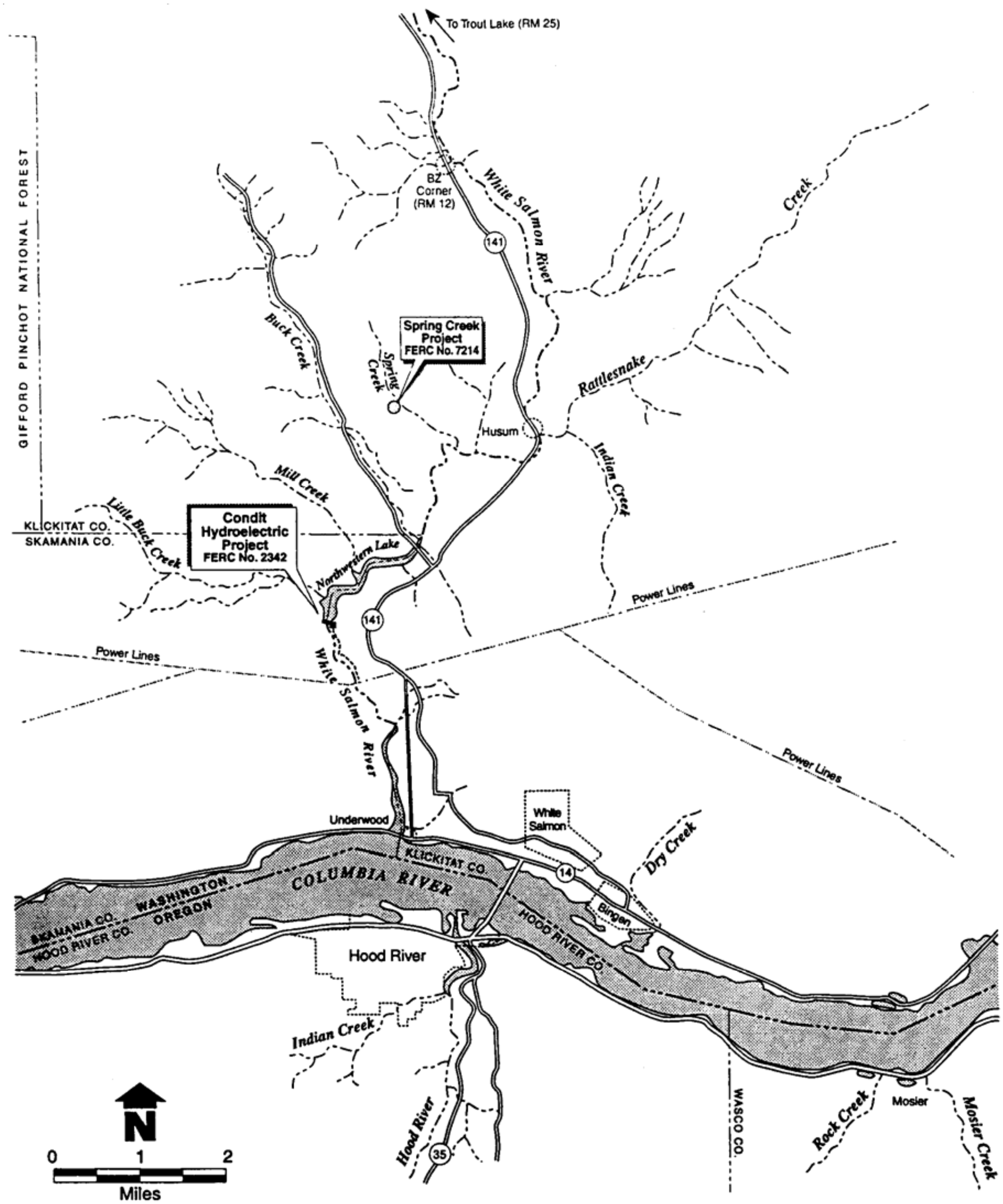

Figure 1. Lower White Salmon River Basin. (Source: FERC 1996, Figure 3-1)

NMFS under Section 7(a)(2) of the Endangered Species Act on both alternatives. Subsequent to FERC's request for ESA consultation, FERC issued a Final Supplemental FEIS in June 2002. This document describes the decommissioning and removal of the Condit Hydroelectric Project in accordance with the Settlement Agreement and additional measures recommended by its staff as FERC's preferred alternative. Since issuance of the 2002 Final Supplemental FEIS, PacifiCorp filed with FERC an amendment to the September 1999 Settlement Agreement extending its term to October 1, 2008 (Miller 2005). The purpose of this amendment was to allow PacifiCorp additional time to generate revenue for permitting and mitigation. FERC noticed the amendment on March 10, 2005, and requested comments on the modification. For purposes of this consultation, NMFS assumes that FERC will accept the amendment and that Project operations will continue until October 1, 2008. Finally, in a letter dated July 12, 2005, FERC requested formal ESA consultation on Lower Columbia River coho salmon, which was listed as endangered under the Endangered Species Act by NMFS on June 28, 2005.

1.2 Objectives

The Endangered Species Act (ESA) (16 USC 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. The ESA requires Federal agencies to consult with the NMFS or the U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat designated critical for the species' survival.

The objective of this Biological Opinion (hereinafter, the Opinion) is to determine whether or not FERC's proposed action, the decommissioning and removal of the Condit Project in accordance with the September 1999 Settlement Agreement and additional measures recommended by FERC staff, as described in the 1996 FEIS and 2002 Final Supplemental FEIS, is likely to jeopardize the continued existence of the anadromous fish species identified in Table 1-1 below or adversely modify designated critical habitat. In addition, while FERC has not requested additional ESA consultation regarding the Settlement Agreement amendment, NMFS believes it is prudent to include the amendment as part of the proposed action (see Section 2). This is because in the event that the Settlement Agreement is approved by FERC, NMFS assumes that it will include the additional two years of operations as described in the amendment.

Table 1-1. List of anadromous fish species that occur in the action area and their status under the Endangered Species Act

Species	ESU (salmon) DPS (steelhead)	Status	Listing	Critical Habitat
Onchorynchus tshawytscha	Lower Columbia River Chinook salmon	Threatened	NMFS 1999b NMFS 2005a	NMFS 2005b
	Upper Willamette River Chinook salmon	Threatened	NMFS 1999b NMFS 2005a	NMFS 2005b
	Upper Columbia River spring Chinook salmon	Endangered	NMFS 1999b NMFS 2005a	NMFS 2005b
	Snake River spring/summer Chinook salmon	Threatened	NMFS 1992a NMFS 1992b NMFS 2005a	NMFS 1993 NMFS 1999a
	Snake River fall Chinook salmon	Threatened	NMFS 1992a NMFS 1992b NMFS 2005a	NMFS 1993
O. kisutch	Lower Columbia River coho salmon	Threatened	NMFS 2005a	Not Designated
O. nerka	Snake River sockeye salmon	Endangered	NMFS 1991 NMFS 2005a	NMFS 1993
O. keta	Columbia River chum salmon	Threatened	NMFS 1999d NMFS 2005a	NMFS 2005b
O. mykiss	Lower Columbia River steelhead	Threatened	NMFS 1998 NMFS 2006	NMFS 2005b
	Upper Willamette River steelhead	Threatened	NMFS 1999c NMFS 2006	NMFS 2005b
	Middle Columbia River steelhead	Threatened	NMFS 1999c NMFS 2006	NMFS 2005b
	Snake River Basin steelhead	Threatened	NMFS 1997 NMFS 2006	NMFS 2005b
	Upper Columbia River steelhead	Threatened*	NMFS 1997 NMFS 2006	NMFS 2005b

*Listing status upgraded from endangered to threatened on January 5, 2006 (NMFS 2006).

1.3 Application of ESA Section 7(a)(2) Standards

This section reviews the approach used in this Opinion to apply the standards for determining jeopardy and destruction or adverse modification of critical habitat as set forth in Section 7(a)(2) of the ESA and as defined by 50 CFR §402.02 (the consultation regulations). Additional guidance for this analysis is provided by the Endangered Species Consultation Handbook, March 1998, issued jointly by NMFS and the USFWS. In conducting analyses of actions under Section 7 of the ESA, NMFS uses the following steps of the consultation regulations:

- Evaluates the current status of salmon and steelhead at the Evolutionarily Significant Unit (ESU) and Distinct Population Segment (DPS)[1] (hereafter referred to as salmon or steelhead species) levels with respect to biological requirements indicative of survival, recovery, and essential features of any designated critical habitat[2] (Section 3).

- Evaluates the relevance of the environmental baseline to the biological requirements and the species' current and future status in the action area, as well as the status of any designated critical habitat (Section 4).

- Determines the effects of the proposed or continuing action on the species and on any designated critical habitat (Section 5).

- Determines and evaluates any cumulative effects within the action area (Section 6).

- Evaluates whether the effects of the proposed action, taken together with any cumulative effects and the environmental baseline, can be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the affected species or is likely to destroy or adversely affect their designated critical habitat (Section 7). (See CFR §402.14(g).)

[1]An *evolutionarily significant unit* (ESU) of Pacific salmon (Waples 1991) and a *distinct population segment* (DPS) of steelhead (NMFS 2006) are considered to be "species", as defined in Section 3 of the ESA.

[2]With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

In completing the last step, if NMFS determines whether the action under consultation is likely to jeopardize the ESA-listed species or adversely modify critical habitat, NMFS must identify any reasonable and prudent alternatives for the action. A reasonable and prudent alternative must avoid jeopardy of the species or adverse modification of critical habitat and must meet the other regulatory requirements (See CFR §402.02). In making these determinations, NMFS must rely on the best available scientific and commercial data.

2. PROPOSED ACTION

As discussed above, FERC has proposed to decommission and remove the Condit Project in accordance with the 1999 Settlement Agreement (PacifiCorp 1999) and take additional measures recommended by FERC staff. The proposed action is described in FERC's June 2002 Final Supplemental FEIS (FERC 2002) and additional relevant information is provided in FERC's October 1996 FEIS (FERC 1996), PacifiCorp's December 14, 2001 draft Biological Assessment (PacifiCorp 2001), PacifiCorp's 1991 License Application (PacifiCorp 1991), and PacifiCorp's June 4, 2004 Project Description (PacifiCorp 2004).

2.1 Action Area

The action area is defined as the geographic extent of all direct and indirect effects of a proposed agency action (50 CFR 402.02 and 402.14(h)(2)). For the purposes of this consultation, NMFS has defined the action area to include the White Salmon River from its mouth to river mile (RM) 16 at Big Brother Falls, a natural migration barrier, and the mainstem Columbia River from its confluence with the White Salmon River downstream to its mouth and extent of its plume into the Pacific Ocean.

2.2 Project Description

The Project powerhouse is located on the Big White Salmon River at RM 2.2 and the dam is located at RM 3.3. Northwestern Lake is roughly 1.7 miles long, ending at about RM 5.0. The bypass reach downstream of the dam to the powerhouse is roughly 1.1 miles in length. The Project was completed in 1913 and included a fish ladder, which was destroyed by a flood in 1918. The ladder was not reconstructed. Project features include the following:

- A 125-foot high, 471-foot long concrete gravity dam with a 250-foot wide spillway.
- A reservoir (Northwestern Lake) containing roughly 1,300 acre-feet of total storage, 615 acre-feet of usable storage and a surface area of approximately 92 acres.
- A 13.5-foot diameter, 5,100-foot long wood stave pipeline.
- A 40-foot diameter, 45-foot high concrete surge tank.
- Two 9-foot diameter, 650-foot long steel penstocks.

- A Powerhouse containing two generating units with horizontal Francis runners with a combined capacity of 14.7 megawatts (MW), a total hydraulic capacity of 1,400 cubic feet per second (cfs), and an average annual generation of 79,700 MW hours.

- A 350-foot concrete-lined tailrace channel.

2.3 Detailed Description of the Proposed Action

If approved by FERC, PacifiCorp would receive a license amendment providing for operation of the Condit Project under the terms of the existing license until October 1, 2008. On that date, PacifiCorp would cease operation and begin removing the dam and Project facilities. Removal of the Condit Project would be completed by December 31, 2009.

2.3.1 Project Operation Through 2008

Historic Project operations have typically been driven by inflow, recreational use of the reservoir, and daily fluctuations in power requirements (load following). When inflow is sufficient to operate both units (roughly 1,100 cfs), or just one unit (approximately 600 cfs), the Project operates in run-of-river mode and the reservoir is kept at a relatively constant elevation. When inflow exceeds the hydraulic capacity of one unit, but is not high enough to efficiently operate both, the units are load factored. Load factoring is accomplished by operating both units until the reservoir is drawn down to its daily limit. Once the drawdown limit is reached, one unit is shut down, the other is kept online, and the portion of net inflow that exceeds the single unit's capacity is stored in the reservoir. When the reservoir reaches full pool the second unit is brought back online.

Under the proposed action, PacifiCorp would operate the Condit Project as a run-of-river operation (i.e., inflow would approximately equal outflow) until October 2008. PacifiCorp would operate the Project in a manner that would maintain a relatively constant reservoir elevation in order to address the concerns of the lakefront cabin owners and to reduce shoreline erosion. The normal operating range of the reservoir is approximately 2 feet (ft) below the normal pool elevation of 295.0 ft mean sea level, but could be lowered by as much as 12 ft for the inspection and repair or replacement of equipment, including but not limited to the Obermeyer weir, spillgate seals, and intake trash rack. Project peaking would only occur for maintenance purposes and when the reservoir needed to be drawn down for inspection. Load factoring and unit cycling would still be used to improve generator efficiency, but not as frequently or to the same extent as during the late 1980s and early 1990s when this mode of operation resulted in large and abrupt changes in stream flow below the powerhouse and large and frequent drawdowns of the reservoir pool (USFWS 2002).

The existing license requires PacifiCorp to release 15 cfs into the 1.1 mile bypass reach but has no requirement for minimum instream flow below the powerhouse (RM 2.2). PacifiCorp has an agreement with the USFWS to maintain a flow of 250 cfs, if possible, to ensure adequate water supply for the USFWS salmon rearing facility (RM 1.6) when there are fish in the rearing ponds. PacifiCorp has maintained these flows for the rearing ponds, although for short periods the flows have been dropped below 250 cfs due to maintenance activities (USFWS 2002). Maintenance activities that affect flows below the Project include maintenance of the generators, replacement of the spillgate seals, maintenance of the intake trash rack, and inspection of the flow release valves in the tunnel at the base of Condit Dam.

Maintenance of the generators occurs annually and may be done in either low flow or high flow periods, depending on PacifiCorp's generation needs. Under low flow conditions, the entire flow can be passed through one of the two identical Francis units while the other is being inspected or repaired. During high flow conditions, the servicing of one or both generators could still occur, resulting in spill at the dam.

The replacement of the spillgate seals, maintenance of the intake trash rack, repair of the Obermeyer weir, and inspection of the flow release valves in the tunnel at the base of Condit Dam require the reservoir pool to be lowered below the normal pool elevation. These activities have typically occurred once per year, or less frequently, and would continue to take place under the proposed action.

Project Outages Due to Load Rejection

Load rejection is most often caused by malfunctions in the transmission lines. Because load rejection can damage the generating facilities, PacifiCorp must rapidly shut down the turbine units. As a consequence, instream flow below the powerhouse drops abruptly and is limited to the bypass reach until (1)one or both of the generating units are brought back into service or (2) additional flow (via spill) is released at the dam into the bypass reach. PacifiCorp reported eleven load rejections between December 1990 and May 1993 and states that this realistically represents what may occur in the future (USFWS 2002).

Spill

When inflow to Northwestern Reservoir exceeds the generating capacity of the powerhouse (approximately 1,400 cfs), excess flow is discharged to the bypass reach through one or more of the five spillway gates.

2.3.2 Project Removal

In short, removal of the Condit Project entails development of a staging area, construction access roads, construction of a drain tunnel, removal of facility hardware (e.g., Obermeyer wier, radial gates, etc.), demolition of the dam, removal of Project facilities, and reclamation of construction areas. These activities are briefly described below. A more detailed description can be found in FERC (2002).

Staging and Access

Staging involves placement of an office trailer, an equipment parts van, a fueling and maintenance station, a parking area, and a facility to store explosives. Because the dam is located in a steep gorge, room for staging areas adjacent to the dam is limited. Therefore, PacifiCorp purchased a 10-acre tract of land east of the dam for construction staging. Earthen material may be borrowed from this area for construction of access roads and some spoils could be stored at this location as well. Staging is scheduled for August 2008.

After the staging area is set up, construction of temporary access roads would begin. The first access road would be constructed immediately downstream of the dam from a point upslope of the 5,100-foot wood stave pipeline, down to the spillway slab. The pipeline would remain in place during this phase of removal; therefore, the road would bridge this structure. Once completed, a rough terrain crane would be set up on the spillway slab for servicing construction of the drain tunnel. Construction of access roads would also be required to remove the pipeline once the reservoir is drained. Finally, because the original wooden cofferdam used to divert the river during construction of Condit Dam is expected still to be in place, an access road leading down to the streambed will be constructed after the reservoir is drained to service removal of this structure (R.W. Beck, Inc. 1998).

PacifiCorp estimates that roughly 2,000 to 3,000 cubic yards (cy) of fill material will be needed to construct the temporary access roads. After the dam and other facilities are removed, all access roads would be removed as well, and the areas impacted by placement of these roads would be reclaimed (i.e., stabilized, seeded, and planted).

Tunnel Construction and Hardware Removal

Starting on or near October 1, 2008 a tunnel measuring 18 feet wide by 12 feet high would be drilled into the base of the dam (from the downstream side) in the thalweg of the downstream channel. This location also correlates with the thalweg of the old channel upstream of the dam. All river flow would be maintained through the wood stave pipeline during tunnel excavation. Before drilling begins, the contractor would install a 20-foot by 40-foot gravel pad to serve as a staging area for tunnel excavation in the river channel at the downstream portal location. The tunnel would be excavated using both drills and explosives. Excavation spoils (sediment) would be hoisted out of the river channel and hauled by truck to a containment area roughly 0.75 miles east of the dam. The tunnel would be excavated to a point roughly 15 feet short of the upstream face of the dam. This “plug” would then be prepared for blasting in order to drain the reservoir. All material and equipment would be removed from the river channel. In addition, all hardware located at the top of the dam would be removed either prior to or during tunnel excavation.

