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

March 7, 2012

VIA ELECTRONIC FILING

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

Subject: National Marine Fisheries Service Biological Opinion, Not Likely to Affect Determination, and Essential Fish Habitat Consultation for the Wells Hydroelectric Project, FERC Project No. 2149.

Dear Secretary Bose:

Enclosed is the National Marine Fisheries Service's (NMFS) Biological Opinion and Not Likely to Affect Determination for the Wells Hydroelectric Project on the Columbia River in Douglas and Chelan Counties, WA. Also included are NMFS's Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat consultation conservation recommendations. NMFS concluded that the proposed action would not jeopardize the continued existence of Upper Columbia Spring-run Chinook salmon or Upper Columbia steelhead. It will also not destroy or adversely modify designated critical habitat for Upper Columbia Spring-run Chinook salmon or Upper Columbia steelhead. The proposed action is not likely to adversely affect endangered southern resident killer whales nor their designated critical habitat.

Comments or questions regarding this Biological Opinion, Not Likely to Adversely Affect Determination, and MSA consultation should be directed to Steve Fransen at 360-753-6038 steven.m.fransen@noaa.gov, or Keith Kirkendall, FERC/Water Diversions Branch Chief, at 503-230-5431, keith.kirkendall@noaa.gov).

Sincerely,

FOR

Will Stelle
Regional Administrator

Enclosure

cc: Shane Bickford
Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802-4497

Service List

UNITED STATES OF AMERICA

FEDERAL ENERGY REGULATORY COMMISSION

Douglas County Public Utility District	)	**Wells Hydroelectric Project**
Douglas County PUD	)	**FERC No. P-2149**

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by electronic or first class mail, a letter to Kimberly D. Bose, Federal Energy Regulatory Commission, from the National Marine Fisheries Service, regarding National Marine Fisheries Service Biological Opinion, Not Likely to Affect Determination, and Essential Fish Habitat Consultation for the Wells Hydroelectric Project, FERC Project No. P-2149 and this Certificate of Service to each person designated on the official service list compiled by the Commission in the above captioned proceeding.

Dated on March 7, 2012

Bonnie J. Hossack

Bonnie J. Hossack

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion, Section 7(a)(2)

"Not Likely to Adversely Affect" Determination and

Magnuson-Stevens Fishery Conservation and Management Act

Essential Fish Habitat (EFH) Consultation

Relicensing of Public Utility District No. 1 of Douglas County's

Wells Hydroelectric Project FERC No. P-2149-152

Columbia River, HUC 1702000503 Douglas, Okanogan, and Chelan Counties, Washington

NMFS Consultation Number: 2011/01621

Action Agency: Federal Energy Regulatory Commission:

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat
Upper Columbia River spring-run Chinook salmon (*Oncorhynchus Tshawytscha*)	Endangered	Yes	No	No
Upper Columbia River steelhead (*Oncorhyncus mykiss*)	Threatened	Yes	No	No
Southern Resident killer whale (*Orcinus orca*)	Endangered	No	—	—

Fishery Management Plan That Includes Stocks With EFH	Does Action Cause Adverse Effects to EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Groundfish	No	No
Coastal Pelagic Species	No	No
West Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued By: _____ *for*

William W. Stelle, Jr.
Regional Administrator

Date: March 7, 2012

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TERMS AND ABBREVIATIONS

AMP	Adaptive Management Plan
ANSMP	Aquatic Nuisance Species Management Plan
ARC	Aquatic Resource Committee
BA	Biological Assessment
BE	Biological Evaluation
BMP	Best Management Practice
BOR	Bureau of Reclamation
BRT	Biological Review Team
ºC	Degrees Celsius
CAJPS	Combined Adult & Juvenile Project Survival
CFD	Computational Fluid Dynamics
CFS	Cubic Feet per Second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corp of Engineers
CWA	Clean Water Act
CWT	Coded Wire Tag
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DEA	Draft Environmental Assessment
DEIS	Draft Environmental Impact Statement
District	Douglas County Public Utility District
DNR	Department of Natural Resources

DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Act
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
FHMP	Fisheries and Habitat Monitoring Plan
FWS	U.S. Fish and Wildlife Service
GBT	Gas Bubble Trauma
GBD	Gas Bubble Disease
GCFMP	Grand Coulee Fish Passage Plan
HCP	Habitat Conservation Plan
HEAD	Elevation difference
HGMP	Hatchery and Genetics Management Plan
HOF	Hatchery Origin Fish
HPA	Hydraulic Project Approval
HPMP	Historic Properties Management Plan
HRA	Habitat Restoration Account
ILP	Integrated Licensing Process
HUC	Hydrologic Unit Code

ICTRT	Interior Columbia Technical Review Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
JBS	Juvenile bypass system
KCFS	Thousand cubic feet per second
Kv	Kilovolt
KW	Kilowatt
LWD	Large Woody Debris
MGD	Million Gallons per day
MPG	Major Population Group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean sea level
MW	Megawatts
NFH	National Fish Hatchery
NGO	Non-governmental organizations
NFS	National Forest Service
NMFS	National Marine Fisheries Service
NNI	No Net Impact
NOF	Natural Origin Fish
NPRP	Northern Pikeminnow Removal Program
NWMP	Noxious Weed Management Plan
Opinion	Biological Opinion