Finally, PacifiCorp intends that anadromous fish returning to the White Salmon River after the reservoir is drained (but before the dam is removed) be able to access habitat upstream of the Condit Project area. Therefore, PacifiCorp proposes to construct the tunnel with several large pockets, which will create resting areas for fish moving up through the tunnel after the reservoir is drafted.

Draining of Northwestern Lake and Accumulated Sediments
Prior to blasting out the tunnel plug, a clamshell dredge would be mounted on a barge and floated down the reservoir to the face of the dam. The dredge would then remove sediment and debris from the area in front of the tunnel to clear it for drainage. The barge would be removed and the area prepared for reservoir draining. The plug would be blasted and forced out by water pressure (approximately 105 feet of head in the reservoir). The tunnel is sized to allow a maximum flow of 10,000 cfs and the reservoir is expected to drain in roughly 6 hours. It is not known just how much large woody debris is buried in the reservoir sediment. As a precaution, measures will be taken to clear debris from the tunnel should it become plugged; most likely an explosive would be detonated near the jam to break it loose. The river would continue to flow through the tunnel while the dam is being razed.

Dam, Cofferdam, and Project Facility Removal
With the reservoir drained, excavation of the concrete dam structure can proceed in the dry and would begin on the east end. Drills and explosives would be employed to cut 10-foot high by 4-foot deep by 6-foot wide concrete blocks which would be removed using a highline yarder system. The blocks would be placed in trucks and hauled to a spoil containment area. Concrete would be excavated across the dam in a series of top slicing cuts at 10-foot vertical intervals. After removing the top two or three layers in this manner, the dam would be wide enough that the center sections could be drilled and blasted into rubble and an excavator used to load it on trucks for hauling offsite (creating, in effect, a trough). After the rubble is removed, the upstream and downstream face of the dam (now the sides of the trough) would be cut into blocks and removed. This process would continue down to the level of the drain tunnel. The center portion, or the area immediately adjacent to the tunnel, would be excavated down to bedrock, leaving sections of intact concrete along the tunnel edges and along the downstream and upstream faces of the dam to keep water out. When excavation reaches bedrock and the rubble is removed, then the edge sections will be blasted into blocks and hoisted out of the river channel. This final portion of the excavation would be accomplished during low flows (i.e., late summer/early fall).

Historical photographs and drawings indicate that upstream cofferdams used to divert the river during construction of Condit Dam were probably flooded (i.e., not removed) when the reservoir filled. These structures would be removed by first constructing an access road from the left bank (east side) down to the dams. Some blasting may be necessary to dismantle these structures. Concrete, boulders, and timber members would be loaded onto trucks and hauled to the spoil area. The structures would be removed down to streambed level by the first of May the following year.

The steel surge tank, wood stave pipeline, steel and wood penstocks, and the foundations that support these structures would be removed and hauled to a spoil area. No in-water work would be required to remove these structures.

Northwestern Lake Bridge Remediation
Northwestern Lake Bridge crosses the White Salmon River approximately 1.8 miles upstream of Condit Dam. The bridge is supported by two piers located in the river channel. The piers are founded on reinforced concrete pile caps supported by pilings. Survey information taken prior to construction of Condit Dam indicate that the natural streambed is buried under 12 to 15 feet of sediment. Scouring around the piers is expected to occur during draining of the reservoir. Proposed remediation would consist of protecting the piling beneath the pile cap with sheet piles driven to refusal and reinforced concrete wing walls (R.W. Beck, Inc. 1998, PacifiCorp 2004).

Water and Gas Pipeline Remediation
Two pipelines cross the White Salmon River upstream of Condit Dam. The first is a 14 inch diameter water supply line that crosses the river roughly 1 mile above the dam. The erosion of sediments from Northwestern Lake may expose the pipeline. If this occurs, armoring would be added to protect the pipe from scour, or it would be placed in a trench cut into the bedrock across the river bottom.

The second line is a 26-inch diameter gas pipeline that crosses the river approximately 2.1 miles upstream of the dam and about 0.25 mile upstream of Northwestern Lake Bridge. This pipeline is embedded in rock and concrete-coated, and therefore not considered to be at risk of damage from scour. Protective armoring or some other means of remediation will be placed if needed (R.W. Beck, Inc. 1998).

2.3.3 Proposed Conservation Measures

In the context of the settlement agreement, conservation measures represent actions pledged by the action agency (FERC) or applicant (PacifiCorp) in the Project description to minimize or compensate for effects of the Projects on listed species. The NMFS considers these parts of the proposed action for this consultation.

Additional Measures Required by FERC
FERC (2002) identified several additional conservation measures that it would require for the proposed action; PacifiCorp has since prepared plans for most of these measures (Table 2-1). The NMFS will review other plans and measures as they are developed and determine if these plans change the proposed action in a way that would increase the amount or extent of take beyond that authorized in this Opinion, which could trigger re-initiation of consultation.

One of the key conservation measures proposed by PacifiCorp (2004) and FERC is the capture of adult Lower Columbia River (LCR) Chinook salmon and Middle Columbia River (MCR) steelhead before the dam is breached; the purpose of which is to conserve the next generation of these species that would otherwise be lost. A plan for this action will be developed, but in general this activity will include installation of a removable weir in the lower White Salmon River near the USFWS' ponds to collect adults (see section 5.3.1). In all likelihood, LCR Chinook salmon will be collected and spawned before the dam is breached. Steelhead are spring spawners and therefore would have to be held in raceways or ponds for several months before spawning.

Table 2-1. Additional conservation measures and plans identified by FERC and plans and measures developed by PacifiCorp.

Additional Conservation Measures Identified in FERC (2002)	**Conservation Plans since Developed by PacifiCorp (PacifiCorp 2004)**
A post reservoir dewatering assessment to (1) determine the quantity and geotechnical characteristics of the remaining sediments on the banks and (2) propose measures to stabilize these sediments and reduce erosion.	- Bank Stabilization Plan - Sediment Assessment and Management Plan
A final wetland creation/riparian re-vegetation and monitoring plan.	- Plan for Wetland Mitigation Within and Downstream of Former Reservoir - Plan for Re-vegetation of Reservoir Area and Other Areas Disturbed by Construction Activities
Detailed plans for Project lands management, woody debris management, sediment and erosion control during dam removal activities, and noxious weed control.	- Canyon and Woody Debris Management Plan - Upland Stormwater and Erosion Control Plan - Bank Stabilization Plan - Sediment Assessment and Management Plan
A plan for handling petroleum and other hazardous materials to minimize impact on anadromous fish and other aquatic species.	- Spill Prevention and Containment Plan
Plan to protect the raceways at the USFWS salmon rearing facility.	- To be developed
A plan for the capture and spawning of Chinook and steelhead adults (pre-dam removal) and the rearing of their progeny for release back into the White Salmon River (post-dam removal).	- To be developed

3. RANGE-WIDE STATUS OF LISTED SPECIES AND DESIGNATED CRITICAL HABIAT

In Step 1 of its analysis, NMFS considers the current status of the listed species, taking into account viability criteria (population size, productivity, population spatial structure, and diversity) (McElhany 2000) and, if available, an assessment of population projections relative to survival and recovery criteria. To assess current range-wide status, NMFS starts with the determinations made in its decision to list for ESA protection the salmon and steelhead species considered in this Opinion, and also considers any new data that is relevant to the determination. The following sections briefly describe the current status of the species (listing status, general life history, and population dynamics) in a manner that is relevant to each species' biological requirements.

3.1 Range-wide Status of the Species

There are 13 ESA-listed salmon and steelhead species that may be affected by the proposed action (see Table 1-1). Of these, NMFS has determined that individuals of only one salmon and one steelhead species currently spend a significant portion of their life-cycle within the White Salmon River and are thus likely to be substantially affected by the proposed action; these species are Lower Columbia River Chinook salmon and Middle Columbia River steelhead. Columbia River (CR) chum salmon, LCR coho salmon, LCR steelhead, Upper Willamette River (UWR) Chinook salmon, UWR steelhead, Snake River (SR) spring/summer Chinook salmon, SR fall Chinook salmon, SR sockeye salmon, SR steelhead, Upper Columbia River (UCR) spring Chinook salmon, and UCR steelhead may also be affected to the extent that they are found within the mainstem Columbia portion of the action area during the expected high turbidity events related to dam removal activities. The listing status and critical habitat designation for each of the species that may be affected by the proposed action are identified in Table 1-1. Except for LCR coho salmon, critical habitat has been designated for all of the anadromous fish potentially affected by the proposed action.

3.2 Life Histories, Factors for Decline, and Population Trends

The biological requirements, life histories, migration timing, historical abundance, and factors contributing to the decline of the 13 salmon and steelhead species have been well documented. The following sections summarize the relevant biological information contained in these documents. Additional detailed information is available in the FEIS, in NMFS' Status Reviews (Weitkamp et al. 1995, Busby et al. 1996, Gustafson et al. 1997, Johnson et al. 1997, Myers et al. 1998, and Good et al. 2005), in NMFS' listing determination (NMFS 2005a), and on NMFS' Northwest Region website: http://www.nwr.noaa.gov.

3.2.1 LCR Chinook Salmon

ESU Description

The LCR Chinook salmon ESU includes all naturally spawned populations of Chinook salmon in tributaries to the Columbia River from a transition point located east of the Hood River, Oregon and the White Salmon River, Washington, to the mouth of the Columbia River at the Pacific Ocean and in the Willamette River below Willamette Falls, Oregon (excluding spring Chinook salmon in the Clackamas River). Not included in this ESU are stream-type spring Chinook salmon found in the Klickitat River (which are considered part of the MCR spring ESU), introduced Carson spring Chinook salmon, or introduced fall run ("brights") Chinook salmon in the Wind, White Salmon, and Klickitat rivers.

The Cowlitz, Kalama, Lewis, Washougal, and White Salmon rivers constitute the major systems on the Washington side; the lower Willamette and Sandy rivers are foremost on the Oregon side. Most of the LCR Chinook salmon ESU is currently represented by fall fish; there is some question whether any natural-origin spring Chinook salmon persist in this ESU.

Seventeen artificial propagation programs releasing hatchery Chinook salmon are considered part of the LCR Chinook salmon ESU. All of these programs are designed to produce fish for harvest, and three of these programs are also intended to augment naturally spawning populations in the basins where the fish are released. These three programs integrate naturally produced spring Chinook salmon into the broodstock in an attempt to minimize the genetic effects of returning hatchery adults that spawn in the wild.

Life History Types

The LCR Chinook salmon ESU exhibits three major life history types: fall run ("tules"), late fall run ("brights"), and spring run. Spring Chinook salmon on the Lower Columbia River, like those from coastal stocks, enter fresh water in March and April, well in advance of spawning in August and September. Historically, the spring migration was synchronized with periods of high rainfall or snowmelt to provide access to upper reaches of most tributaries, where spring stocks would hold until spawning.

Fall Chinook salmon predominate the Lower Columbia River salmon runs. Tule type fall Chinook salmon, differentiated from bright fall Chinook salmon by their dark skin coloration and advanced state of maturation at the time of freshwater entry, begin returning to the Columbia River in mid-August and spawn within a few weeks. Bright fall Chinook salmon populations typically return to the fresh water later than tule fall Chinook salmon and spawn between late September and early November. Most fall Chinook salmon emigrate to the marine environment as subyearlings. Adult fall tule Chinook salmon return to tributaries in the Lower Columbia River at 3 and 4 years of age, compared to 4 to 5 years for bright Chinook salmon and spring run fish. Marine coded wire tag recoveries for LCR stocks tend to occur off the British Columbia and Washington coasts, although a small proportion of the tags are recovered in Alaskan waters. LCR Chinook salmon in the White Salmon River are tule Chinook salmon.

Current Viability

Many populations within the LCR Chinook salmon ESU exhibited pronounced increases in abundance and productivity in recent years, possibly due to improved ocean conditions. Abundance estimates of naturally spawned populations have been uncertain until recently due to a high (about 70 percent) fraction of naturally spawning hatchery fish. Abundance estimates of naturally produced spring Chinook salmon have improved since 2001 due to the marking of all hatchery spring Chinook salmon releases (compared to a previous marking rate of only one percent to two percent), which allows for the separation in counts at weirs and traps and on spawning grounds. Despite recent improvements, long-term trends in productivity are below replacement for the majority of populations in the ESU. Of the historical populations, eight to ten have been extirpated or nearly extirpated. Although about 35 percent of historical habitat has been lost behind impassable barriers, the ESU exhibits a broad spatial distribution in a variety of watersheds and habitat types. Natural production currently occurs in about 20 populations, although only one population has a mean spawner abundance exceeding 1,000 fish. The West Coast Salmon Biological Review Team (BRT) expressed concern that most of the extirpated populations are spring run, and the disproportionate loss of this life history type represents a risk to ESU diversity (Good et al. 2005). Additionally, of the four hatchery spring run Chinook salmon populations considered part of the ESU, two are propagated in rivers that, although they are within the historical geographic range of the ESU, probably did not support spring run populations. High hatchery production poses genetic and ecological risks to the natural populations and complicates assessments of their performance. The BRT also expressed concern over the introgression of out-of-ESU hatchery stocks. In its conclusion, the BRT found moderately high risk for all viable salmon population (VSP) categories for this ESU.

Limiting Factors

Spring run populations have largely been extirpated by dams blocking access to their high elevation habitat. The remaining spring run populations continue to be impacted by hatchery production and habitat degradation resulting from urbanization, logging, and agriculture.

The existing fall Chinook salmon populations are affected by large-scale hatchery production, relatively high harvest, and extensive habitat degradation. Hatchery impacts are thought to include genetic introgression resulting from the use of out-of-basin stocks and genetic homogenization resulting from extensive egg exchanges between hatcheries within the ESU. The expected freshwater harvest rates on fall run adults are about eight percent for the bright fall run adults and 16 percent for tule fall run adults; harvest rates on spring run adults is about two percent (NMFS 2001 and 2002). These populations have also suffered from habitat degradation resulting from urbanization, logging, and agriculture.

3.2.2 MCR Steelhead

DPS Description

The MCR steelhead DPS includes all natural-origin populations in Oregon and Washington drainages upstream of the Hood and Wind River systems to and including the Yakima River. Steelhead from the Snake River Basin are not included in the DPS. Both the Deschutes River and Umatilla River hatchery stocks are included in the DPS but are not listed. Seven artificial propagation programs are considered part of the DPS (NMFS 2006).

Life Histories

Almost all steelhead populations within this DPS are summer run fish. Adults typically spend 1 to 2 years at sea before returning to spawn. Summer run adults typically migrate through the Lower Columbia River from April through early November, overwinter in tributaries, and spawn the following spring. Steelhead in Fifteen Mile Creek, Oregon return to fresh water during the winter (winter run). Both winter and summer steelhead are found in the Klickitat and White Salmon rivers in Washington. Winter run adults primarily migrate through the Lower Columbia River between November and April. Most juveniles smolt at 1 or 2 years of age and then migrate to sea during the spring freshet (mid-April through mid-June).

Current Viability

Estimates of historical (pre-1960s) abundance are available for the Yakima River, which has an estimated run size of 100,000. Assuming comparable run sizes for other drainage areas, the total historical run size may have exceeded 300,000 steelhead. An estimated 200,000 adult MCR steelhead returned in the early 1980s, but only 20 percent (40,000) were likely naturally produced. The 5-year average (1992-1997) run size was 142,000, with an average naturally produced component of 39,000. With some exceptions, a recent 5 year average (geometric mean of 1997-2001 returns) abundance for natural steelhead within this ESU was higher than previously reported.

Limiting Factors

The habitat of MCR steelhead has been negatively affected by a host of human activities. Hydroelectric projects have blocked access to habitat and continue to injure and kill juveniles and adults migrating through the projects. Water diversions have seriously reduced flow levels in several Mid-Columbia River drainages. Urbanization, logging, and agriculture have degraded riparian vegetation and instream structure and have contributed to elevated summer and lowered winter temperatures in many drainages.

MCR steelhead continue to be negatively affected by harvest and hatchery operations. The expected freshwater harvest rate of adult MCR steelhead is about nine percent (NMFS 2001 and 2002). Over two million hatchery summer steelhead are released into the rivers occupied by this ESU every year. Hatchery impacts are thought to include some genetic introgression resulting from the use of out-of-basin stocks, although this practice has largely been eliminated (e.g., hatchery steelhead currently released into the Deschutes and Umatilla rivers are derived from native stock). In addition, strays from several Columbia River Basin hatcheries are also common in the Deschutes and Umatilla rivers, accounting for up to 20 percent of the steelhead handled at collection facilities in some years.

3.2.3 Lower Columbia River Coho Salmon

ESU Description

The Lower Columbia River coho ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, Oregon. Twenty-five artificial propagation programs are considered to be part of the ESU: Grays River, Sea Resources Hatchery, Peterson Coho Project, Big Creek Hatchery, Astoria High School (STEP) Coho Program, Warrenton High School (STEP) Coho Program, Elochoman Type-S Coho Program, Elochoman Type-N Coho Program, Cathlamet High School FFA Type-N Coho Program, Cowlitz Type-N Coho Program in the Upper and Lower Cowlitz Rivers, Cowlitz Game and Anglers Coho Program, Friends of the Cowlitz Coho Program, North Fork Toutle River Hatchery, Kalama River Type-N Coho Program, Kalama River Type-S Coho Program, Lewis River Type-N Coho Program, Lewis River Type-S Coho Program, Fish First Wild Coho Program, Fish First Type-N Coho Program, Syverson Project Type-N Coho Program, Washougal River Type-N Coho Program, Eagle Creek NFH, Sandy Hatchery, and the Bonneville/Cascade/Oxbow complex coho hatchery programs. The NMFS determined that these artificially propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU (NMFS 2005a).

Life Histories

Adult LCR coho salmon typically migrate through the Lower Columbia River September through November. Juveniles migrate to the ocean as yearlings mid-April through the end of May with the peak migrations in the Lower Columbia River during May.