OR	Operational Reach
PCB	Polychlorinated Biphenyl
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
PIT	Passive Integrated Transponder
PLMP	Pacific Lamprey Management Plan
PME	Protect, Mitigate & Enhance
Project	Wells Hydroelectric Project
PUD	Public Utility District
RFMP	Resident Fish Management Plan
RM	River Mile
ROW	Right of Way
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
RRMP	Recreation Resources Management Plan
RSP	Relicensing Study Plan
SA	Settlement Agreement
Staff Alternative	Staff Alternative with Mandatory Conditions
3D	Three Dimensional
SWG	Settlement Working Group
TCP	Tributary Conservative Plan
TDG	Total Dissolved Gas
TMDL	Total Maximum Daily Load

TRT	Technical Recovery Team
TRMP	Terrestrial Resources Management Plan
UCR	Upper Columbia River
USFS	United States Forest Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Services
VSP	Viable Salmonid Population
WDF	Washington Department of Fisheries
WDFW	Washington Department of Fish & Wildlife
WDOE	Washington Department of Ecology
WQ	Water Quality
WQPP	Water Quality Protection Plan
WQS	Water Quality Standard
WRIA	Water Resource Inventory Area
WSMP	White Sturgeon Management Plan
WUA	Weighted Usable Area

1. INTRODUCTION

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

1.1 Background

The biological opinion (opinion) and incidental take statement portions of this document were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402.

The NMFS also completed an Essential Fish Habitat (EFH) consultation. It was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, et seq.) and implementing regulations at 50 CFR 600.

The opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-5444) ("Data Quality Act") and underwent pre-dissemination review.

1.2 Consultation History

This biological opinion is based on information provided in the 2003 biological opinion (NMFS 2003), the 2004 anadromous fish habitat conservation plan ((HCP); NMFS 2003), the May 2010 biological assessment (Douglas County PUD[Public Utility District] 2011), the September 2010 final license application (Douglas County PUD 2011, the April 2011draft environmental statement (FERC 2011a), the August 2011 supplemental biological assessment (Douglas County PUD 2011, the October 2011 final environmental impact statement (FERC 2011b) field investigations, and other sources of information. A complete record of this consultation is on file at NMFS' Northwest Regional Office in Portland, OR. The 2003 biological opinion covered the 50-year term of the HCP, but the proposed action to incorporate the remaining HCP term into a FERC license constitutes a new Federal action requiring reconsideration of the prior opinion.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. The Federal Energy Regulatory Commission (FERC) proposes to relicense the 774.3-MW Wells Hydroelectric Project on the Columbia River in Douglas, Okanogan, and Chelan Counties, WA. Douglas PUD, the licensee, is not proposing to add capacity, make any major structural modifications to the Wells Project, or substantially modify Project operations under the new license. FERC and the PUD propose to continue implementation of agreements associated with the management and operation of the Wells Project, including the 2004 Anadromous Fish Agreement and Habitat Conservation Plan (FERC 2011a). All of the measures in the HCP that affect listed Upper Columbia River (UCR) spring-run Chinook and UCR steelhead are incorporated into the

proposed license. .This 50-year agreement and HCP comprehensively addressed the effects of the project on anadromous fish. The current consultation extends the HCP into a new FERC license, with few substantive changes.

1.4 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this opinion, the action area includes all areas affected directly or indirectly by the Wells Project. The Wells Project action area is the Columbia River from river mile (RM) 514.4 (approximately 1.2 miles downstream of the Wells Dam) to RM 544.9 (Chief Joseph tailrace). The action area also includes the Methow River 1.5 miles upstream from its confluence with the Columbia River and the lower 15.5 miles of the Okanogan River (Wells Reservoir tributaries), as both river segments are affected by the impoundment of the Wells Project; and the 41 mile 230 Kilovolt (kV) transmission line right-of-way (ROW).

The HCP and proposed license include a commitment on the part of the applicant, Douglas County PUD, to pay tributary habitat improvements to mitigate for project related mortality of up to 2%, and hatchery programs to mitigate for project related mortality of up to 7% of both UCR spring-run Chinook and UCR steelhead. NMFS considers the effects of habitat improvements on the listed species and critical habitat in separate, project-specific consultations and the effects of hatchery facilities and their operations in separate consultations on the ESA section 10(a)(1)(A) permits for these programs. Therefore, the reaches in the Methow River and its tributaries the Twisp and Chewuch Rivers affected by HCP habitat improvements and hatcheries are not within the action area for this consultation.