Current Viability

McElhany et al. (2004) identified a total of 21 extant, demographically independent populations in three major population groups in this ESU: Coastal, Cascade, and Gorge. There are only two extant populations in the LCR coho salmon ESU with appreciable natural productivity, those in the Clackamas and Sandy rivers, down from an estimated 23 historical populations in the ESU. Although adult returns in 2000 and 2001 for the Clackamas and Sandy river populations exhibited moderate increases, the recent 5-year mean of natural-origin spawners for both populations represents less than 1,500 adults. The Sandy River population has exhibited recruitment failure in five of the last ten years and has exhibited a poor response to reductions in harvest. During the 1980s and 1990s, natural spawners were not observed in the lower tributaries in the ESU. Coincident with the 2000-2001 abundance increases in the Sandy and

Clackamas populations, a small number of coho salmon spawners of unknown origin have been surveyed in some lower tributaries. Short-term and long-term trends in productivity are below replacement.

The lack of naturally produced spawners is contrasted by the very large number of hatchery-produced adults. The abundance of hatchery coho salmon returning to the Lower Columbia River in 2001 and 2002 exceeded one million and 600,000 fish, respectively. The BRT (Good et al. 2005) expressed concern that the magnitude of hatchery production continues to pose significant genetic and ecological threats to the extant natural populations in the ESU. However, these hatchery stocks collectively represent a significant portion of the ESU's remaining genetic resources. The 21 hatchery stocks considered to be part of the ESU, if appropriately managed, may prove essential to the restoration of more widespread naturally spawning populations. Several of these risks have recently begun to be addressed by improvements in hatchery practices. Out-of-ESU broodstock is no longer used, and almost 100 percent of hatchery fish are marked to improve monitoring and evaluation of broodstock and hatchery- and natural-origin returns.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that hatchery programs collectively mitigate the immediacy of extinction risk for the LCR coho salmon ESU in the short term, but these programs do not substantially reduce the extinction risk of the ESU in the foreseeable future. At present, within-ESU hatchery programs significantly increase the abundance of the ESU. Without adequate long-term monitoring, the contribution of ESU hatchery programs to the productivity of the ESU is uncertain. The hatchery programs are widely distributed throughout the Lower Columbia River, reducing the spatial distribution of risk to catastrophic events.

Limiting Factors

Approximately 40 percent of historical habitat is currently inaccessible, which restricts the number of areas that might support natural production, and further increases the ESU's vulnerability to environmental variability and catastrophic events. The extreme loss of naturally spawning populations, the low abundance of extant populations, diminished diversity, and fragmentation and isolation of the remaining naturally produced fish confer considerable risks to the ESU.

3.2.4 Columbia River Chum Salmon

ESU Description

The Columbia River chum ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (NMFS 1999d). Three artificial propagation programs are considered to be part of the ESU: Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum hatchery programs. The NMFS determined that these artificially propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU (NMFS 2005a).

Life Histories

Adult CR chum salmon typically return to the Lower Columbia River from mid-October through December, and spawn from mid-November through December. Juvenile CR chum salmon migrate to the estuary as fry between February and May.

Current Viability

Approximately 90 percent of the historical populations in the Columbia River chum ESU are extirpated or nearly so. During the 1980s and 1990s, the combined abundance of natural spawners for the Lower and Upper Columbia River Gorge, Washougal, and Grays River populations was below 4,000 adults. In 2002, however, the abundance of natural spawners exhibited a substantial increase evident at several locations in the ESU. The preliminary estimate of natural spawners is approximately 20,000 adults. The cause of this dramatic increase in abundance is unknown. Improved ocean conditions, the initiation of a supplementation program in the Grays River, improved flow management at Bonneville Dam, favorable freshwater conditions, and increased survey sampling effort may all have contributed to the elevated 2002 abundance. However, long- and short-term productivity trends for ESU populations are at or below replacement. The loss of off-channel habitats and the extirpation of approximately 17 historical populations increase the ESU's vulnerability to environmental variability and catastrophic events. The populations that remain are low in abundance, and have limited distribution and poor connectivity (NMFS 2005a).

There are now three artificial propagation programs producing chum salmon considered to be part of the Columbia River chum ESU. These are conservation programs designed to support natural production. The Sea Resources program has begun to provide benefits to ESU spatial structure through reintroductions of chum salmon into restored habitats in the Chinook River. The Washougal Hatchery artificial propagation program provides artificially propagated chum salmon for re-introduction into recently restored habitat in Duncan Creek, Washington. This program also serves as a genetic reserve for the naturally spawning population in the mainstem Columbia River below Bonneville Dam, which can access only a portion of spawning habitat during low flow conditions. The other two programs are designed to augment natural production in the Grays River and the Chinook River in Washington. All these programs use naturally produced adults for broodstock. These programs were only recently established (1998–2002), with the first hatchery chum returning in 2002.

NMFS' assessment of the effects of artificial propagation on ESU extinction risk concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NMFS 2005a). The Columbia River chum hatchery programs have only recently been initiated, and are beginning to provide benefits to ESU abundance. The contribution of ESU hatchery programs to the productivity of the ESU in-total is uncertain. These three programs have a neutral effect on ESU diversity. Collectively, artificial propagation programs in the ESU provide a slight beneficial effect to ESU abundance and spatial structure.

Limiting Factors

Good et al. (2005) found high risks for each of the VSP categories, particularly for ESU spatial structure and diversity. The loss of off-channel habitats and the extirpation of approximately 17 historical populations increase the ESU's vulnerability to environmental variability and catastrophic events. The populations that remain are low in abundance, and have limited distribution and poor connectivity. In the Columbia River, habitat limiters associated with chum salmon included gravel quality and stability, availability of good quality nearshore mainstem freshwater and marine habitat, road building, timber harvest, diking, and industrialization.

3.2.5 Other ESUs and DPS'

UWR Chinook salmon, UWR steelhead, LCR steelhead, SR spring/summer Chinook salmon, SR fall Chinook salmon, UCR spring Chinook salmon, SR sockeye salmon, SR steelhead, and UCR steelhead are not known to spawn or rear within the action area. However, adults and juveniles of these ESUs may be found migrating through the action area when water quality impacts associated with dam removal could occur. All of these species are listed as threatened under the ESA, except SR sockeye salmon which NMFS has determined is endangered (i.e., in danger of extinction throughout all or a significant portion of its range).

Significant Factors Influencing Range-wide Status of the Listed Species

Hydroelectric development in the Columbia River Basin and its tributaries has affected these ESUs to the extent that (1) they historically relied upon habitat which is now blocked and (2) they must now migrate through these projects to complete their life cycles. All of the ESUs listed in Table 1-1, above, have been negatively affected by both types of impacts.

The expected freshwater harvest rate of SR fall Chinook salmon, about 31 percent, is the highest of any listed species. Expected harvest rates for UCR spring Chinook salmon, SR spring/summer Chinook salmon (spring run component), UCR steelhead (of natural origin), and SR steelhead range between about eight to 17 percent. The harvest rate of SR spring/summer Chinook salmon (summer run component) and SR sockeye salmon range from 1.6 to five percent (NMFS 2001 and 2002).

Nearly all of these species, to varying degrees, have been affected by hatchery programs (genetic introgression resulting from the use of out-of-basin stocks and genetic homogenization resulting from egg exchanges between hatcheries within ESUs and DPS'). In some instances, these impacts have been substantially reduced in recent years. Some hatchery programs now are operated primarily to achieve conservation objectives for listed species (e.g., SR sockeye salmon). However, many hatchery programs continue to negatively impact the ESA-listed species (see NMFS 2004a for additional information regarding the effects of artificial propagation on these species).

These species have generally suffered from habitat degradation resulting from urbanization, logging, and agriculture, as well as many other human activities (e.g., industry, recreation, mining, poor resource management practices, road construction and maintenance, conversion of wetlands to other land-uses, etc.).

3.3 Factors Affecting All Listed Salmon and Steelhead Species in the Estuary and Nearshore Ocean Environment

The estuary and near-shore ocean environments have also been changed by human activities. Historically, the downstream half of the estuary was a dynamic environment with multiple channels, extensive wetlands, sandbars, and shallow areas. Winter and spring floods, low flows in late summer, large woody debris floating downstream, and a shallow bar at the mouth of the Columbia River kept the environment dynamic. Today, navigation channels have been dredged, deepened, and maintained; jetties and pile-dike fields have been constructed to stabilize and concentrate flow in navigation channels; marsh and riparian habitats have been filled and diked, and causeways have been constructed across waterways. These actions have decreased the width of the mouth of the Columbia River from 4 miles to 2 miles and increased the depth of the Columbia River channel at the bar from less than 20 ft to more than 55 ft. Sand deposition at river mouths has extended the Oregon coastline approximately 4 miles seaward and the Washington coastline approximately 2 miles seaward.

More than 50 percent of the original marshes and spruce swamps in the estuary have been converted to industrial, transportation, recreational, agricultural, or urban uses. More than 3,000 acres of this habitat have been converted to other uses since 1948. Many wetlands along the shore in the upper reaches of the estuary have been converted to industrial and agricultural lands after levees and dikes were constructed. Furthermore, water storage and release patterns from reservoirs upstream of the estuary have changed the seasonal pattern and volume of discharge. The peaks of spring/summer floods have been reduced, and the amount of water discharged during winter has increased.

3.4 Range-wide Status of Designated Critical Habitat

NMFS has designated critical habitat for 12 of the 13 salmon and steelhead species that would be affected by the proposed action.[3] Critical habitat includes the stream channels within the designated stream reaches, and includes a lateral extent as defined by the ordinary high-water

[3] Critical habitat has not been designated for LCR coho salmon.

line.[4] Within these areas, the primary constituent elements (PCEs) essential for the conservation of these ESUs are those sites and habitat components that support one or more life stages, including:

- Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development.

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

- Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

- Estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

- Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation (offshore marine PCEs not identified for SR spring/summer Chinook salmon, SR fall Chinook salmon, and SR sockeye salmon).

NMFS determines the importance of the populations associated with an area to the recovery of their respective ESUs and DPS' and the contribution of the area to the conservation (i.e., recovery) of each population through either its current or potential productivity. The Critical Habitat Analytical Review Teams (CHARTs) rated 525 occupied fifth field hydrologic units (referred to as HUC5s or watersheds) in the Columbia River basin. The CHARTs gave each of these occupied HUC5s a high, medium, or low rating. High-value watersheds/areas are those with a high likelihood of promoting conservation, while low value watersheds/areas are expected

[4] In areas where ordinary high-water line has not been defined, the lateral extent is the bankfull elevation (i.e., the level at which water begins to leave the channel and move into the floodplain, generally reached at a discharge with a 1- to 2-year recurrence interval).

to contribute relatively little. Conservation value was determined by considering the factors listed in Table 3-1 below.

Of the 525 occupied HUC5s, 382 were assigned a high rating, 93 a medium rating, and 50 a low rating. The CHART ratings do not address SR spring/summer Chinook salmon, SR fall Chinook salmon, or SR sockeye salmon as critical habitat was designated for these ESUs in 1993. Ratings for the LCR coho salmon ESU are under development.

Table 3-1. Factors considered by Columbia Basin CHARTs to determine the conservation value of occupied HUC5s.

Factors	**Considerations**
PCE quantity	Total stream area or number of reaches in the HUC5 where PCEs are found; compares to both distribution in other HUC5s and to probable historical quantity within the HUC5
PCE quality – current condition	Existing condition of the quality of PCEs in the HUC5
PCE quality – potential condition	Likelihood of achieving PCE potential in the HUC5, either naturally or through active conservation/restoration, given known limiting factors, likely biophysical responses, and feasibility
PCE quality – support of rarity/importance	Support of rare genetic or life history characteristics or rare/important types in the HUC5
PCE quantity – support of abundant populations	Support of variable-sized populations relative to other HUC5s and the probably historical levels in the HUC5
PCE quality – support of spawning/rearing	Support of spawning or rearing of varying numbers of populations (i.e., different run-timing or life history types within a single ESU and or different ESUs)

Many factors, both human-caused and natural, have contributed to the decline of salmon over the past century. Salmon 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 (Table 3-2).

Table 3-2. Major factors limiting the conservation value of designated critical habitat by species (NMFS 2005d).

Species	Major Limiting Factors
SR spring/summer Chinook salmon	• Mainstem lower Snake and Columbia hydropower system mortality • Reduced tributary stream flow • Altered tributary channel morphology • Excessive sediment in tributaries • Degraded tributary water quality
SR fall Chinook salmon	• Mainstem lower Snake and Columbia hydropower system mortality • Degraded water quality • Reduced spawning/rearing habitat due to mainstem lower Snake River hydropower system
SR steelhead	• Mainstem lower Snake and Columbia hydropower system mortality • Reduced tributary stream flow • Altered tributary channel morphology • Excessive sediment in tributaries • Degraded tributary water quality
SR sockeye salmon	• Mainstem lower Snake and Columbia hydropower system mortality • Reduced tributary stream flow • Impaired tributary passage and blocks to migration
UCR spring Chinook salmon	• Mainstem Columbia River hydropower system mortality • Tributary riparian degradation and loss of in-river wood • Altered tributary floodplain and channel morphology • Reduced tributary stream flow and impaired passage
UCR steelhead	• Mainstem Columbia River hydropower system mortality • Reduced tributary stream flow • Tributary riparian degradation and loss of in-river wood • Altered tributary floodplain and channel morphology • Excessive sediment • Degraded tributary water quality
MCR steelhead	• Mainstem Lower Columbia River hydropower system mortality • Reduced tributary stream flow • Impaired passage in tributaries • Excessive sediment • Degraded tributary quality • Altered channel morphology
LCR Chinook salmon	• Reduced access to spawning/rearing habitat in tributaries • Loss of habitat diversity and channel stability in tributaries • Excessive sediment in spawning gravel • Elevated water temperature in tributaries

Table 3-2. Continued

Species	Major Limiting Factors
LCR steelhead	• Degraded floodplain and stream channel structure and function • Reduced access to spawning/rearing habitat • Altered streamflow in tributaries • Excessive sediment and elevated water temperatures in tributaries
CR chum salmon	• Altered channel form and stability in tributaries • Excessive sediment in tributary spawning gravels • Altered streamflow in tributaries and mainstem Columbia • Loss of some tributary habitat types • Harassment of spawners in tributary and mainstem
UWR Chinook salmon	• Reduced access to spawning/rearing habitat in tributaries • Altered water quality and temperature in tributaries • Lost/degraded floodplain connectivity and lowland stream habitat • Altered streamflow in tributaries
UWR steelhead	• Reduced access to spawning/rearing habitat in tributaries • Altered water quality and temperature in tributaries • Lost/degraded floodplain connectivity and lowland stream habitat • Altered streamflow in tributaries

4. ENVIRONMENTAL BASELINE

In Step 2 of this analysis, NMFS evaluates the relevance of the environmental baseline to the species' current and future status. Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone Section 7 consultation and the impacts of state and private actions that are contemporaneous with the consultation in progress." It is an analysis of the effects of past and ongoing human and natural factors affecting the current and future status of the species, its habitat, and ecosystems within the action area, including effects on the status of designated critical habitat. "It does not include the effects of the action under review in the consultation" (ESA Section 7 Consultation Handbook [March 1998] p. 4-22).

As described in Section 2.1, the action area is defined as (1) the White Salmon River from its confluence with the Columbia River to RM 16, including Northwestern Lake; (2) tributaries that enter this reach from their confluence upstream to the point that each becomes impassible to salmon and steelhead; and (3) the mainstem Columbia River from its confluence with the White Salmon River downstream to its mouth and the extent of its plume into the Pacific Ocean.

In the following sections, NMFS describes historical Project effects and the effects of other factors on the status of populations and critical habitat in the action area. Historical Project effects are included because they are partly responsible for current conditions. The continuing Project effects that are the subject of the proposed action are not in the environmental baseline and vice versa (i.e., historical Project effects are assumed to continue unless and until they are modified by the proposed action).

4.1 Status of Populations within the Action Area

4.1.1 White Salmon River

4.1.1.1 Status of Populations within the White Salmon River

Only LCR fall Chinook salmon and MCR steelhead have been known to spawn and rear in the White Salmon River below Condit Dam in recent years. Condit Dam has blocked access to the rest of the historical habitat for over 90 years. Due to inundation by the Bonneville Reservoir at the lower end of the river, less than 3 miles of stream habitat is now available. Although the Willamette/Lower Columbia Technical Recovery Team (WLC-TRT) described the LCR fall Chinook population in the White Salmon as a historical core population for the Columbia Gorge stratum (i.e., major population group) (McElhany et al. 2003), the majority of fish currently observed in the river are probably hatchery strays from one of the four major production hatcheries nearby (McElhany et al. 2004). The early fall (tule) broodstock used at the Spring

Creek National Fish Hatchery was established using fish taken from the White Salmon River prior to the construction of Condit Dam and NMFS (2005a) considered it similar enough to the natural-origin populations (genetically and behaviorally) to include it in the ESU. The abundance of natural spawners has been low except for the most recent year or two.

The Interior Columbia Technical Recovery Team considers the native demographically independent population of MCR steelhead to have been extirpated from the White Salmon River (NMFS 2005c). Any remaining spawners are probably strays from the out-of-DPS Skamania Stock Summer Steelhead Program, which NMFS did not include in the MCR steelhead ESU (NMFS 2004a), or stray individuals from other natural-spawning populations. The IC-TRT concluded that the area above Condit Dam may be essential for this species' recovery (NMFS 2005c).

Over the past several years, few CR chum salmon have been observed in tributaries between The Dalles and Bonneville dams. Surveys of the White Salmon River in 2002 found one male and one female carcass and the latter had not spawned (Ehlke and Keller 2003). Chum salmon were not observed in any of the upper gorge tributaries, including the White Salmon River, during the 2003 and 2004 spawning ground surveys (PSMFC 2005, Keller 2004). Radio-tracking studies show that adult chum tagged at Bonneville Dam were near the confluence of the White Salmon, but did not necessarily enter the river and did not stay in the area. Based on the carcasses found in 2002, the WLC-TRT determined that the White Salmon River is "occupied" and has stated that it may be the only extant population within the historical range of the Upper Columbia Gorge Major Population Group. The WLC-TRT also stated that the unoccupied area above Condit Dam may be essential for the recovery of this ESU (NMFS 2005b).