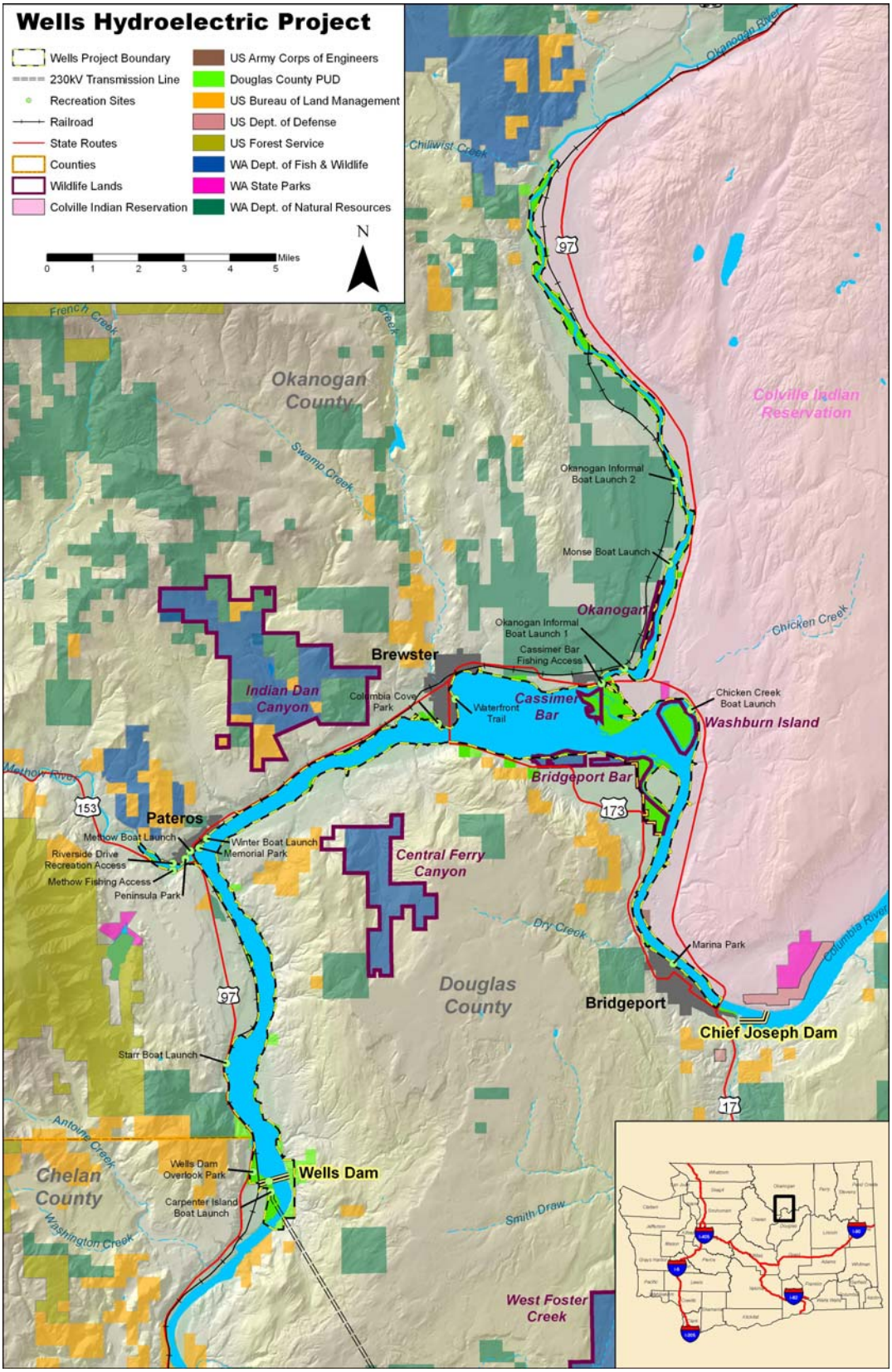

Figure 1. General Location of the Wells Project.

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

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

2.1 Introduction to the Biological Opinion

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

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

This biological opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.[1]

- *Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action*. This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. For listed salmon and steelhead, NMFS has developed specific guidance for analyzing the status of the listed species' component populations in a "viable salmonid populations" paper (VSP; McElhany et al. 2000). The VSP approach considers the abundance, productivity, spatial structure, and diversity of each population as part of the overall review of a species' status. For listed salmon and steelhead, the VSP criteria therefore encompass the species' "reproduction, numbers, or distribution" (50 CFR 402.02). In describing the range-wide status of listed

[1] Memorandum from William T. Hogarth (NMFS 2005a) to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005a).

species, we rely on viability assessments and criteria in technical recovery team documents and recovery plans, where available, that describe how VSP criteria are applied to specific populations, major population groups, and species. We determine the rangewide status of critical habitat by examining the condition of its physical or biological features (also called "primary constituent elements" or PCEs in some designations) - which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 2.2.