There is little historical information on coho salmon in the White Salmon River. The construction of Condit Dam in 1913 eliminated anadromous access to the majority of the basin (Fulton 1968, cited in Meyers et al. 2006). Stream surveys conducted in the 1950s suggested that suitable coho salmon spawning habitat existed in Rattlesnake, Buck, and Trout Lake creeks, but because of low summer and early autumn flow, only late run (Type N) coho salmon would be suitable (LeMeir and Smith 1955, cited in Meyers et al. 2006). LeMeir and Smith (1955, cited in Meyers et al. 2006) also estimated that the existing habitat could support about 200 coho salmon.

In addition, some individual adult salmon and steelhead from the upriver species (SR sockeye salmon, SR spring/summer Chinook salmon, SR fall Chinook salmon, SR steelhead, UCR spring Chinook salmon, and UCR steelhead) may use the lower reach of the White Salmon River as a thermal refuge for short periods of time. However, based on adult radio-telemetry information (Bjornn et al. 2000, Keefer et al. 2002, Ferguson et al. 2004), migrants originating from further inland are not expected to remain within this portion of the action area for more than a few days or weeks.

4.1.1.2 Factors Affecting the Status of Populations in the White Salmon River

Since its construction in 1913, the Condit Project has affected LCR Chinook salmon, MCR steelhead, CR chum salmon, and LCR coho salmon by: (1) Blocking access to spawning and rearing habitat upstream of the Project (up to 33 miles of additional habitat, which was used to varying degrees by each species) , (2) altering flows and temperatures downstream, especially in the 1.1-mile bypass reach, (3) reducing or eliminating the transport of spawning-sized gravels and cobbles, and (4) reducing or eliminating the transport of large woody debris downstream of the Project. These impacts have reduced the abundance, population growth rate, spatial structure, and diversity of the listed species.

4.1.2 Lower Columbia River

4.1.2.1 Status of Populations in the Lower Columbia River

Adult SR spring/summer run Chinook salmon migrate through the Lower Columbia River from March through July (spring run from March through May and summer run May through July). Upper Columbia River spring run, LCR (spring run), and UWR Chinook salmon typically migrate through the Lower Columbia River March through May; SR and LCR fall run Chinook populations migrate August through mid-November. Adult UWR steelhead migrate upstream during March and April. Adult LCR steelhead migrate predominately April through November with median passage in the later part of June and July. Adult UCR, SR, and MCR summer steelhead are in this portion of the action area April through November and adult SR sockeye salmon June through July. Adult LCR coho salmon migrate through the Lower Columbia River September through November. Adult CR chum salmon migrate in the Lower Columbia River mid-October through December (Busby et al. 1996, Johnson et al.1997, and Meyers et al. 1998).

Juvenile SR spring/summer Chinook salmon, UCR spring run Chinook salmon, UWR Chinook salmon, LCR Chinooks salmon (spring run), SR steelhead, UCR steelhead, MCR steelhead, LCR steelhead, and SR sockeye salmon primarily migrate through the Lower Columbia River (as yearling fish) between mid-April and mid-June. Subyearling SR and LCR fall Chinook salmon are present primarily between mid-June and late August. Juvenile LCR coho salmon migrate to the ocean from mid-April through the end of May, and juvenile CR chum salmon migrate between February and May.

4.1.2.2 Factors in the Lower Columbia River Affecting the Status of Populations

Passage Survival at Bonneville Dam

All adults from the upriver species and some adult CR chum and LCR Chinook salmon must pass one of the FCRPS Dams (i.e., Bonneville Dam) as they transit the action area. The estimated survival rates of adult spring and fall run Chinook are 96.5 percent and 98.0 percent, respectively; steelhead survival rate is 97.7 percent (Table 6.5 in NMFS 2004b). The survival rate of adult chum salmon passing Bonneville Dam has not been estimated.

All juveniles from the upriver species, and some juvenile CR chum and LCR Chinook salmon must pass Bonneville Dam as they transit the action area. The estimated survival rates of yearling and subyearling Chinook are 90.0 percent (range: 85.5 percent to 93.5 percent) and 86.0 percent (76.7 percent to 97.2 percent), respectively; steelhead survival rate is 83.8 percent (61.1 percent to 95.4 percent) (Table 6.5 in NMFS 2004a). The survival rate of juvenile chum salmon passing Bonneville Dam has not been estimated.

Habitat in the Lower Columbia River and Estuary

The Lower Columbia River and estuary habitats have been affected over the past 60 years by the series of mainstem Columbia and Snake river hydro system reservoirs and by the operation of multipurpose storage projects farther upstream (Fresh et al. 2005). Spawning habitat used historically by LCR Chinook, CR chum salmon, and LCR steelhead was probably inundated by the Bonneville pool, and the mainstem habitats of the Lower Columbia River have been reduced primarily to a single channel. Floodplains have been reduced, off-channel habitat features have been eliminated or disconnected from the main channel, and the amount of large woody debris in the mainstem has been greatly reduced. Finally, most of the remaining habitats are affected by flow fluctuations associated with reservoir water management for power peaking, flood control, irrigation, and other operations.

Model studies indicate that the hydro system and climate change together have decreased suspended particulate matter to the lower river and estuary by about 40 percent (as measured at Vancouver, Washington) and have reduced fine sediment transport by 50 percent or more (Bottom et al. 2001). Overbank flow events, important to habitat diversity, have become rare in part because flow management and irrigation withdrawals prevent high flows and in part because diking and revetments have increased the “bank full” flow level. The dynamics of estuarine habitat have changed in other ways relative to flow. The availability of shallow (between 4 inches and 6 feet depth), low-velocity (less than 1 foot per second) habitat (used by the smallest juvenile salmon) now appears to decrease at a steeper rate with increasing flow than during the 1880s, and the absorption capacity of the estuary appears to have declined.

The significance of these changes for salmonids is unclear. Estuarine habitat is likely to provide services (food and refuge from predators) to subyearling migrants that reside in estuaries for up to 2 months or more (Casillas 1999). Historical data from Rich (1920) indicate that small juvenile salmon (< 50 mm), which entered the Columbia River estuary during May, grew 50 to 100 millimeters during June, July, and August. Data from a more contemporary period (Dawley et al. 1986; CREDDP 1980) show neither small juveniles entering the estuary in May nor growth over the summer season.

Mainstem Harvest Rates

Treaty Indian fishing rights are included in the environmental baseline for this consultation as described in NMFS (2004b). In any particular year, the parties in U.S. v. Oregon seek to quantify the Tribal right and associated non-Tribal fishing, subject to ESA-imposed constraints for the listed species. As of August 2004, there were two interim Court-approved settlement agreements in place in U.S. v. Oregon: the 2001 Spring Agreement, which will continue to set harvest rates through spring of 2005, and the 2004 Fall Agreement, which will remain in effect through December 2004. Agreed-to and estimated harvest rates for various stocks under these current agreements are set forth in Tables 4-1and 4-2. For the purpose of projecting the environmental baseline into the future, the tribal treaty right must be included as indicated. In terms of the analysis in the Opinion, it does not matter whether the tribes harvest all of the harvest available to them or, as has been the practice, allocate a portion of that harvest to the states. In order to estimate the extent of this baseline harvest, NMFS will presume that treaty and non-treaty harvest rates comparable to the current harvest rates will continue into the future pursuant to Court-approved settlement agreements. In addition, the Colville Confederated Tribes have consulted with NMFS on their fisheries and that Biological Opinion remains in effect through October 2012.

Table 4-1. Expected harvest rates for listed salmonids in winter, spring, and summer season fisheries in the mainstem Columbia River under the 2001 - 2005 Spring Agreement in U.S. v Oregon. NA - similar estimates not available for other areas (Table modified from NMFS 2004c).

ESU	Non-Indian Fisheries	Treaty Indian Fisheries
Snake River fall Chinook	0	0
Snake River spring/summer Chinook	<0.5-2.0%[a]	5.0-15.0%[a]
Upper Columbia River spring Chinook	<0.5-2.0%[a]	5.0-15.0%[a]
Lower Columbia River Chinook	2.7%[b]	0
Upper Willamette River Chinook	<15%[d]	0
Snake River steelhead		
A-run	0.2%	2.7%[f]
B-run	0	0[f]
Upper Columbia River steelhead		
Natural-origin	0.6%	3.8%
Hatchery-origin	4.5%	2.7%
Mid-Columbia River steelhead	<2.0%[g]	3.6%
Lower Columbia River steelhead	<2.0%[g]	1.6%
Upper Willamette River steelhead	<2.0%[g]	0
Lower Columbia River coho	0	0
Columbia River chum	0	0
Snake River sockeye	<1.0%	<7.0%

[a] Allowable harvest rate varies depending on run size.
[b] Spring component of the Lower Columbia River ESU only.
[c] Impacts in tributary fisheries will be population specific depending on where the fisheries occur.
[d] Harvest rate limited to 15 percent or less in all non-Indian mainstem and tributary fisheries.
[e] Maximum harvest rate applied to wild fish passing through terminal fishery areas where hatchery fish are being targeted; hooking mortality of five percent applied to an assumed 50 percent encounter rate. Harvest rates to stocks not passing through targeted terminal fishing areas will be less.
[f] B-run steelhead of the current return year are primarily caught in fall season fisheries. However, a portion of the summer steelhead run holds over in the Lower Columbia River above Bonneville dam until the following winter and spring; these fish, thought to be mostly A-run, are caught in fisheries in those seasons.
[g] Harvest rate limits for winter run populations.
[h] Chum may be taken occasionally in tributary fisheries below Bonneville Dam. Retention is prohibited.

Table 4-2. Expected harvest rates for listed salmonids in fall season fisheries in the mainstem Columbia River under the 2004 Fall Agreement in U.S. v Oregon (Table modified from NMFS 2004c)

ESU	**Non-Indian Fisheries**	**Treaty Indian Fisheries**
Snake River fall Chinook	8.25%	23.04%
Snake River spring/summer Chinook	0	0
Upper Columbia River spring Chinook	0	0
Lower Columbia River Chinook		
Spring component	0	0
Tule component	12.4%	0
Bright component	11.8%	0
Upper Willamette River Chinook	0	0
Snake River steelhead		
A-run	≤2% (1.1%)[a]	3.4%
B-run	≤2% (1.7%)[a]	15% (13.6%)[a]
Upper Columbia River steelhead		
Natural-origin	≤2% (1.1%)[a]	3.4%
Hatchery-origin	10.9%	5.7%
Mid-Columbia River steelhead	≤2% (1.1%)[a]	3.4%
Lower Columbia River steelhead	≤2% (0.3)[a]	0.1
Upper Willamette River steelhead	0	0
Lower Columbia River coho	6.4%	0
Columbia River chum	5% (1.6%)[a]	0
Snake River sockeye	B	b

[a] Maximum proposed harvest rates with the expected harvest rates associated with the proposed fisheries shown in parenthesis.
[b] 8 percent cap (combined Tribal and non-Tribal harvest)

Artificial Propagation Programs

For more than 100 years, hatcheries in the Pacific Northwest have been used primarily to produce fish for harvest and to replace natural production lost to dam construction and other development. They have been used only minimally to protect and rebuild naturally produced salmonid populations (e.g., Redfish Lake sockeye). As a result, a large proportion of salmonids returning to the region are first-generation hatchery-origin fish. For example, in 1987 95 percent of the coho salmon, 70 percent of the spring Chinook salmon, 80 percent of the summer Chinook salmon, 50 percent of the fall Chinook salmon, and 70 percent of the steelhead returning to the Columbia River Basin (and occupying during both juvenile and adult migrations the portion of the mainstem Lower Columbia River that is in the action area for this consultation) originated in hatcheries (CBFWA 1990). Because hatcheries have traditionally focused on providing fish for harvest, it is only recently that substantial adverse effects of hatcheries on natural populations have been demonstrated. For example, hatchery practices, among other factors, have contributed to the 90 percent reduction in natural coho salmon runs in the Lower Columbia River over the past 30 years (Flagg et al. 1995).

NMFS has identified four primary harmful effects produced by hatcheries that can harm natural-origin salmon and steelhead: ecological effects, genetic effects, over-harvest effects, and masking effects (Appendix F in NMFS 2004d). Ecologically, hatchery-origin fish can prey on, displace, and compete with natural fish. These effects are most likely to occur when hatchery-reared juveniles are released in poor condition and remain in the streams for extended rearing periods rather than migrating to marine waters. Hatchery-origin fish also may transmit hatchery-borne diseases, and hatcheries themselves may release disease-carrying effluent into streams. Hatchery-origin fish can affect the genetic variability of native fish by interbreeding with them. Outbreeding depression can also result from the introduction of stocks from other areas. Genetic interactions like these can result in fish being less adapted to the local habitats where the original native stock developed and may therefore be less productive there.

In many areas, hatchery-origin fish provide increased fishing opportunities. However, when natural fish mix with hatchery-origin fish in these areas, the naturally-produced fish can be over-harvested. Moreover, when migrating adult hatchery and natural fish mix on the spawning grounds the health of the natural runs and the habitat's ability to support them can be overestimated because the hatchery fish mask the actual natural run status from the surveyors' observations.

The role hatcheries play in the Lower Columbia River has been redefined by NMFS' hatchery listing policy, developing environmental impact statements, and recovery planning efforts. These efforts focus on maintaining and improving ESU viability. Research designed to clarify interactions between natural and hatchery fish and to quantify the effects of artificial propagation on natural fish will play a pivotal role in informing these efforts. The final facet of these initiatives is to use hatcheries to create fishing opportunities that are benign to listed populations (e.g., terminal area fisheries).

4.1.3 Summary: Status of Populations in the Action Area

For the threatened and endangered ESUs that occur within the action area, the environmental baseline, as described above, does not currently meet biological requirements within the action area. Maintenance or further long-term degradation of the existing conditions within the action area would contribute to the long-term declining trend of the ESA-listed species and thus would continue to increase the high risk of extinction on which the listings were based. Measures must be taken within the action area to avoid or minimize the ongoing impacts and to improve conditions whereby the listed species will continue to exist in the future while retaining the potential for recovery.

4.2 Status of Primary Constituent Elements of Designated Critical Habitat within the Action Area

The extent, nature, and conservation value of the PCEs of the critical habitat that has been designated for each ESU are discussed in Section 3.4. In the following sections, NMFS identifies and discusses the status of the PCEs that are within the action area for this consultation.

4.2.1 White Salmon River

4.2.1.1 Primary Constituent Elements of Critical Habitat within the White Salmon River

NMFS determined that the following occupied areas of the Middle Columbia/Hood Sub-basin Unit of critical habitat contain PCEs (as described below) for the LCR Chinook salmon ESU and MCR steelhead DPS (NMFS 2004c):

- LCR Chinook salmon -- starting just below Condit Dam and moving downstream, there are 2.8 miles of PCEs for spawning/rearing, 0.1 mile for rearing/migration, and 0.8 mile for migration/presence in the lower White Salmon River watershed; the conservation value of the designated areas is “high” (Appendix B in NMFS 2005c); 15.9 miles of unoccupied habitat above Condit Dam may be essential for the recovery of LCR Chinook salmon, but NMFS does not have enough information to warrant designation as critical habitat at this time.

- CR chum salmon -- 3.4 miles below Condit Dam have PCEs for migration/presence; the conservation value of the designated areas is “high” (Appendix F in NMFS 2005); 4.5 miles of unoccupied habitat above Condit Dam may be essential for conservation, but NMFS does not have enough information to warrant designation as critical habitat at this time.

- MCR steelhead -- 3.1 miles below Condit Dam have PCEs for spawning/rearing, and 1.9 miles have PCEs for migration/presence; the conservation value of the designated areas is “medium” (Appendix J in NMFS 2005c); 37.3 miles of unoccupied habitat above Condit Dam may be essential for the recovery of this ESU, but NMFS does not have enough information to warrant designation as critical habitat at this time

4.2.1.2 Factors Affecting the Status of Primary Constituent Elements of Critical Habitat within the White Salmon River

As discussed in Section 4.1.1.2, the Condit Project (1) blocks access to spawning and rearing habitat upstream of the Project, (2) alters flows and temperatures downstream, especially in the 1.1-mile bypass reach, (3) reduces or eliminates the transport of spawning-sized gravels and cobbles, and (4) and reduces or eliminates the transport of large woody debris downstream of the Project.

Peak summer temperatures within Northwestern Lake and in the bypass reach downstream of the dam are higher than the U.S. Environmental Protection Agency’s 60.8°F (16°C) guidance for “core” juvenile salmon rearing areas (EPA 2003).[5] Northwestern Lake stratifies during the summer, developing a thermocline ranging in depths of 3.3 to 16.5 feet. The highest temperature recorded in the reservoir’s epilimnion was 62.4°F. At depths greater than 16.5 feet, temperatures seldom exceeded 50°F (PacifiCorp 1991). The highest water temperature measured in the Project area was 62.8°F at the downstream end of the 1.1-mile bypass reach. The bypass reach also showed the greatest temperature increase (3.4°F) between stream reaches (between the dam and powerhouse tailrace) (PacifiCorp 1991). Dissolved oxygen levels within the Project area (reservoir, bypass reach, tailrace) ranged between 9.5 and 14.2 parts per million (ppm), and pH ranged between 7 and 8.

4.2.2 Lower Columbia River

4.2.2.1 Primary Constituent Elements of Critical Habitat within the Lower Columbia River

The Lower Columbia/Sandy Sub-basin Unit contains habitat in the mainstem Columbia River below Bonneville Dam that is used by CR chum salmon for spawning and was given a "high" conservation value (Appendix F in NMFS 2005c). In addition, NMFS described approximately 118 miles of occupied riverine and estuarine habitat in the Columbia River between the

[5] EPA (2003) provides guidance for temperature water quality standards in the Pacific Northwest. The criteria for specific life stages of salmon are expressed as maximum 7-day averages of the daily maximum temperatures.

confluence of the Sandy River (Oregon), the Washougal River (Washington), and the Pacific Ocean as having PCEs for rearing/migration for 12 of the listed species in the Columbia Basin. The conservation value of this mainstem juvenile rearing and juvenile and adult migration corridor is also "high" (NMFS 2005c).

4.2.2.2 Factors Affecting the Status of Primary Constituent Elements of Critical Habitat within the Lower Columbia River

The past and ongoing operation of Bonneville Dam and Reservoir has affected critical habitat designated for LCR Chinook salmon and CR chum salmon within the action area by inundating the lowermost portion of the White Salmon River and the mainstem Columbia River above Bonneville Dam. The past and ongoing operation of major Federal (including Bonneville Dam), non-Federal (FERC-licensed privately owned projects), and Canadian storage and hydroelectric projects in the Columbia River basin have together affected the environmental baseline within the action area by altering the hydrology (e.g., seasonal and daily flows), water quality (e.g., thermal regime and total dissolved gas levels), and biological community (e.g., predators) of the mainstem Columbia River portion of the action area for this consultation.