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

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

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

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

2.2 Range-Wide Status of the Species and Critical Habitat

Two fish species in the action area and their respective designated critical habitats are ESA listed, UCR spring-run Chinook salmon and UCR steelhead. The biological requirements, life histories, migration timing, historical abundance, and factors for the decline of these species migrating through the middle reach of the Columbia River have been well-documented (Busby et al. 1996; Myers et al. 1998; NMFS 2000a; 2000b; West Coast Salmon BRT 2003). The

following sections summarize the relevant biological information for UCR spring-run Chinook and UCR steelhead.

The construction of Grand Coulee Dam blocked upstream migration in the Columbia River after 1938. This project not only eliminated populations of anadromous fish upstream of the dam, but the resultant hatchery mitigation plan (the Grand Coulee Fish Mitigation Plan (GCFMP)) likely influenced all of the species Evolutionarily Significant Units (ESUs) and Distinct Population Segment (DPSs). Fish from multiple populations were mixed into relatively homogenous groups and redistributed into streams and lakes throughout the region or raised and released from hatcheries. Grand Coulee Dam, as well as the large upstream storage projects in Canada, Idaho, and Montana, has affected the quantity and timing of runoff in the Columbia River. Compared with historical flows, the spring freshet has been greatly reduced, summer flows have been somewhat reduced, and fall and winter flows have been increased (NMFS 2000a).

The five FERC-licensed Mid-Columbia River hydroelectric dams (Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids) and reservoirs have affected the mainstem migration corridor and the survival of juvenile migrants. Each of these projects has license requirements and settlement agreements that specify operations or processes that govern operations for reducing the effects of these projects on anadromous salmonids.

Four Federally owned hydroelectric projects in the Lower Columbia River (McNary, John Day, The Dalles, and Bonneville) have also affected the mainstem migration corridor and reduced the survival of juvenile and adult migrants.

UCR Spring-run Chinook

On August 15, 2011, NMFS completed a five-year review for the UCR spring Chinook salmon ESU and concluded that the species should remain listed as endangered (NMFS 2011). The ESU includes all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington. NMFS has identified three important spawning populations within this ESU: the Wenatchee, Entiat, and Methow, as well as six artificial propagation programs: the Twisp River, Chewuch River, Methow Composite, Winthrop National Fish Hatchery (NFH), Chiwawa River, and White River spring-run Chinook hatchery programs (NMFS 2009). The populations are genetically and ecologically separate from the summer- and fall-run populations in the lower parts of many of the same river systems.

Historical Information

The construction of Grand Coulee Dam (completed in 1942) blocked anadromous fish from habitat upstream of RM 596.6 after 1938. The concurrent GCFMP influenced the present distribution of the ESU. Until recently, non-listed Carson-origin spring-run Chinook were produced and released within the spawning range of UCR spring-run Chinook salmon ESU. Non-listed spring-run Chinook salmon hatchery populations contained within this ESU include those produced at the Winthrop, Leavenworth and Entiat NFHs. The Carson based spring Chinook hatchery program is currently being phased out at the Winthrop NFH in favor of using local spring Chinook broodstock. The Carson based spring Chinook program at the Entiat NFH was terminated in 2006 and the last adults returned in 2010 (Jones et al. 2011).

Life History
Upper Columbia River spring-run Chinook salmon exhibit classic stream-type life history strategies. They emigrate from freshwater as yearling smolts and undertake extensive offshore ocean migrations. The majority of these fish mature at age 4 and return to the Columbia River from March through mid-May.

Abundance and Productivity
Overall abundance and productivity (A/P) remains rated at High Risk for each of the three extant populations in this Major Population Group (MPG)/ESU (Ford et al. 2010). The 10-year geometric mean abundance of adult natural origin spawners has increased for each population relative to the levels for the 1981-2003 series, but the estimates remain below the corresponding Interior Columbia Technical Review Team (ICTRT) viability thresholds. Estimated productivity (spawner-to-spawner return rate at low to moderate escapements) was on average lower over the years 1987-2009 than for the previous period.

Spatial Structure and Diversity
Upper Columbia River spring Chinook have been extirpated from the Okanogan basin. Of the three remaining populations, spatial structure is good for the Wenatchee and Methow River and moderate for the Entiat due to loss of production in the lower section (Ford et al. 2010).[2] All three of the extant populations in this MPG are rated at high risk for diversity, driven primarily by chronically high proportions of hatchery-origin spawners in natural spawning areas and lack of genetic diversity among the few remaining natural-origin spawners (ICTRT 2003).

UCR Steelhead
On August 15, 2011, NMFS completed a five-year review for the UCR steelhead DPS and concluded that the species should remain listed as threatened (NMFS 2011). NMFS considers all naturally-produced steelhead returning to tributary streams upstream of the confluence of the Yakima River and the Columbia River to the Canadian border as belonging to the listed UCR steelhead DPS (NMFS 2008a) as well as fish produced in six artificial propagation programs: Wenatchee River, Wells Hatchery (in the Methow and Okanogan rivers), Winthrop NFH, Omak Creek, and Ringold Hatchery (Jones et al. 2011). The ICTRT identified four extant populations in the Wenatchee, Entiat, Methow, and Okanogan rivers, respectively (ICTRT 2003).

Historical Information
Estimates of historical (pre-1960s) abundance specific to this DPS are available from fish counts at dams. Counts at Rock Island Dam from 1933 to 1959 averaged 2,600 to 3,700, suggesting a run size exceeding 3,000 adults back to the four tributary spawning populations. Lower Columbia River fisheries and other habitat degradation in the natal tributaries may already have depressed runs, however. Grand Coulee Dam at RM 596.6 blocked anadromous fish from upstream habitat after 1938. The concurrent GCFMP also influenced the present distribution of the DPS. In 1961, the Chief Joseph Dam blocked anadromous fish from remaining habitat upstream of RM 545.1.

[2] Loss of production in the lower reaches of a spawning tributary increases the effective distance to neighboring populations (i.e., the likelihood of recolonization).

Life History

Life history characteristics for UCR steelhead are similar to those of other inland steelhead; however, smolt age is dominated by 2- and 3-year-olds, and some of the oldest smolt ages for steelhead, up to 7 years, are reported from this DPS (Chapman 1994). Based on limited data, steelhead from the Wenatchee and Entiat Rivers return to freshwater after one year in salt water, whereas Methow River steelhead primarily return after two years in salt water. Similar to other inland Columbia River basin steelhead DPSs, adults typically return to the Columbia River between May and October and are considered summer-run steelhead. Adults may remain in freshwater up to a year before spawning. Unlike Chinook or sockeye salmon, a fraction of steelhead adults attempt to migrate back to the ocean. These fish are called kelts, and those that survive will migrate from the ocean back to their natal streams to spawn again.

Steelhead eggs incubate from late March through June, and fry emerge from late spring to August. Their use of tributaries for rearing is variable, depending upon population size, and both weather and flow at any given time. Generally, juveniles rear in tributaries for two to three years (range from one to seven years) before migrating downstream as smolts. Fry and smolts disperse downstream through the Wells Project in late April through June. Some steelhead residualize and live their entire lives in freshwater (Peven et al. 1994). As a result, of their varied length of freshwater residence, their variable ocean residence, and their spatial and temporal spawning distribution within a watershed, steelhead exhibit an extremely complex mosaic of life-history types.

Steelhead originating in the mainstem Methow River and eleven of its tributaries (located in the mid and upper reaches of the drainage) and in the Okanogan River and several of its tributaries, (NMFS 2002a) migrate past the Wells Project. Documented spawning sites for steelhead in both drainages are located upstream of the action area.

Abundance and Productivity

The most recent estimates (five year geometric mean) of total and natural origin spawner abundances (Ford et al. 2010) are higher for the individual spawning populations of UCR steelhead and the Priest Rapids Dam aggregate run than for those from the previous review period (Good et al. 2005). However, natural origin returns remain well below target levels. The modest improvements in natural returns in recent years are probably primarily the result of hatchery reform efforts, several years of relatively good survival in the ocean and in tributary habitats.

Spatial Structure and Diversity

With the exception of the Okanogan population, the UCR steelhead populations rated as “low” risk for spatial structure (Ford et al. 2010). The “high” risk ratings for diversity in the Okanogan River were driven by the high levels of hatchery spawners within natural spawning areas and lack of genetic diversity among the populations. Hatchery origin returns continue to make up a high fraction of total spawners in natural spawning areas for this DPS, although estimates of natural origin spawner abundance are higher for the most recent cycle. The proportion of natural origin fish was the highest in the Wenatchee River and extremely low in both the Methow and Okanogan rivers.

Rangewide Status of Critical Habitat for UCR Spring-run Chinook Salmon and Steelhead

Designated critical habitat for UCR spring Chinook includes all Columbia River estuarine areas and river reaches proceeding upstream to Chief Joseph Dam as well as specific stream reaches in the Chief Joseph, Methow, Upper Columbia/Entiat, and Wenatchee sub-basins (NMFS 2005b). Rangewide critical habitat for UCR steelhead is similar, but also includes specific stream reaches in the Okanogan, Similkameen, Lower Crab, and Upper Columbia/Priest Rapids subbasins. For both species, critical habitat within the action area includes the mainstem Columbia River from the Wells tailrace upstream to the tailrace of Chief Joseph Dam and the lower reaches of the Methow and Okanogan rivers described in Section 1.4 (Action Area).

NMFS (2005c) defined PCEs for these species as sites essential to support one or more life stages of the ESU or DPS (sites for spawning, rearing, migration and foraging). These sites in turn contain physical or biological features essential to the conservation of the ESU or DPS (for example, adequate spawning gravels, water quality and quantity, side channels, forage species). Specifically, the PCEs and physical/biological features of critical habitat are:

1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;

2) Freshwater rearing sites with:

   (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility,

   (ii) Water quality and forage supporting juvenile development; and

   (iii) 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.

3) 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.

4) 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, side channels; and juvenile and adult forage, including aquatic invertebrates and fishes supporting growth and maturation.