Federal Columbia River Power System

On November 30, 2004, the FCRPS Action Agencies and NMFS completed a new consultation on the continued operation and maintenance of FCRPS and 19 of the U.S. Bureau of Reclamation's (USBR) projects in the Columbia Basin with NMFS' issuance of a Biological Opinion (NMFS 2004b), followed by the Action Agency issuance of Records of Decision (Corps 2005, BPA 2005, USBR 2005). The District Court for Oregon subsequently found that the 2004 Opinion was legally flawed and remanded it to NMFS for correction but left the Opinion in place during the 1-year remand period. Until NMFS completes a new Biological Opinion (expected October 7, 2006), the effects of the FCRPS on critical habitat in the Lower Columbia River that are part of the environmental baseline for this consultation are best described in Sections 5 (existence and non-discretionary operations) and 6 (discretionary operations) in NMFS (2004b). In summary, in the mainstem Columbia River downstream from the confluence of the White Salmon River (section 4.1.2 .2), the FCRPS:

- Reduces passage survival.
- Increases the amount and type of habitat available to predators.
- Alters water quantity (reduces absolute flows and alters the seasonal hydrograph).
- Degrades water quality conditions (elevates temperatures and total dissolved gas levels).
- Reduces the availability of spawning habitat.

Upper Snake Basin Project
The existence and operation of the USBR's Upper Snake Basin projects reduce flows in the mainstem Columbia River by about 2.2 million acre-feet annually, primarily in the months of May and June (NMFS 2005e). As a result the frequency of involuntary spill at Bonneville Dam during spring may be reduced, which reduces exposure to toxic levels of total dissolved gas in high flow years (water quality in the migration corridor), but increases the likelihood of turbine passage (decreasing the passage survival rate of juvenile spring migrants) in low flow years. The decrease in the size of the spring freshet probably also reduces the quantity of shallow water rearing habitat in the estuary, but by a small to negligible amount.

Lake Chelan Hydroelectric Project
The Public Utility District No. 1 of Chelan County, Washington, owns and operates the Lake Chelan Hydroelectric Project. The Project stores water behind Lake Chelan Dam during spring, producing hydroelectric power upon release during fall and winter. The Lake Chelan Project operates under a 50-year license from FERC. The Project reduces flows in the mainstem Columbia River by about 1,200-2,500 cfs during the spring (April-June), increasing water quality (by reducing exposure to toxic levels of total dissolved gas) in the juvenile migration corridor during spring in high water years and reducing safe passage (by reducing the frequency of involuntary spill) in low water years (NMFS 2005f). The Project increases flows by about 1,100-1,600 cfs during fall and winter (October-January), increasing the quantity of spawning/incubation habitat available to chum salmon in the mainstem Columbia River below Bonneville Dam.

4.2.3 Summary: Status of Primary Constituent Elements of Critical Habitat in the Action Area

The Matrix of Pathways and Indicators of habitat quality lists the pathways (significant environmental features) and the indicators of whether those features are in a condition suitable for salmon conservation (i.e., recovery). The matrix can be divided into five pathways by which natural conditions and human activities affect habitat suitability:

- Water quality
- Water quantity
- Habitat elements
- Access/Barriers
- Channel dynamics

- Watershed condition

Each pathway is further broken down into indicators, which are generally of two types: (1) numerical metrics (e.g., six pools per stream mile) and (2) narrative descriptions. Tables 4-3 and 4-4 summarize the pathways and indicators within the White Salmon River and the Lower Columbia River below the confluence of the White Salmon. Many of the habitat indicators within the White Salmon portion of the action area are not in a condition suitable for salmon conservation. In most cases, this is a result of the past operation and the continuing effect of the existence of the Project or the downstream effects of land use activities (logging, livestock grazing, and agriculture) in tributaries above Condit Dam. Several of the habitat indicators within the Lower Columbia River portion of the action area also are not in a condition suitable for salmon conservation. This is primarily because of the past effects of the large federal, non-federal, and Canadian storage projects and ongoing future effects of the large federal projects described in Section 4.2.1.2.

Table 4-3. Matrix of Pathways and Indicators for critical habitat in the White Salmon River portion of the action area under the environmental baseline.

PCE	**Pathway**	**Indicator**	**Condition**	**Limiting Factors**
Freshwater spawning sites Freshwater rearing Freshwater migrations corridors	Water quality	Temperature	Summer/Fall temperatures in bypass reach below Condit Dam exceed 62.8^{o}F	Condit Dam
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Water quality	Sediment Turbidity	Elevated sediment loads/turbidity in tributary streams	Land use practices
Freshwater spawning sites	Habitat elements	Substrate	Lack of spawning gravel downstream of dam	Condit Dam
Freshwater rearing sites Freshwater migration corridors	Habitat elements	LWD Refugia	Low flows and lack of LWD downstream of dam	Condit Dam
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Channel morphology	Reduced peak flows and blocked sediment transport within and downstream of the Project	Condit Dam
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Streambank condition	Erosion in tributaries within and upstream of the Project	Land use practices
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Altered streamflows	Load rejection can temporarily reduce flows below powerhouse	Condit Dam

Table 4-4. Matrix of Pathways and Indicators for critical habitat in the mainstem Columbia River portion of the action area under the environmental baseline

PCE	**Pathway**	**Indicator**	**Condition**	**Limiting Factors**
Freshwater spawning sites Freshwater rearing Freshwater migrations corridors	Water quality	Temperatur e	Summer/Fall temperatures in Lower Columbia River	FCRPS and USBR operations
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Water quality	Total dissolved gas	Cannot exceed 120% criterion (with waiver)	FCRPS
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Access	Barriers	About 2% adult and 10% to 15% juvenile passage mortality	Bonnevill e Dam
Freshwater rearing sites	Habitat elements	LWD	Lack of LWD downstream of dam	Condit Dam
Freshwater rearing sites	Habitat elements	LWD	Reduced	FCRPS dams
Freshwater spawning sites	Channel dynamics	Altered streamflow	Reduces the availability of mainstem spawing habitat	FCRPS and USBR operations
Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Floodplains and offchannel features	Reduced	FCRPS and USBR operations
Freshwater rearing sites Freshwater migration corridors	Watershed conditions	Shallow, low velocity estuarine habitat	Reduced	FCRPS and USBR operations

4.3 Summary of the Environmental Baseline

The biological requirements of ESA-listed salmon and steelhead and the conservation value of their designated critical habitat in the action area appear not to be met under the environmental baseline. Current populations are greatly depressed from historical run sizes and critical habitat has become degraded. The effects of historical activities, including the past existence and operation of the Project, and of natural conditions, have all contributed to this condition. Maintenance or further degradation of the existing conditions within the action area would contribute to the long-term decline of the listed species.

5. ANALYSIS OF EFFECTS OF THE PROPOSED ACTION

5.1 Effects of the Proposed Action

Effects of the action are defined in 50 CFR §402.02 as "the direct and indirect effects of an action on the species, together with the effects of other activities that are interrelated or interdependent with the action that will be added to the environmental baseline." Direct effects occur at the Project site and may extend upstream or downstream based on the potential for impairing important habitat elements. Indirect effects are defined as "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." They include the effects of future activities on listed species that are induced by the proposed action and that occur after the action is completed. 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."

In Step 3 of its jeopardy approach, NMFS evaluates the effects of the proposed action on the environment, including the geographic distribution, nature, intensity, timing, frequency, and/or duration of the effect. The NMFS then looks at the effects of the action on individual fish and on primary constituent elements of critical habitat in the action area.

The effects of operating the Project through 2008 are discussed below in Section 5.2. The effects of activities related to dam removal are discussed throughout the remainder of this section and are summarized in Table 5-2 at the end of this section. Unless otherwise noted, the estimated effects of dam removal on the physical environment summarized below were obtained from FERC (1996 and 2002), R.W. Beck, Inc. (1998), G&G Associates (2003 and 2004), and PacifiCorp (2004).

5.2 Continued Project Operations through October 2008

Operating the Project as specified in the current FERC license through October 2008 would result in, from the date of this Opinion, an additional 2.5 years of the continuing effects of the past operation and existence of the Project. These effects have resulted in conditions that have contributed to the current degraded status of the listed populations within the White Salmon sub-basin. As described in Section 4, the Condit Project affects MCR steelhead, LCR Chinook salmon, LCR coho salmon, and CR chum salmon within this part of the action area by:

- Blocking access to roughly 33 miles of spawning and rearing habitat for MCR steelhead and about 14 miles of spawning and rearing habitat for spring run LCR Chinook salmon (WDOE 2005).

- Restricting these fish to less suitable spawning and rearing habitat below the dam for as long as it remains in place.

- Low flows (15 cfs or 1.5 percent of average annual flow) and elevated temperatures in the 1.1-mile bypass reach.

- Blocked transport of gravel, cobbles, and large woody debris.

The river is not supplied with sediment and large wood from upstream reaches. The channel bed downcuts, coarsens, and simplifies. The imbalance between supply and transport of these structural elements prevents the formation of pools, riffles, and gravels, which are important resting and spawning areas for adults and rearing habitat for juvenile out-migrants.

Based on the effects described above, NMFS expects that the continued operation of the Project for 2.5 years will continue its negative effects on habitat used by LCR Chinook salmon and MCR steelhead in the lower White Salmon River. This also negatively affects habitat that could be used by LCR coho and CR chum salmon. These effects will limit the abundance, productivity, and spatial structure of the White Salmon populations of the affected species and the conservation value of PCEs at the watershed scale.

A small number of adults from each of the upriver species (SR spring/summer Chinook, fall Chinook and sockeye salmon, SR steelhead, and UCR spring Chinook salmon and steelhead) may temporarily occupy the lower White Salmon during upstream or downstream migrations but will not be affected. Two of the lower Columbia basin species, UWR Chinook salmon and steelhead, do not enter this portion of the action area.

5.3 Dam Removal Activities August 2008 through August 2009

The removal of Condit Dam would occur in three distinct phases: preparation and mobilization, Project removal, and bank stabilization. The effects of these activities are described below. FERC has also proposed several measures to minimize or mitigate the effects of dam removal activities (see Section 2.3.3).

5.3.1 Phase I: Preparation and Mobilization, August 2008 through October 2008

Adult Fish Salvage

While the plan for salvaging adults is yet to be developed, a removable weir will be installed in the lower White Salmon River near the USFWS ponds to direct returning adult LCR Chinook salmon into the ponds where they would likely be held until spawned. This conservation measure will preserve that year-class of spawners and assure survival of the next generation. Adults that are collected will experience harassment but very little, if any, mortality is expected to occur. Adult LCR Chinook salmon that are not collected will probably spawn in the lower White Salmon River and subsequently perish. Most, if not all, spawning would occur before dam breaching and thus the redds will be smothered when the sediment is released.

The IC-TRT considers the native demographically independent population of MCR steelhead to have been extirpated from the White Salmon River (NMFS 2005c). Any remaining spawners are probably strays from the out-of-DPS Skamania Stock Summer Steelhead Program, which NMFS did not include in the MCR steelhead DPS (NMFS 2004a), or stray individuals from other natural-spawning populations (see Section 4.1.1). As such, it is unlikely that the origin of returning adult steelhead could be determined and properly collected. Therefore, this conservation measure for MCR steelhead is not likely to advance the viability of the species (see Section 10).

Access Road

Phase 1 requires that a road be constructed to gain access to the downstream side of the spillway to allow the drain tunnel to be excavated through the base of the concrete dam. These activities on the steep slopes could result in short-term erosion, allowing pulses of sediment to be carried into the bypass reach below the dam during storm events. The introduction of suspended sediment and turbidity into the White Salmon River due to construction of the access road can affect the listed species in both beneficial and negative ways. Elevated total suspended solids (TSS) and turbidity have been reported to enhance cover and reduce the predation rates of piscivorous fish and birds, improving survival (Gregory and Levings 1988). In systems with intense predation pressure, enhanced survival may balance the cost of detrimental physical effects (e.g., reduced growth). However, elevated TSS conditions have also been reported to cause physiological stress and to reduce growth. Of key importance in considering the detrimental effects of TSS on fish are TSS concentration and the frequency and duration of exposure.

PacifiCorp will implement standard Best Management Practices (BMPs) that include, but are not limited to: silt fencing; covering exposed slopes with geotextile fabric and newly constructed access roads with clean gravel, constructing and maintaining settling ponds where appropriate, revegetating exposed areas, and minimizing the amount of sediment entering the stream below the dam. Moreover, mobilization and staging will occur during the dry season which will further reduce the potential for erosion of newly exposed soils. The NMFS anticipates that few adult LCR Chinook salmon or MCR steelhead will be present immediately below the dam where these activities will occur and that salvage of adult LCR Chinook salmon will reduce the number of these individuals migrating into the bypass reach. The NMFS does not expect any juvenile LCR Chinook salmon to be present during this phase of operations. Juvenile steelhead may be present, but can move downstream to avoid the suspended sediment and turbidity. The NMFS does not anticipate that any LCR coho or CR chum will be present during this phase. Any ESA-listed steelhead or salmon adults from interior Columbia River Basin populations are less likely to be affected because they are less likely to be in the White Salmon River for extended periods of time (Ferguson 2004).

Hazardous Materials

PacifiCorp will implement a Spill Prevention and Containment Plan to minimize the potential of toxic materials entering the stream. Construction staging and refueling areas will be placed a minimum of 150 feet from the ordinary high water mark of any body of water. Berms or dikes will be placed around loading and unloading areas. Absorbent materials will be on sight and readily accessible. Minor spills could affect behavior and physiology of any individuals in the action area downstream of the incident. A large hazardous materials spill could result in mortality of any individual anadromous fish species present in the White Salmon River at the time a large spill occurs. However, the measures listed here and a host of other measures proposed in PacifiCorp (2004), along with any permit requirements will minimize, if not prevent, toxic materials from entering the stream. See proceeding paragraph regarding expected presence/absence of ESA-listed species.

Drain Tunnel

Excavation of the drain tunnel would be accomplished by drilling and blasting. Construction activities will likely limit fish presence near the dam. Shockwaves from the blast opening the tunnel for reservoir draining could kill or injure any adult and juvenile salmon or steelhead that are present immediately below the dam. Fish that are present in the bypass reach (especially close to the dam) will be killed by the high concentration of suspended sediment draining from the reservoir.

A crane will be used to haul broken concrete out of the bypassed stream channel below the dam. Some residual concrete would remain in the river channel after the final blast to breach the tunnel. The stream's pH could increase quickly to lethal levels (above 9) and then decrease to nominal levels (Squire Associates 1998). However, recalculation of this effect by WDOE (2005) showed that any spike would be diluted to below lethal levels in less than a minute and that pH would return to near normal levels within 15 minutes of breaching. However, fish that are present in the bypass reach after the tunnel is opened will likely be killed by the high concentration of suspended sediment rather than experience injury or mortality due to elevated pH.

Sediment events at this time would be relatively minor in magnitude and duration, and petroleum and hazardous substance spills would be greatly diluted (as would any sediment events), as would spikes in pH, upon entering the Columbia River. Thus the effects of sediment events or spills in the Columbia River would likely affect salmon or steelhead migrating through this portion of the action area to a much lesser degree, if at all, than those individuals found within the White Salmon River.

5.3.2 Phase II: Project Removal, October 2008 through August 2009

Phase II would begin with blasting open the remaining 15 feet of drain tunnel and draining Northwestern Lake. FERC has estimated that initial flow rates through the tunnel would be about 10,000 cfs, slightly less than the 50-year return flow of 12,000 cfs. This high rate of flow through the bottom of the dam is intended to cut through the unconsolidated lake sediments and sluice much of the reservoir sediments downstream as quickly as possible.

The rest of Phase II would focus on removal of the concrete dam, steel surge tank, wood-stave pipe, and steel and wood-stave penstocks and would include clean-up of the river channel and reclamation of the construction area. The removal of these structures would be completed about 10 months after the reservoir was drained. Demolition debris would include 30,000 cy of concrete, 6,000 cy of wood staves, and 400 tons of steel, which would be hauled to a nearby spoil disposal site and either recycled or buried.

PacifiCorp will construct pockets in the drain tunnel to create eddies where upstream migrating fish can rest. The original cofferdam used in the construction of Condit Dam is still in place and will be removed by May 2009 to ensure that anadromous fish can access historical spawning and rearing areas upstream of the Project.

Sediment and Turbidity

Roughly 2.4 million cy of clay, silt, sand, and gravel are trapped behind Condit Dam. It is expected that between 1.6 million cubic yards (mcy) and 2.2 mcy of sediment will erode in the first 6 months after breaching, but it could take up toone year for all of the sediment to move out of the reservoir (G&G Associates 2004). G&G Associates (2004) used several procedures to analyze erosion rates and volumes and determined that three separate processes covering three separate time spans will erode sediment from the reservoir after the dam is breached. The three processes are:

1. *Near Term Erosion - River Channel Formation*: Reservoir sediments (silt, sand, and gravel) will be eroded to form a new river channel over the course of about one year after the dam is breached. The reservoir is expected to empty in about 6 hours after the initial breach. The primary process by which sediment will exit the reservoir area will be through vertical erosion and embankment failure.

2. *Mid Term Sediment Erosion - Surface Erosion and Upland Conveyance Formation*: Surface erosion of the exposed banks after draining will occur primarily from rain and snow events, forming gullies and rills. This process will occur until vegetation is established on the banks and is predicted to occur 2 to 5 years.

3. *Long Term Sediment Erosion - Floodplain Formation*: Bank failures may occur during occasional high flow events (approximately once per decade), but will last for only a short period of time (hours or days) and the volume of sediment eroded will decrease over time. This process is expected to occur for over 20 to 30 years.

G & G Associates (2004) also described sediment behavior over time at four locations: (1) The White Salmon River below Condit Dam, (2) the Columbia River from the mouth of the White Salmon River to 3 miles downstream (mixing zone), (3) the Columbia River immediately upstream of Bonneville Dam, and (4) the Columbia River at Quincy, Oregon (RM 54).