5) Nearshore marine areas free of obstruction and excessive predation with:
Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

6) Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

The action area for this consultation serves primarily as a migration corridor for both juvenile and adult salmonids. As described in the introduction to this section, habitat in this area is altered from its natural functional condition. The morphology of a developed stream channel and seasonal flow modifications could cause some level of delay, stress, or mortality during passage when compared to a natural system. Predator abundance (e.g., northern pikeminnow) is higher than natural background levels due to the presence of the reservoir, and some smolts are injured or killed passing through project turbines and even during spillway passage.

2.2.1 Climate change

Unless otherwise cited, the following section is adapted from NMFS (2008b).
Ongoing and future climate change has the potential to alter aquatic habitat throughout the Pacific Northwest region. These effects would be expected to be evidenced by alterations of water yields, peak flows, and stream temperatures. Other effects, such as increased vulnerability to catastrophic wildfires, may occur as climate change alters the structure and distribution of forest and aquatic systems. Given the increasing certainty that climate change is occurring and accelerating (IPCC 2007, page 98; Battin et al. 2007, 6720), one can no longer, assume that climate conditions in the future will resemble those in the past.

In Washington State, most models predict warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures are likely to increase between 1.7°C and 2.9°C (3.1°F and 5.3°F) by 2040 (Casola et al. 2005, page 10). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing streamflow timing and increasing peak river flows, which may limit salmon survival (NMFS 2008b).

In a study to predict impacts of climate change on salmon habitat in the region, model results indicate a large negative effect on freshwater salmon habitat driven by increased winter peak flows that scour the streambed and destroy salmon eggs (Battin et al. 2007, page 6722). Higher water temperatures, lower spawning flows, and higher magnitude of seasonal peak flows are all likely to decrease salmon productivity in the northwest and in hydrologically similar watersheds. This is expected to make recovery targets for these salmon populations more difficult to achieve. Recommendations to mitigate the adverse impacts of climate change on salmon include 1) restoring connections to historical floodplains and freshwater and estuarine habitats to provide refugia for fish and storage for excess floodwaters; 2) protecting and restoring riparian vegetation to ameliorate stream temperature increases; and 3) purchasing or applying easements to lands that provide important cold water or refuge habitat (ISAB 2007, pages 85 and 86; Battin et al. 2007, page 6723).

Higher ambient air temperatures will likely cause water temperatures to rise (ISAB 2007, page 16). Salmon and steelhead require cold water for spawning and incubation. Suitable spawning habitat is often found in accessible higher elevation tributaries and headwaters of rivers. In addition, as climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia provide important patches of suitable habitat for salmon and steelhead that will allow them to undertake migrations

through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may increasingly be found only at the confluence of colder tributaries or other areas of cold-water refugia.

There is still a great deal of uncertainty associated with the timing, location and magnitude of future climate change. It is also likely that the intensity of effects will vary by region (ISAB 2007, page 12); however, several studies indicate that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (ISAB 2007, page 29; Battin et al. 2007, page 6722; Rieman et al. 2007, page 1560). The cumulative effects from land use change combined with climate change may further hinder salmon survival and recovery. Additionally, these effects may reduce prey availability for Southern Resident killer whales.

2.3 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). The environmental baseline includes the effects of both human and natural factors affecting the present status of the species, but does not incorporate impacts specific to the proposed action (relicensing Wells Dam). Therefore, future impacts resulting from the future existence and operation of the project (or other hydroelectric projects beyond the action area) and other activities authorized pursuant to the proposed action are not part of the environmental baseline. Rather, the environmental baseline describes the current status of the species, and the factors currently affecting the species, within the action area. The resulting "snapshot" of the species' health within the action area provides the relevant context for evaluating the anticipated effects of the proposed actions on the ESU's and DPS' likelihood of survival and recovery relative to their biological requirements.

The construction of Chief Joseph Dam (completed in 1955) by the Federal government blocked anadromous fish from historical spawning and rearing habitat upstream of RM 545. Private interests built and operated timber splash dams in the Methow and Wenatchee Rivers in the early 20th century, seasonally blocking upstream fish migration. Private and Federal irrigation projects continue to divert water from each of the rivers during critical migration, spawning, and juvenile rearing periods. The Federal GCFMP further influenced the distribution of each species by introducing hatchery Chinook and steelhead from outside of their respective ESU/DPS (including mixed broodstocks) into tributary spawning areas.

Wells Dam is the ninth in the series of Federal (Bonneville, The Dalles, John Day, and McNary) and non-Federal (Wanapum, Priest Rapids, Rock Island, Rocky Reach, and Wells) mainstem dams on the Columbia River, which affect upstream and downstream fish migration, riverine habitat, and hydrology and entrain juvenile fish into turbines. The Federal Grand Coulee Dam, upstream of Chief Joseph (also a Federal dam), due to its large water storage capacity, has the greatest effect on basin hydrology, TDG, and the seasonal hydrograph. Some fish populations have been extirpated, and others continue to persist at critically low levels of abundance. These conditions all existed when the ESA was enacted in 1973 and when UCR steelhead and UCR spring-run Chinook were listed in 1997 and 1999, respectively.

The past and present existence and operation of the Wells Project are critical factors influencing survival in the action area. Mortality and sub-lethal effects (e.g., changes in migration timing or travel time) associated with river impoundments, dam passage, and other aspects of the project are described in the Biological Assessment (BA) (Douglas PUD 2011), Draft Environmental Impact Statement (DEIS) (FERC 2011a) FEIS (FERC 2011b and supplemental BA (Douglas PUD 2011). Douglas PUD has been operating its juvenile bypass system consistent with HCP requirements since formal ESA consultation was completed in 2000, 2002, and 2003 (NMFS 2003).[3] NMFS determined in that biological opinion that the operation of the project would likely achieve the HCP standards for ESA-listed species. Project juvenile survival studies conducted on yearling spring migrating Chinook and steelhead in 1998, 1999, 2000, and 2010 confirmed this determination for ESA listed spring Chinook and steelhead. Adult passage studies and annual adult Passive Integrated Transponder(PIT)-tag monitoring have similarly demonstrated high passage survival, rapid ladder ascension rates and low fall back rates for adult Chinook and steelhead at Wells Dam (Douglas PUD and Anchor, 2008, 2011).

Additionally, the past operation of upstream Federal dams and reservoirs (Grand Coulee and Chief Joseph) and Canadian water storage and hydroelectric projects have affected the environmental baseline within the action area by altering natural seasonal and daily flows, water temperatures, and Total Dissolved Gas (TDG) levels in the mid-Columbia River.

The existence and past operation of the other Federally-owned and PUD-owned projects have substantially affected the migration corridor and former spawning and rearing habitat of the listed species in the areas up and downstream of the action area, and many of these effects will continue into the future. It is also clear that the future effect attributable to the discretionary operation of these projects cannot be considered in the environmental baseline of this opinion because they have not yet happened, undergone ESA section 7(a)(2) consultation, or the consultation has expired or been remanded.

Below we present a more detailed description of specific elements of the environmental baseline within the project action area:

2.3.1 Overview of the Environmental Baseline

The Columbia River within the Wells Project lies in a relatively narrow valley comprising numerous large, dry side canyons and is joined by two major tributaries: the Methow and Okanogan rivers. Land ownership in the Wells Project area is a mixture of local, state, tribal, Federal and private interests, with the majority of land being privately owned and used for agriculture, rangeland, and residences. Agricultural uses include pasture, orchards, nurseries, and dry and irrigated lands used to grow crops. Natural meadow areas and dry shrub-steppe areas are largely used as rangeland for cattle. Residential areas are found primarily around the incorporated cities of Bridgeport, Brewster and Pateros. Major habitats include waterbodies such as the reservoir and associated tributaries; wetlands associated with tributary floodplains and

[3] Note, the HCP was the subject of the 2000 and 2003 consultations, and is included in the baseline. However, the adoption of the HCP into a FERC license for the remainder of the HCP term is the subject of the proposed action, and is therefore not part of the baseline.

low-lying depressions; riparian areas that form the transition from waterbodies and wetlands into adjacent upland communities; and, the adjacent upland communities that include managed agriculture/pasture lands, shrub-steppe, and forest habitats.

For purposes of outlining the environmental baseline conditions of the Wells Project, related facilities, and general Project setting, this section provides a summary of the project components within the action area.

2.3.2 Project Components

2.3.2.1 Wells Dam

Wells Dam is located at Columbia River Mile 515.6. The design of Wells Dam is unique to the Columbia River with the generating units, spillways, switchyard and fish passage facilities combined into a single structure referred to as the hydrocombine. Adult fish passage facilities are located on both ends of the hydrocombine structure. The hydrocombine itself is 1,130 feet long and 168 feet wide with a top elevation at 795 feet above mean sea level (MSL). Its design includes a series of eleven spillway bays and ten separate generating units. The generating units are isolated in individual silo-like structures with the spaces between the units serving as spillway bays. The turbine draft tubes are located below the spillway bays.

Earth embankments extend from the hydrocombine to the west and east abutments. The west embankment is 2,300 feet long and 40 feet above the terrace, with a top elevation of 797 feet MSL. The east embankment is 1,030 feet long with a maximum height of 160 feet above the riverbed. The east embankment also has a top elevation of 797 feet.

2.3.2.2 Wells Reservoir

The body of water formed and directly influenced by Wells Dam is known as Wells Reservoir (Figure 1.). Wells Reservoir consists of portions of three rivers including 29.1 miles of the Columbia River, 1.5 miles of the lower Methow River (Water Resource Inventory Area [WRIA] 48), and 15.5 miles of the lower Okanogan River (WRIA 49). The normal maximum water surface elevation of Wells Reservoir is 781 feet MSL. At this elevation, Wells Reservoir surface area is 9,740 acres, the total storage capacity is 331,200 ac-ft, and the usable storage capacity is 97,985 ac-ft. The Wells Project has an impoundment right of 331,200 ac-ft per year and is authorized to maintain its reservoir level between elevation 781 and 771 feet MSL for power and non-power purposes. The maximum depth of the reservoir under average conditions is >100 feet and the mean depth is 34 feet. The flushing rate varies seasonally with average flushing rates of 0.48 days in June and 2.98 days in January (Douglas PUD 2006).