Near Term Erosion - White Salmon River

As previously noted, it will take approximately 6 hours for the reservoir to drain. Total suspended solid concentrations in the White Salmon River throughout the first 24 hours after breaching will average about 150,000 ppm but could range from 100,000 ppm to 250,000 ppm. After breaching, the existing deep pool at the mouth of the White Salmon River, commonly referred to as the "In lieu" site[6], will rapidly fill and trap approximately 451,000 to 897,000 cy of silt and sand, depending on the elevation of the Bonneville Pool. That is, the lower the pool the less sediment will be trapped at the in lieu site (G&G Associates 2004).

TSS concentrations will begin to decline after the first day, but will remain high for the first 3 months following dam breaching. Estimated concentrations of TSS after the first week could range between 15,000 and 60,000 ppm, but the daily average is expected to be about 30,000 ppm. After the first month, TSS concentrations are expected to range between 4,000 and 12,000 ppm with the daily average anticipated to be about 6,000 ppm; and after 90 days the anticipated average daily TSS concentration will be roughly 3,000 ppm (range 1,000 to 6,000 ppm) (G&G Associates 2004).

From 90 days (about mid January) up to about 6 months (mid April), average daily TSS concentrations will decline sharply and are expected to range between 100 and 3,000 ppm. These levels are anticipated to occur intermittently for several days at a time due to bank failures and surface erosion events. From 6 months up to 1 year, the same range of TSS concentrations are expected to occur as a result of specific events but will not be sustained levels over time.

It is thought that the original coffer dam used to divert flow during construction of the Project is still in place. Removal of this dam will be necessary to allow fish access to historical habitat, and will take place as soon as possible but no later than May 2009. After removal, a spike in TSS will occur for about 1 day and is estimated to be about 25,000 ppm.

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[6]The pool formed by Bonneville Dam created a backwater at the mouth of the White Salmon River. This area is commonly referred to as the "In lieu" site because it was dedicated to Native Americans for use as an access site to the Columbia River in lieu of other sites that were inundated when Bonneville Dam was completed 1938.

Although adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediment that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991), expected levels of TSS in the White Salmon River during the initial flushing of the reservoir will be much higher and will likely kill any individuals of ESA-listed salmon and steelhead that do not escape to the Columbia River. Any redds that have been constructed will be smothered and all eggs suffocated. Due to the high likelihood of fish mortality, the 1999 Settlement Agreement stipulates a salvage operation for adult LCR Chinook salmon that occur in the White Salmon River prior to dam breaching. These fish would be trapped and moved to a hatchery for holding and spawning, thus preserving the next generation of spawners in the White Salmon River. FERC also proposes that a similar operation be conducted for steelhead. Thus, the effects from dam breaching on this species will largely be those associated with capture, transfer, holding, and spawning in the hatchery.

The listed LCR Chinook salmon that currently spawn in the White Salmon River are tule fall run, and employ an ocean-type life history wherein the juveniles migrate to the ocean during the early to mid-summer months in their first year of life, and do not overwinter in their natal streams. Thus, NMFS does not expect any juvenile LCR Chinook salmon to be present in the White Salmon River when the dam is breached. However, MCR juvenile steelhead typically spend 1 to 2 years in freshwater before migrating to the ocean, thus some juveniles could be present in the White Salmon River when the dam is breached and would likely be killed if they cannot escape to the Columbia River.

NMFS does not expect any adult CR chum salmon to be present in the White Salmon River as they return to the mouth of the Columbia River at about the same time as breaching (mid to late October) and do not enter upriver spawning tributaries until mid-November. Furthermore, the Washington Department of Fish and Wildlife (WDFW) has not observed CR chum during spawning surveys in the White Salmon River in recent years (see Section 4.1.1.1). Although also historically present, it is unknown if LCR coho salmon use the White Salmon River and NMFS believes that existing habitat does not support a viable population in this stream (see Section 4.1.1.1). Lastly, NMFS expects that very few, if any, individuals of listed species returning to interior Columbia Basin streams will be present in the White Salmon River when the dam is breached (Bjornn et al. 2000, Keefer et al. 2002, Ferguson et al. 2004). Upstream migrating steelhead would not be likely to seek thermal refuge (cooler water) in the White Salmon River because the ten year average (1996-2005) temperature of the Columbia River at Bonneville Dam in mid-October is about 60°F, which is within the tolerable range for salmon and steelhead.

MCR steelhead, which are summer run fish, typically overwinter in tributary streams but may hold in the Columbia River until they are ready to spawn (NPCC 2004). The NMFS anticipates that MCR steelhead will avoid the White Salmon River until at least mid January when it is estimated that TSS concentrations will begin to decline rapidly. Depending on when the cofferdam is removed, these fish may not have timely access to spawning areas. The NMFS expects that adults will either seek other Columbia River tributaries, or may attempt to spawn in the lower White Salmon River. Any spawning in the lower White Salmon River will likely fail due to the amount of sediment still moving through the system. Any adults present when the cofferdam is breached may be killed if not able to return back to the Columbia River. If it is possible to remove the cofferdam in late winter, then steelhead could access areas above the Project.

LCR Chinook salmon returning the following September (2009) will be able to seek spawning areas upstream of the Project. However, most of their historical spawning habitat is located in the lower 3 miles of the river which will be inundated by reservoir sediment. TSS concentrations will be at tolerable levels but adults may experience physiological stress, increased maintenance energy requirements, respiratory impairment, and possibly gill damage (Herbert and Merkens 1961, Redding et al. 1987, Lloyd et al. 1987, Servizi and Martens 1991) resulting from short term spikes in TSS.

Near Term Erosion - Columbia River

Near term erosion will take place during the first year after breaching. The initial pulse of TSS will take approximately 48 hours to reach Bonneville Dam and an additional 50 hours to reach the Pacific Ocean. Settling in the Bonneville Pool and dilution from tributaries in the Columbia River will further decrease TSS levels as the sediment plume moves downstream. Within the first few hours of TSS reaching the Columbia River, concentrations in the mixing zone (Columbia River 3 miles downstream from the mouth of the White Salmon River) will range between 2,333 to 5,833 ppm, but are expected to average approximately 3,500 ppm. The sediment plume will move along the right bank (Washington shoreline) of the Columbia River for at least the first 3 miles. As the initial plume moves downstream, TSS at Bonneville Dam could range between 1,100 and 2,630 ppm but is estimated to average about 1,580 ppm. As the initial plume continues to move downstream, the TSS concentration is anticipated to be about 1,316 ppm (range between 917 and 2,192 ppm) at Quincy, Oregon (RM 54). Solids that are in suspension past Bonneville Dam will consist of clay and remain in suspension to the Pacific Ocean. These TSS estimates are expected to last less than 1 day (G&G Associates 2004).

After the reservoir is drained (about 6 hours), conditions in the Columbia River will greatly improve because the flow from the White Salmon River will be in much smaller proportion to the Columbia River flow. Thus, while the TSS concentration in the White Salmon River will remain high, the rate at which suspended solids enter the Columbia River will be greatly reduced and therefore they will be much more dilute. Within the first day, average TSS concentrations are anticipated to drop from an average of 3,500 ppm to 294 ppm in the mixing zone, and from an average of 1,580 ppm to 156 ppm at Bonneville Dam. This TSS concentration will be diluted further by water from Columbia River tributaries as it moves downstream and is therefore expected to average about 130 ppm at Quincy, Oregon.

A week after the dam is breached, average daily TSS concentrations would be approximately 16 ppm in the mixing zone, 8 ppm at Bonneville Dam, and 6 ppm at Quincy. At 30 days, TSS concentrations are expected to be about 3 ppm in the mixing zone, 1 ppm at Bonneville Dam and 1 ppm at Quincy. Finally, 90 days after breaching, TSS concentrations are expected to be about 2 ppm in the mixing zone, 1 ppm at Bonneville Dam and 1 ppm at Quincy. These concentrations will continue for up to 1 year after breaching. Upon removal of the cofferdam, a short term (< 1 day) spike in TSS of about 250 ppm will occur in the mixing zone.

Based on their passage timing at Bonneville Dam, NMFS finds that the following listed species are not likely to be affected by TSS concentrations in the mainstem Columbia River during the first year after breaching Condit Dam: UCR spring run Chinook salmon, SR spring/summer Chinook and sockeye salmon, and UWR spring run Chinook salmon and steelhead. UCR and UWR spring run Chinook salmon, SR spring/summer Chinook salmon, and SR sockeye salmon adults complete their upstream migration well before dam breaching. Their respective juvenile migrations occur in the spring, about 6 months after breaching, when TSS concentrations in the Columbia River are expected to return to background levels.[7] A few individual adult UWR steelhead may be present in the Lower Columbia River as early as November or December following breaching but TSS contributions to this reach of river will be negligible by that time and thus should not affect this species.

A small number of adult LCR Chinook and coho salmon, SR fall Chinook salmon, and LCR, MCR, SR, and UCR steelhead could be present in the Columbia River at the time the dam is breached. Based on 10-year (1996-2005) average of passage counts at Bonneville Dam, about 99 percent of adult Chinook salmon (all runs), 98 percent of adult steelhead, and 90 percent of coho salmon will have passed Bonneville Dam by mid-October (DART 2006) or before Condit Dam will be breached. Any adult LCR Chinook salmon returning to the Little White Salmon and Wind rivers, about 5 miles and 14 miles, respectively, downstream from the mouth of the White Salmon River on the Washington shore will likely have entered these rivers before the sediment plume reaches their mouths. Juveniles from these populations migrate in the spring and summer and thus will have left the area before the dam is breached. However, it is possible that a few juvenile MCR and LCR steelhead may be rearing in the Columbia River downstream from its confluence with the White Salmon River during the critical period. CR chum salmon return to the mouth of the Columbia River during mid to late October, about the time the dam will be breached. By the time this species reaches Bonneville Dam, concentrations of TSS will have declined to 1 ppm or less.

[7] G&G Associates (2004) reports that data from U.S. Geological Survey gauges located on the Columbia River downstream from the mouth of the White Salmon River at Warrendale (RM 142) and at Quincy (RM 51), Oregon, show that TSS concentrations range from 1 to 360 ppm and averages about 25 ppm.

Species that are present in the mainstem Columbia below the confluence of the White Salmon River during the hours when the highest concentrations of TSS occur will likely be able to avoid the plume by moving away from the mixing zone. Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay et al. 1984 and 1987, Sigler et al. 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991), and avoidance of turbid waters is one of the most important effects of suspended sediments (DeVore et al. 1980, Birtwell et al. 1984, Scannell 1988). Individual salmon and steelhead that cannot avoid the sediment plume during the first 24 hours following dam breaching could experience physiological stress, increase maintenance energy, reduced feeding and growth (juveniles), respiratory impairment, and possibly gill damage (Herbert and Merkens 1961, Redding et al. 1987, Lloyd et al. 1987, Servizi and Martens 1991). The peak TSS concentration is anticipated to last for less than a day in the Columbia River. Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). The exposure to the highest concentrations of TSS in the Columbia River will be short-lived and affect a very small portion of the listed populations.

Mid and Long Term Erosion - White Salmon River

Mid term erosion is that which takes place during the period from 1 to 5 years after breaching. Sediment input during this time period will be primarily due to upland contour formation (runoff from rain and snow) and floodplain formation (extreme high water events). The primary source of reservoir sediment erosion over the long term (> 5 years) will result primarily from floodplain formation processes. TSS contributions to the White Salmon River from upland contour formation are anticipated to range from 7 to 158 ppm and will occur for less than 1one day over a period of roughly 5 years. After 5 years, the TSS resulting from this process will likely be negligible. TSS contributions from floodplain formation during the 1 to 5 year period after breaching may range from 1,000 ppm to 6,000 ppm and would occur for less than 1 day on an infrequent basis. After 5 years, TSS contributions from floodplain formation are anticipated to decline to possible peaks of about 1,000 ppm and would occur for less than 1 day per storm event and likely only once per year (G&G Associates 2004).

During this period, TSS levels occurring in the White Salmon River will not preclude fish movement into the stream and are not expected to be lethal. Short term spikes of TSS are expected to occur from storm and flood events and are anticipated to last less than 1 day. Thus, adult and juvenile fish would likely experience similar stresses as previously described for Near Term Erosion in the Columbia River. That is, fish will avoid turbid water if possible and may experience physiological stress, increased maintenance energy, respiratory impairment, and possibly gill damage. Fish will be able to move upstream of the heaviest concentrations of TSS or move back down to the Columbia River until TSS returns to background levels.

Mid and Long Term Erosion - Columbia River

Sediment input during this time period will be primarily due to upland contour formation (runoff from rain and snow) and floodplain formation (extreme high water events). The primary source of reservoir sediment erosion over the long term (>5 years) will result primarily from floodplain formation processes. TSS contributions to the Columbia River from upland contour formation are expected to be negligible (zero to 1.1 ppm) after 1 year. After 5 years, TSS resulting from this process will likely be unmeasurable. TSS contributions to the Columbia River from floodplain formation during the 1 to 5 year period after breaching may range from 7 to 40 ppm in the mixing zone, 3 to 18 ppm at Bonneville Dam, and 3 to 15 ppm at Quincy, Oregon. These levels are anticipated to occur for less than 1 day on an infrequent basis. After 5 years, TSS contributions from floodplain formation are anticipated to decline to possible peaks of about eight ppm and would occur for less than 1 day per storm event and likely only once per year (G&G Associates 2004). Contributions of TSS to the Columbia River as a result of these processes are expected to have negligible impacts on listed species in the Columbia River as these events will be infrequent, short lived, and minor in magnitude compared to background.

Hazardous Materials

Few, if any, juvenile or adult salmon or steelhead are likely to be present within the lower White Salmon River between November and May 2009. In the event of a petroleum or hazardous substance spill resulting from Project removal activities, effects would be similar to those described in Section 5.3.1. That is, if this were to occur, only a small number of individuals would be affected and these would likely experience non-lethal exposures of relatively short duration.

Toxic Metals, Pesticides, and Herbicides

Erosion of sediments resulting from the draining of Northwestern Lake could mobilize toxic metals, pesticides, and herbicides. Chromium, copper, zinc, nickel, and mercury are commonly found in the reservoir sediments at concentrations at or a little above expected background concentrations. Lead and cadmium have been detected in only a few samples from Northwestern Lake and at relatively low concentrations. Pesticides and herbicides are not widespread in the reservoir sediments. However, where present, they are found in relatively high concentrations (FERC 1996 and 2002). FERC has concluded that flushing of the reservoir sediments and deposition downstream would not likely increase already existing concentrations of toxic metals, pesticides, or herbicides in the lower White Salmon River and the Columbia River. This is due primarily to the expected dilution of these substances resulting from initial high flows and sediment movement associated with the draining of Northwestern Lake.

Fish Passage and Connectivity

Following the construction of pockets in the drain tunnel and removal of the cofferdams by May 2009, LCR Chinook salmon and MCR steelhead[8] would regain free and unrestricted access to about 14 miles and 33 miles of historical habitat, respectively, that was blocked by the Project in 1913 (WDOE 2005).[9] In addition, the opportunity for metapopulation dynamics between the fish recolonizing the White Salmon River and related populations in adjacent river basins will be strengthened as a result of this action. NMFS concludes that restoring fish passage would likely substantially improve conditions for LCR Chinook salmon and MCR steelhead relative to the past operational and existence effects of the Project, which have contributed to the degraded current status of these species. The same would also be true for CR chum salmon and LCR coho salmon should they either volitionally recolonize or be intentionally reintroduced into the White Salmon River.

Water Quality, Quantity, and Timing

Following the draining of the reservoir, flows would be unregulated within the Project boundary and the downstream action area to the Bonneville pool. The NMFS expects that the restoration of unregulated flows will benefit the ESA-listed fish residing in the White Salmon River in several ways. First, by increasing summer flows in the bypass reach, temperatures will be restored to the cooler conditions needed by rearing MCR steelhead and LCR Chinook salmon juveniles (and potentially CR chum salmon and LCR coho salmon juveniles in the future). Second, unregulated flows (due to the removal of the Project) are expected to restore the transport of sediment and large woody debris through the Project boundary and lower White Salmon River. The restoration of these natural processes is expected to enhance conditions for holding and rearing within the White Salmon River (from the currently inundated segment downstream to its confluence with the Columbia River). Third, restoration of unregulated flows will enhance riparian function within this portion of the action area, which will also benefit habitat quality.

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[8] Though not observed spawning or rearing in the White Salmon River in recent years, LCR coho salmon and CR chum salmon (to the extent that suitable habitat for these species exists upstream of the dam) could also access historical habitat after May 2009.

[9] Because deltas have formed at the mouths of tributaries entering Northwestern Lake, historically available habitat in these streams may not be restored until PacifiCorp has completed its bank stabilization and sediment erosion mitigation efforts. These efforts should be completed by August 2009, in time for the spawning period of LCR fall Chinook salmon.

5.3.3 Phase III: Bank Stabilization and Wetland Protection Activities (After October 2008)

FERC has reviewed PacifiCorp's proposal to revegetate reservoir areas after the Project is removed. In addition, FERC would require PacifiCorp to (1) develop, and upon FERC approval, implement a post reservoir-dewatering assessment to stabilize the reservoir area (including revegetation, grading, sediment removal, and timber and debris removal) and (2) develop a final wetland creation/riparian revegetation and monitoring plan based on the results of the post reservoir-dewatering assessment, for implementation upon FERC approval. These plans have already been developed and will be implemented concurrently with Project removal activities. Based upon the effectiveness of initial efforts, these bank stabilization and wetland restoration activities could continue for many months after the Project had been completely removed in August 2009.

The first measure would likely minimize, to the extent practicable, the potential for erosion and for the colonization of noxious weeds within the former reservoir bed. It would also help establish locally adapted and therefore sustainable plant communities capable of providing ecological services and promoting watershed health. This should benefit MCR steelhead and LCR Chinook salmon (and potentially CR chum salmon and LCR coho salmon in the future) by shortening the period for stabilization and recovery of adjacent riparian areas that are affected by dam removal. When the natural processes in these areas have been restored, the intermittent inputs of materials that elevate turbidity and suspended sediment concentrations, described above, will cease to affect individuals that enter the White Salmon River.

The second measure would likely enlarge the acreage and enhance the value of wetlands available to fish recolonizing historical spawning and rearing areas upstream of Condit Dam. For example, at present, 5.7 acres of wetlands have been identified at Northwestern Lake. Of these, 3.8 acres are lake fringe wetlands maintained by the operation of Condit Dam. About 3.2 acres (84 percent) of these lake fringe wetlands are dominated by reed canary grass and yellow-flag iris (both are listed as Class C Weeds by the State of Washington) classified as having low function. The remaining wetlands (1.9 acres) are associated with major streams or spring-fed seeps that are independent of the reservoir. These wetlands are dominated by native red alder or western red cedar and classified as having higher function (PacifiCorp 2004). PacifiCorp has estimated that 3.8 acres of high function wetlands associated with tributary streams are likely to develop within the reservoir area following dam removal. Additional wetlands are likely to occur along the banks of the White Salmon River and from additional spring-fed seeps that are likely to reappear after the reservoir is drained. These wetlands are likely to be similar in assemblage and function to the currently identified stream and spring-fed seep wetlands. As wetlands can serve as important rearing habitat for juvenile salmon and steelhead, restoring these areas to properly functioning condition should also benefit MCR steelhead and LCR Chinook salmon (and potentially CR chum salmon and LCR coho salmon in the future).

5.4 Effects of the Proposed Action on Designated Critical Habitat

The White Salmon River below Condit Dam and the mainstem Columbia River have been designated as critical habitat. The PCEs identified in this portion of critical habitat include sites for spawning, rearing, and migration.

Spawning
Continued operation of the Project through October 2008 is expected to prevent gravel recruitment to the lower river and to maintain extremely low flows in the 1.1-mile bypass reach—average daily bypass reach flow of 15 cfs compared to average daily river flow of 1,005 cfs (Table 5-1). The latter limits the aerial extent of spawning habitat. Continued Project operations are not expected to affect spawning habitat in the Columbia River (Table 5-2).

The breaching of Condit Dam and subsequent draining of Northwestern Lake is expected to temporarily eliminate spawning in the lower river from inundation by reservoir sediments. Spawning habitat in the lower 3 miles of the White Salmon River will, initially, be negatively affected, but recovery is expected to begin within the first year. Higher velocity flows during the winter and spring months will redistribute bedload downstream, flushing fine sediment from the gravel and pools. It is difficult to estimate the time needed for this PCE to become functional again and it will largely depend on erosion rate, bank stability, and natural flows. The primary source of fine sediment after the first 6 to 12 months will be from the exposed banks in the reservoir during high flow events. Implementation of plans (Section 2.3.3) to stabilize the newly exposed banks will speed recovery of lower river spawning habitat. It is NMFS' Opinion that this PCE in the lower 3 miles of the river will become usable within 5 years after breaching, and possibly as soon as two years. The NMFS does not anticipate any impact on LCR Chinook salmon and CR chum salmon spawning habitat in the Columbia River. Sediment remaining in suspension past Bonneville Dam will be clay, and will remain in suspension to the Pacific Ocean (G&G Associates 2004). Therefore, no smothering of spawning gravels and existing redds is expected to occur in spawning grounds below Bonneville Dam. There is no spawning in the Mainstem Columbia River between the White Salmon River and Bonneville Dam.

Rearing
Continued operation of the Project through October 2008 is expected to keep the lower White Salmon River in a degraded condition by occluding large wood recruitment, and by maintaining extreme low flows in the 1.1-mile bypass reach—average daily bypass reach flow of 15 cfs compared to average daily river flow of 1,005 cfs—which significantly reduces the wetted perimeter of the steam channel is likely to increase water temperatures within the reach during

the summer months. Removing Condit Dam will restore these habitats and processes. Project operations are not expected to affect rearing habitat in the Columbia River.

Upon breaching, inundation by reservoir sediments in the lower White Salmon River will significantly retard rearing habitat by temporarily plugging the interstitial spaces between existing cobbles and gravel and degrading water quality. The smothering of cobbles and gravel will likely result in high mortality of anadromous fish prey species and significantly impact on their habitat. As with spawning habitat, rearing habitat should begin to recover within the first year after the reservoir is drained. Higher velocity flows will redistribute bedload downstream, flushing fine sediment from the gravel and cobble. The primary source of fine sediment after the first 6 to 12 months will be from the exposed banks in the reservoir and high flow events. Plans to flush and then stabilize newly exposed banks (Section 2.3.3) will significantly speed the recovery of these banks and thus reduce the rate of sediment contribution from precipitation runoff and mass wasting events. Anadromous fish are expected to use the lower river for rearing the following year, but it may take 2 to 5 years before prey species begin to recolonize this reach.

The value of rearing habitat in the mixing zone within the Columbia River will likely be reduced for up to one month following dam breaching due to reduced water quality from suspended sediments. The NMFS does not anticipate any significant impact to rearing habitat in the mixing zone or elsewhere in the Columbia River thereafter.

Migration

Until the dam is breached, the low flows in the 1.1-mile bypass reach will continue to affect juvenile and adult migration habitat by increasing summer water temperature, reducing pool volumes, and preventing the recruitment of large wood, which provides cover. After breaching, the value of migration habitat will be significantly reduced for up to 6 months due to high concentrations of TSS. After 6 months, TSS spikes resulting from storm events or bank failures will be shorter than 1 day in duration. Migration habitat within the mixing zone in the Columbia River will be affected for about 1 month due to elevated concentrations of suspended sediment. After 1 month, there will be intermittent, brief (up to 1 day) spikes in TSS and turbidity as described above for the lower White Salmon River. Downstream of the mixing zone, migration habitat will be affected by the initial pulse of sediment as it moves down river, with the effect lasting about 1 day.

Table 5-1. Matrix of Pathways and Indicators for the effects of the proposed action in White Salmon River portion of the action area.

PCE	**Pathway**	**Indicator**	**Effects of the Proposed Action**
Freshwater spawning sites Freshwater rearing Freshwater migrations corridors	Water quality	Temperatur e	*Continued Project operations (until Oct. 2008)* Max temps continue to exceed EPA's recommendation for spawning, egg incubation, and fry emergence and for core juvenile rearing areas, increasing the risk of disease *Dam removal (Oct. 2008 through Aug. 2009)* Unregulated flows and cooler natural temps will be restored once dam is breached
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Water quality	Suspended sediment and turbidity	*Continued Project operations (until Oct. 2008)* No effect. *Dam removal (Oct. 2008 through Aug. 2009)* Sediments released when dam is breached will kill juveniles and adults that do not escape to the Columbia River; degrade downstream spawning and rearing habitat (TSS and turbidity); unregulated freshets are expected to restore this habitat within 2-5 years; high TSS will degrade migration habitat for up to 6 months after breaching

Table 5-1. Continued

PCE	Pathway	Indicator	Effects of the Proposed Action
Freshwater spawning sites Freshwater rearing sites	Habitat elements	Substrate	*Continued Project operations (until Oct. 2008)* Condit Dam will continue to interrupt the supply of gravel and cobble from upstream, limiting amount of spawning habitat *Dam removal (Oct. 2008 through Aug. 2009)* Reservoir sediment released when dam is breached will plug interstices in gravel and cobble substrates; unregulated freshets are expected to restore this habitat within 2-5 years
Freshwater rearing sites Freshwater migration corridors	Habitat elements	LWD	*Continued Project operations (until Oct. 2008)* Condit Dam will continue to interrupt the supply of LWD from upstream, limiting cover and channel structure below the dam *Dam removal (Oct. 2008 through Aug. 2009)* Removing Condit Dam will restore the supply of LWD and the habitats it provides
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Altered streamflows and channel morphology	*Continued Project operations (until Oct. 2008)* Condit Dam will continue to reduce peak flows and block sediment transport within and downstream of the Project; the channel bed will continue to coarsen, downcut, and simplify *Dam removal (Oct. 2008 through Aug. 2009)* Removing Condit Dam will restore peak flows and sediment transport so that channel habitat features can re-form

Table 5-2. Matrix of Pathways and Indicators for the effects of the proposed action on critical habitat in the mainstem Columbia River portion of the action area.

PCE	**Pathway**	**Indicator**	**Effects of the Proposed Action**
Freshwater spawning sites Freshwater rearing Freshwater migrations corridors	Water quality	Temperature	No effect.
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Water quality	Total dissolved gas	No effect.
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Water quality	Suspended sediment and turbidity	*Continued Project operations (until Oct. 2008)* No effect. *Dam removal (Oct. 2008 through Aug. 2009)* Elevated TSS within the mixing zone for about 1 month, then intermittent and brief (< 1 day) due to sloughing of reservoir bank (may be associated with high runoff from rain or snow).
Freshwater spawning sites	Water quality	Suspended sediment and turbidity	No effect on mainstem sites below Bonneville Dam.
Freshwater spawning sites Freshwater rearing sites Freshwater migration corridors	Access	Barriers	No effect.

Table 5-2. Continued

PCE	Pathway	Indicator	Effects of the Proposed Action
Freshwater spawning sites	Habitat elements	Substrate	No effect.
Freshwater rearing sites	Habitat elements	LWD	No effect.
Freshwater rearing sites	Channel dynamics	Altered streamflow	No effect.
Freshwater rearing sites Freshwater migration corridors	Channel dynamics	Floodplains and offchannel features	No effect.
Freshwater rearing sites Freshwater migration corridors	Watershed conditions	Shallow, low velocity estuarine habitat	No effect.

5.5 Summary of Project Effects

Effects on Listed Species

NMFS finds that the dominant negative effect of the proposed dam removal will be the sudden release of large volumes of sediment into the lower White Salmon River and the mixing zone within the mainstem Columbia River when Northwestern Lake is drained in October 2008. Initial sediment releases would likely be lethal to any anadromous fish present (most likely LCR Chinook salmon) except for those that escape into the Columbia River (outside the mixing zone). Collecting LCR Chinook salmon for holding and subsequent spawning in a hatchery will preserve the next generation and significantly reduce mortality of this species. As previously stated, it is likely that most of the naturally spawning steelhead in the White Salmon River at this time are probably strays from the out-of-DPS Skamania Stock Summer Steelhead Program, which NMFS did not include in the MCR steelhead DPS. If the majority of steelhead currently spawning in the lower river were from the MCR DPS, NMFS would likely require the salvage of these fish as a means to minimize take. However, because salvage of an out-of-basin stock will not enhance the species' viability, and given the limited space in the White Salmon ponds for collecting and holding adults, it is more prudent to collect and spawn as many LCR Chinook salmon as practical and not implement this conservation measure for steelhead.

Neither adult nor juvenile UCR spring Chinook salmon, SR spring/summer Chinook salmon, or SR sockeye salmon are likely to be present in the lower White Salmon River when the dam is breached in October 2008. Any individuals that are present will be killed or will move back to the Columbia River to escape the large pulse of sediment. Both the juvenile and adult life stages of these species may encounter minor and very brief (up to 1 day) pulses of sediment in the Columbia River mixing zone during their upstream and downstream migration in the spring and early summer of 2009, and possibly 2010, released by storm runoff events in the White Salmon Basin. Some individuals may alter normal migration behavior by maneuvering to avoid a sediment plume, but this is not expected to result in injury or delayed migration. A small number of adults from the LCR Chinook and coho salmon ESUs, and LCR, MCR, SR, and UCR steelhead DPS' may be present in the Columbia River at the time the dam is breached. These individuals will avoid the sediment plume if possible, but may experience physiological effects such as stress, gill trauma, reduced osmoregulation function, and altered blood chemistry. The NMFS anticipates that neither adult nor juvenile UWR spring Chinook salmon and UWR steelhead will be affected by the proposed action. Neither species occupies the White Salmon River and neither their adult nor juvenile life stages are expected to be present in the Columbia River when the initial pulse of TSS passes the mouth of the Willamette River. After the initial pulse, TSS contributions to reaches below Bonneville Dam will be negligible.

Subsequent wasting events (reservoir sediments) could affect all of the ESA-listed species to some small degree (i.e., when individuals occupy the lower White Salmon River or the mixing zone of the mainstem Columbia River). However, these events are expected to be brief (<1 day) and the affects on individual fish would most likely be non-lethal and of short duration.

The proposed dam removal is expected to have many long-term benefits to MCR steelhead, LCR Chinook salmon, LCR coho salmon, and CR chum salmon. First among these is unimpeded access to approximately 14 miles of Chinook salmon and about 33 miles of steelhead habitat that has been blocked since the Project was constructed in 1913 (WDOE 2005). In addition, the restoration of unregulated flows through the lower White Salmon River should fully restore, over time, the spawning, rearing, and migration habitat to its full potential, and contribute to the recovery of MCR steelhead, LCR Chinook salmon, LCR coho salmon, and CR chum salmon.

Effects on Primary Constituent Elements of Critical Habitat

Spawning habitat will be severely degraded in the lower 3 miles of the White Salmon River for at least 2 years after dam breaching, but will begin to recover within the first year. While it is difficult to estimate the time needed for this PCE to become functional (i.e., fish successfully spawn), NMFS anticipates that spawning habitat will be functional in the lower river within 2 to

5 years of breaching. MCR steelhead will migrate into habitat above the former dam site the spring following breaching.

Rearing habitat in the lower White Salmon River will remain in a degraded condition through October 2008 from ongoing operation of the Project. The Project occludes large wood recruitment and maintains extremely low flows in the 1.1-mile bypass reach, thus significantly reducing the wetted perimeter of the steam channel (and thus the aerial extent of habitat) and increasing summer water temperatures in the bypass reach. Interim Project operations are not expected to affect rearing habitat in the Columbia River. At the time of breaching, rearing habitat will be inundated by reservoir sediments. The smothering of cobbles and gravel will eliminate cover for salmonid fry and is expected to result in high mortality of existing anadromous fish prey species and significantly impact their habitat. Anadromous fish species may be able to migrate through the lower river for rearing the following year, but it may take 2 to 5 years before prey species begin to recolonize this reach. Rearing habitat in the mixing zone of the Columbia River will likely be temporarily reduced for up to 1 month following dam breaching due to reduced water quality from suspended sediments. The NMFS does not anticipate any significant impact to rearing habitat in the Columbia River after the first month following dam breaching.

Migration

Until the dam is breached, the low flows in the 1.1-mile bypass reach will affect migration habitat by increasing summer water temperature, reducing pool volumes, and occluding recruitment of large wood, which provides cover. After breaching, migration habitat in the lower White Salmon River will be significantly retarded for up to 6 months due to high concentrations of TSS. After 6 months, this PCE should be functional except for short term (<1 day) spikes of TSS resulting from storm events or bank failures. Migration habitat in the Columbia River will be affected in the mixing zone for a period of about 1 month due to elevated concentrations of suspended sediment. After 1 month, brief ($\leq$1 day) reductions in function in the mixing zone may occur from bank failure, high runoff from rain or snow, or high flood flows. Downstream of the mixing zone, this PCE is expected to be impacted from the initial pulse of sediment as it moves down river, but will quickly recover after about 1 day.

6. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "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." In Step 4 of this analysis, NMFS considers cumulative effects within the action area. Future Federal actions (e.g., ongoing operation of hatcheries, fisheries, and land management activities) are not considered within the category of cumulative effects for ESA purposes because they require separate consultations pursuant to Section 7 of the ESA, after which they are considered part of the environmental baseline.

NMFS evaluated many actions to determine whether or not they would meet the requirements of its implementing regulations. Those actions which are most notable include State laws that influence future development or land management activities in the action area (Washington Forest Practices Act, including the Shoreline Management Act, Growth Management Act, and Hydraulics Code, and recent legislation to enhance salmon recovery through tributary enhancement programs, among others); TMDL (total maximum daily load) development and implementation; recent human population trends in the action area, as well as unauthorized land use and management activities (e.g., poaching, chemical spills, and applications; and hydraulic modifications to tributaries (riparian clearing, diking, and adding impervious surfaces). However, after this review, NMFS has determined that these actions cannot be deemed reasonably likely to occur based on its ESA implementing regulations.

The Endangered Species Consultation Handbook describes this standard as follows:

> "Indicators of actions 'reasonably certain to occur' may include, but are not limited to: approval of the action by State, tribal or local agencies or governments (e.g., permits, grants); indications by State, tribal or local agencies or governments that granting authority for the action is imminent; Project sponsors' assurance the action will proceed; obligation of venture capital; or initiation of contracts. The more State, tribal or local administrative discretion remaining to be exercised before a proposed non-Federal action can proceed, the less there is a reasonable certainty the Project will be authorized."

NMFS is not aware of any specific future non-Federal activities within the action area that would adversely affect the listed species or their designated critical habitat. Between 1990 and 2000, the population of Klickitat and Skamania counties, Washington, increased by 15 percent and 19 percent, respectively. Population densities remained relatively low (10 persons per square mile in Klickitat and 6 in Skamania County) at that time.[110] However, as the human population in the

[10]U.S. Census Bureau, State and County Quickfacts, Klickitat and Skamania Counties, Washington. Available at http://quickfacts.census.gov/qfd/

action area continues to grow, there is likely to be an increased demand for agricultural, commercial, or residential sites for development. The effects of new development are likely to further reduce the value of habitat within the action area.

7. CONCLUSIONS

This section presents NMFS' Biological Opinion regarding whether the aggregate effects of the factors analyzed under the environmental baseline (Section 4), the effects of the proposed action (Section 5), and the cumulative effects (Section 6) in the action area, when viewed against the current range-wide status of the species (Section 3), are likely to jeopardize the continued existence of the listed species considered in this Opinion. 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 (CFR §402.02). This section also represents NMFS' Biological Opinion regarding whether the proposed action is likely to result in the destruction or adverse modification of critical habitat.

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' Biological Opinion that the proposed action is not likely to jeopardize the continued existence of these species or to destroy or adversely modify the critical habitat designated for 12 of the species. These conclusions are based on the considerations described below.

7.1 Summary: Effects of the Proposed Action on Listed Species and on Designated Critical Habitat

7.1.1 Effects on Species that Historically Occupied the White Salmon River and their Designated Critical Habitat

The effects of the action will be greatest on the four species that historically occupied the White Salmon River: MCR steelhead and LCR Chinook, LCR coho, and CR chum salmon. The MCR steelhead and LCR coho populations were not large, but their losses contributed to the risk of extinction of their respective species and their restoration would support each population's viability, especially its spatial structure and diversity. In the case of LCR Chinook, the White Salmon was one of only two spring and only four fall run historical populations in the Gorge Spring- and Fall run Major Population Groups. Restoration above Condit Dam, especially of a spring run, would be an important contribution to the viability of the ESU. Much of the CR chum salmon's historical spawning habitat has been inundated by the Bonneville pool, but a portion of this may be restored over time due to the deposition of sediment from dam removal (i.e., raising the stream bottom' elevation) and natural bedload movement.

As discussed in Section 4, the environmental baseline within the lower White Salmon River portion of the action area, as influenced by historical Project operations, does not adequately fulfill the biological requirements of the listed species and the designated critical habitat in this watershed does not fulfill its conservation function. The proposed action, which includes the interim operation and, as of October 2008, the removal of the Condit Project (summarized in Tables 5.1 and 5.2) will continue to degrade spawning, rearing, and migration habitat in the lower White Salmon River by increasing temperatures and by interrupting channel forming processes (flow, gravel, and LWD) in the bypass reach during the interim period. Breaching Condit Dam and draining the reservoir will release large plumes of sediment and turbidity, which will further degrade this habitat for some time, but will ultimately remove a factor that has limited viability at the population scale and will restore the conservation function of the designated critical habitat. The proposed action will also have a short term (i.e., sustained for 1 month and then occurring intermittently for brief periods) negative effect on TSS and turbidity in the mixing zone within the Lower Columbia River, but these effects will dissipate rapidly with time and in a downstream direction.

The proposed salvage operation of LCR Chinook that are preparing to spawn below Condit Dam just prior to breaching will conserve production that would otherwise be lost when redds and gravel are smothered by sediments released from the reservoir. Within a few years, the quality of spawning, rearing, and migration habitat in the lower river will improve significantly as fines are flushed out, gravel and LWD migrate downstream, and invertebrate prey recolonize the substrate. In the meantime, MCR steelhead and LCR Chinook will have access to habitat upstream during the season following breaching. Thus, although the proposed action will have short-term negative effects on MCR steelhead and LCR Chinook, LCR coho, and CR chum salmon and the designated critical habitat for 3 of those species in the lower White Salmon River and within the mixing zone within the Columbia River, it will eventually remove a factor limiting the viability of each species and will restore the conservation value of designated critical habitat within this reach.

7.1.2 Effects on Species that Migrate in the Lower Columbia River and their Designated Critical Habitat

The following species did not historically occupy the White Salmon River, but migrate through the Lower Columbia River: UCR spring Chinook salmon and steelhead; SR spring/summer and fall Chinook salmon, sockeye salmon, and steelhead; and LCR steelhead. Except for SR sockeye salmon, for which the risk to all four viability criteria is extreme, and SR fall Chinook, for which spatial structure has been severely restricted by the existence of Idaho Power Company's Hells Canyon Complex, the primary risk to the survival and recovery of these species is low numbers and productivity. Within the mainstem Columbia portion of the action area, the FCRPS, specifically Bonneville Dam and Reservoir, is the most important limiting factor. Conditions for juvenile migrants improved in 2003 when a corner surface collector was installed at the Bonneville Dam Second Powerhouse and changes in spill operations have reduced adult fallback (NMFS 2004b). Further survival improvements are expected in this reach from ongoing efforts to reduce predation (especially the northern pikeminnow control and Caspian tern relocation programs; Corps et al. 2004). Thus, conditions that limit the viability of these species in the action area are improving, although it is not yet possible to determine whether these result in higher adult returns.

As a result of the proposed action, both the adult and juvenile life stages of these species will encounter elevated levels of TSS in the mixing zone along the Washington shoreline of the Lower Columbia River during their migrations. Individuals that cannot avoid the sediment plume during the first 24 hours following dam breaching are likely to experience physiological stress, increased maintenance energy, reduced feeding and growth (juveniles), respiratory impairment, and possibly gill damage. These effects will also constitute a small, short-term reduction in the conservation value of designated critical habitat (freshwater migration corridors). By the following spring or summer, juvenile salmonids migrating through the action area will encounter only temporary ($\leq$1 day) exposure to elevated TSS concentrations, i.e., during storm events. Adults that would use the White Salmon as a cool water refuge are likely to avoid the area when there are sediment plumes. Thus, NMFS expects that these individuals will be exposed to levels of TSS only slightly higher than background and for up to 1 day.

7.1.3 Effects on UWR Chinook Salmon and UWR Steelhead and their Designated Critical Habitat

All of these species originate from and return to spawning areas in tributaries that are downstream from the predicted mixing zone for the sediment plume. They are at risk for all four VSP categories (abundance, population growth rate, population spatial structure, and diversity) and access is blocked to roughly one-third of the historical spawning habitat for UWR Chinook salmon and steelhead in the upper Willamette basin. Limiting factors within the action area include lost and degraded floodplain connectivity and lowland habitat. With respect to the proposed action, after the initial pulse of TSS passes through the lower Columbia, levels in the reach downstream of Bonneville Dam will be negligible compared to background. Thus effects of the proposed action on these species and their designated critical habitat will be negligible.

7.2 Biological Opinion on the Effects of the Proposed Action

Based on NMFS' consideration of the range-wide status of the species and their designated critical habitat, the effects of the action, and any cumulative effects, NMFS concludes that the proposed action will not jeopardize the survival and recovery or destroy or adversely modify the designated critical habitat of the ESA-listed species considered in this Opinion. There are two important factors in reaching this conclusion. Firstly, the adverse effects on listed species will be relatively short term and there will be a long term benefit for at least two of the listed species from restoring access to historical habitat above Condit Dam. Secondly, currently occupied habitat will be restored in the long term and maintained by natural channel forming processes which will restore the conservation value of designated critical habitat in the lower White Salmon River.

8. REINITIATION OF CONSULTATION

As provided in 50 CFR §402.16, reinitiation of formal consultation is required when discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if the following occur: (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, any operations causing such take must cease pending reinitiation.

In this instance, FERC has proposed to adopt a Settlement Agreement that will result in the continued operation of the Project under the existing license conditions prior to decommissioning and removal of the Project between October 2008 and August 2009. Thus, after August 2009, NMFS expects that reinitiation of formal consultation could most likely occur as a result of new information relating to sediment erosion or transport, fish passage into affected tributaries, or PacifiCorp's post-removal monitoring and mitigation activities, based upon the proposed measures and those required as terms and conditions of the Incidental Take Statement (Section 10)

9. INCIDENTAL TAKE STATEMENT

Sections 9(a)(1) of the ESA prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to Section 4(d) of the ESA extend the prohibition to threatened species. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as spawning, rearing, feeding, and migrating (50 CFR §222.102; 64 FR 60727). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity by a Federal agency or applicant (50 CFR §402.02). Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of the incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. The measures described in this section are nondiscretionary. If FERC fails to include these conditions in the license or PacifiCorp fails to assume and implement the terms and conditions of this incidental take statement, the protective coverage of Section 7(a)(2) may lapse. To monitor the effect of incidental take, PacifiCorp must report the progress of the action and its effect on each listed species to NMFS, as specified in this incidental take statement (50 CFR §402.14(i)(3)).

9.1 Amount or Extent of Take

FERC's proposed action to grant project surrender under the Settlement Agreement with modifications is designed to minimize the incidental take of MCR steelhead, LCR Chinook and coho salmon, CR chum salmon, and the upriver species considered in this Opinion.

In Section 5, NMFS described the mechanisms by which ESA-listed anadromous fish species would likely be affected (taken) by continued operation of the Project, the removal of the Project, or by oil and hazardous waste spills that could occur as a result of Project removal activities. The extent to which these mechanisms can result in effects on salmon or salmon habitat has been described, enabling reinitiation of consultation if such effects are exceeded. The NMFS generally concludes that there will be:

1. Continuing (until October 2008) impairment of flow, temperature, channel morphology, large woody debris, and spawning gravels used by LCR Chinook salmon and MCR steelhead, and potentially LCR coho and CR chum salmon, in

the 3.3-mile reach of the White Salmon River below Condit Dam, downstream to the confluence with the Columbia River.

2. Continuing (until October 2008) harm to the abundance and productivity of the White Salmon River populations of MCR steelhead and spring run LCR Chinook salmon, LCR coho salmon, and potentially CR chum salmon, by preventing access to historical spawning and rearing habitat above the dam.

3. NMFS anticipates that individual adult LCR Chinook salmon, and potentially MCR steelhead, LCR coho and CR chum salmon, will be captured during the salvage operations that precede breaching. PacifiCorp may capture the following:
   - up to 1,500 adult LCR Chinook salmon
   - up to 100 adult MCR steelhead
   - up to 50 adult coho salmon
   - up to 50 adult chum salmon

4. An increase in suspended sediments, turbidity, and other water pollutants due to dam removal activities that will:
   - Kill juvenile and adult LCR Chinook salmon, MCR steelhead, and potentially adult and juvenile LCR coho salmon and juvenile CR chum salmon if present, in the lower White Salmon River for up to 6 months after breaching:
     - up to 500 adult and 500 juvenile LCR Chinook salmon
     - up to 50 adult and 50 juvenile LCR coho salmon
     - up to 50 adult and 50 juvenile CR chum salmon
     - up to 50 adult and 500 juvenile MCR steelhead
   - Inundate gravel in spawning and rearing areas in the lower 3.3 miles of the White Salmon River; this effect could persist for up to 5 years.
   - Harass juvenile and adult fish from the mixing zone in the mainstem Columbia River for about 1 month after breaching.

5. Intermittent, brief (<1 day) increases in suspended sediments and turbidity that harass juvenile and adult LCR Chinook and coho salmon and steelhead, CR chum salmon, MCR steelhead, SR spring/summer and fall Chinook salmon, SR sockeye salmon, SR steelhead, and UCR spring Chinook salmon and steelhead from the lower White Salmon River and from the mixing zone in the mainstem Columbia River for up to 5 years after breaching.

The NMFS anticipates that individual juvenile and adult LCR Chinook salmon, MCR steelhead, and potentially LCR coho and CR chum salmon, will be captured (during the salvage operations that precede breaching), injured, or killed due to dam removal activities. Because the individual fish that are likely to be captured, injured, or killed by this action are from different listed species that are similar to each other in appearance and life history and to unlisted species that occupy the same area, assigning this take to individual listed species is not possible.

Take is also anticipated in the form of harm. However, because the relationship between habitat conditions and the distribution and abundance of fish in the action area is imprecise, a specific number of individuals taken cannot be practically estimated. In such circumstances, NMFS uses the predicted extent of habitat modification to describe the extent of take, based on the causal relationship between habitat function and normal behaviors linked to that habitat function. Thus, the extent of incidental take anticipated and exempted in this incidental take statement is that which will accrue from the habitat modification cause by dam removal activities (see above). Exceeding any of these limits will trigger the reinitiation provisions of this Opinion.

9.2 Effect of Take

NMFS has determined that the extent of anticipated take from the proposed action (analyzed in Section 5) is not likely to jeopardize the species' survival and recovery or to adversely modify or destroy designated critical habitat. The effects of the proposed action will be mitigated to the extent possible through measures incorporated into the Settlement Agreement and through additional measures proposed by FERC staff.

9.3 Reasonable and Prudent Measures and Terms and Conditions

NMFS believes that the following reasonable and prudent measures and terms and conditions are necessary and appropriate to monitor the incidental take of the ESA-listed species resulting from the continuing operation or removal of the Condit Hydroelectric Project. In order to be exempt from the prohibitions of Section 9 of the ESA, FERC and PacifiCorp must comply with all of the reasonable and prudent measures and terms and conditions set forth below.

1. Minimize incidental take from general construction by applying conditions to the proposed action that avoid or minimize adverse effects to water quality, riparian, and aquatic systems.

2. Minimize direct take of listed species during adult salvage operations by following standard hatchery protocols for collecting, holding, and spawning brood stock.

3. FERC shall require PacifiCorp to report all observations of dead or injured salmon or steelhead adults or juveniles coincident with removal and restoration activities (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.

9.3.1 Terms and Conditions

To be exempt from the prohibitions of Section 9 of the ESA, FERC must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that complete the reasonable and prudent measures described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to a different conclusion regarding whether the proposed action will result in jeopardy or the destruction or adverse modification of critical habitats.

I. To implement reasonable and prudent measure #1, FERC shall ensure the following:
   A. **Minimum Area:** Confine construction impacts to the minimum area necessary to complete the Project.
   B. **Pollution and Erosion control Plan:** A pollution and erosion control plan must be prepared and carried out to prevent pollution related to construction operations. The plan must be available for inspection on request by NMFS.
      1. <u>Plan Contents:</u> The pollution and erosion control plan must contain the pertinent elements listed below and meet requirements of all applicable laws and regulations.
         a. Practices to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, and staging areas.
         b. A description of any hazardous products or materials that will be used for the Project, including procedures for inventory, storage, handling, and monitoring.
         c. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that must be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.
         d. Practices to prevent construction debris from dropping into any stream or body of water, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.
      2. <u>Inspection of erosion controls:</u> During construction, all erosion controls must be inspected daily during the rainy season and weekly during the dry season to ensure they are working.

a. If inspection shows that the erosion controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.

b. Sediment must be removed from erosion controls once it has reached one-third of the exposed height of the control.

3. Construction discharge water: All discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water) must be treated as follows.

a. *Water quality treatment:* Design, build, and maintain facilities to collect and treat all construction and drilling discharge water, using the best available technology applicable to site conditions, to remove debris, sediment, petroleum products, metals, and other pollutants likely to be present.

b. *Return flow:* If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 fps, and the maximum size of any aperture may not exceed 1 inch.

c. *Pollutants:* Do not allow pollutants such as green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any waterbody, wetland, or stream channel below ordinary high water.

4. Preconstruction activity: Before significant alteration of the individual construction sites, the following actions must be completed.

a. *Marking:* Flag the boundaries of clearing limits at the construction site to prevent disturbance of critical riparian vegetation and wetlands.

b. *Emergency erosion controls:* Ensure that the following materials for emergency erosion control are onsite.

(a) A supply of sediment control materials (e.g., silt fence, straw bales).

(b) An oil-absorbing, floating boom whenever surface water is present.

c. *Temporary erosion controls:* All temporary erosion controls must be in-place and appropriately installed downslope of Project activity within the riparian area until construction at the specific site is complete.

d. *Existing ways:* Existing roadways or travel paths must be used whenever possible.

e. *Minimizing soil disturbance and compaction:* When a new temporary road is necessary within 150 feet of a stream, waterbody or wetland, soil disturbance and compaction must be minimized by clearing vegetation to ground level and placing clean gravel over geotextile fabric (geotextile fabric is a woven material that reduces surface erosion and sometimes allows vegetative growth), unless otherwise approved in writing by NMFS.

5. Heavy Equipment: Use of heavy equipment will be restricted as follows.
   a. *Vehicle staging:* Vehicles must be fueled, operated, maintained, and stored as follows.
      (1) Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place 150 feet or more from any stream, waterbody, or wetland or have suitable spill prevention measures at the refueling site if it must be closer.
      (2) All vehicles operated within 150 feet of any stream, waterbody, or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by NMFS.
      (3) All equipment operated instream must be cleaned before beginning operations below the bank full elevation to remove all external oil, and grease.
   b. *Stationary power equipment*: Stationary power equipment (e.g., generators, cranes) operated within 150 feet of any stream, waterbody, or wetland must be diapered to contain leaks, unless otherwise approved in writing by NMFS.
6. Post Construction Activity: When the Project is completed, all temporary access roads and work bridges (if constructed) must be obliterated, the soil must be stabilized and the site must be revegetated. All newly exposed slopes and work areas must be stabilized and revegetated as soon a possible.

II. To implement reasonable and prudent measure #2, FERC shall ensure the following:
   A. PacifiCorp completes the plan in cooperation with the USFWS , Spring Creek National Fish Hatchery, and NMFS for collection and spawning of adult LCR Chinook salmon.
   B. The plan shall include standard hatchery protocols for the collection, holding, and spawning of adult Chinook salmon.

III Reports of dead or injured salmon or steelhead shall be sent to:

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

10. 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. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information. The NMFS has no recommendations for additional conservation actions to be carried out by FERC.

11. MAGNUSON-STEVENS FISHERY CONSERVATION & MANAGEMENT ACT

11.1 Background

The Magnuson-Stevens Fishery Conservation & Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

1. Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

2. NMFS must provide EFH conservation recommendations for any Federal or State action that would adversely affect EFH (§305(b)(4)(A)).

3. Federal agencies must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS' EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (§3). For the purpose of interpreting this definition of EFH, waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem, and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR §600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR §600.810).

EFH consultation with NMFS is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

11.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council has designated EFH for 3 species of Federally-managed Pacific salmon: Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable manmade barriers (PFMC 1999), and longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). In this case, EFH extends above the Project on the White Salmon River. Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

11.3 Proposed Action

The proposed action is detailed in Section 2 of this Opinion.

11.4 Effects of Proposed Action

The proposed action would likely result in short-term adverse effects and long-term beneficial effects to a variety of habitat parameters. These effects are summarized in Section 5 of this Opinion.

11.5 Conclusion

NMFS concludes that the proposed action would adversely affect designated EFH for Chinook salmon and coho salmon in the lower White Salmon River for up to 5 years after breaching, when at which time effects due to the removal of the Project are expected to be so small as to be negligible. After this date, the proposed action will positively affect EFH by providing access to essential fish habitat upstream of the dam.

11.6 EFH Conservation Recommendations

Pursuant to §305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which adversely affect EFH. The proposed action includes a number of measures for fish protection and enhancements. While

NMFS understands that the measures described in the license will be implemented by PacifiCorp and enforced by FERC, it does not believe that these measures are sufficient (although they will help) to address the adverse impacts to EFH described above. However, the terms and conditions in the incidental take statement (Section 9 of this Opinion) are applicable to designated EFH for Chinook salmon and coho salmon and will minimize these adverse effects. Consequently, NMFS hereby adopts all of the terms and conditions in its incidental take statement (Section 9 of this Opinion) as its EFH recommendations.

11.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR §600.920(j), Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

11.8 Supplemental Consultation

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

12. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

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 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 (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

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.

Objectivity:

> ***Information Product Category:*** Natural Resource Plan.
>
> ***Standards:*** 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 ESA *Consultation Handbook*, ESA Regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).
>
> ***Best Available Information:*** This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: 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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