The Wells Project is a “run-of-river” hydroelectric project meaning that on average, daily inflow to Wells Reservoir equals daily outflow. The inflow to Wells Reservoir is primarily determined by operations of the Federal Columbia River Power System (FCRPS), which is managed for a number of purposes, including flood control, irrigation, power production, protection of fish resources and recreation. In general, the FCRPS is operated to fill upstream storage reservoirs by the end of June, provide augmented summer flows for fish passage and power production through the summer, draft storage reservoirs to meet power demand and salmon spawning

requirements through the fall and winter and, depending on snow accumulations and runoff forecasts, draft for flood control and fill to meet the June refill target through the spring (Douglas PUD 2006). The FCRPS manages for these objectives using releases from storage at Chief Joseph Dam (U.S. Army Corps of Engineers (Corps) and Grand Coulee Dam (United States Bureau of Reclamation [BOR] adjusted for inflow from tributary streams above the Wells Project (Okanogan and Methow rivers) and below the Wells Project (Entiat, Wenatchee, Yakima and Snake rivers).

The uppermost five-mile section of Wells Reservoir immediately downstream from the Chief Joseph Dam tailrace (RM 540 to RM 544.9) is characteristic of a riverine environment. This section of Wells Reservoir is relatively narrow and fast flowing with a precipitous shoreline. The dominant substrate in this upper section is large cobble. The middle 10-mile section between the town of Brewster (RM 530) and just upstream of Chief Joseph State Park (RM 540) is more characteristic of a lacustrine environment. This section of Wells Reservoir is a shallow, relatively broad area containing the confluence of the Okanogan River. Water velocities in this middle section are slower, more of the substrate is composed of fine sediment, and the bathymetry is more gradual than in upper Wells Reservoir. This section has the highest density of aquatic plant communities and has the largest area of littoral fish habitat compared to the other two sections of Wells Reservoir (Le and Kreiter 2006). The lowermost 15-mile section is relatively narrow and fast flowing, compared to the middle section, but eventually slows and deepens as it nears Wells Dam. Shoreline slopes are steep with a relatively high frequency of riprap; substrates in this section tend to be coarse. The exception to these habitat characteristics in the lower section of Wells Reservoir is the area near the confluence of the Methow River, which consists of higher levels of fine substrate.

Lower Methow River

The Wells Project Boundary includes the Methow River from its confluence with the Columbia River to RM 1.5. The lower Methow River drainage is a moderately confined alluvial valley with an average gradient of 0.37 percent (NMFS et al. 1998). Shoreline areas in this 1.5-mile section of the river are highly developed, with the southern shoreline dominated by homesteads, boat docks, and lawns, and the northern shoreline bank dominated by riprap and the City of Pateros. Water quality in the section of the Methow River within the Project is considered excellent (except seasonally for temperature at the mouth) and the substrate is in good condition (NMFS et al. 1998). Although water use data is not specifically available for this portion of the river, aquatic life use, recreation, water supply, and other miscellaneous uses in this portion of the Methow are expected to be the same as those identified for the reservoir component. Similarly, water quality assessment data are expected to be similar to those of the reservoir and would include a Category 5 designation for temperature exceedances (Ecology 2008). The Methow watershed overall currently supports healthy unlisted populations of anadromous summer/fall Chinook as well as ESA-listed stocks of spring Chinook, steelhead and bull trout. Aquatic habitat in the lower section of the Methow River is used by anadromous salmonids (Chinook, steelhead) and bull trout primarily as an adult migratory corridor to access spawning areas in the upper reaches and by juvenile anadromous salmonids for rearing and as a migration corridor (Ecology 1992).

Lower Okanogan River

The Wells Project Boundary includes the Okanogan River from its confluence with the Columbia River to RM 15.5(Figure 1.). This lower section of river flows through a U-shaped, unconfined alluvial valley, has a gradient of 0.03 percent, and consists of mostly eroded banks and straight and impounded stream types (NMFS et al. 1998). Riparian vegetation is dense, but is not of suitable height to provide adequate shading of the river, which is > 100 feet wide throughout most of the lower reach (Douglas PUD 2006, Ecology 2009). The entire Okanogan River drainage is a broad valley composed of deep glacial deposits that are highly erodible. Substrate in the Project area component of the river is primarily gravel and increases in size to primarily cobble substrate heading northward (Ecology 2009). The State of Washington has designated the Okanogan River for salmonid spawning, rearing and migration, recreation (primary contact), water supply uses (domestic, industrial, agricultural, and stock watering), and miscellaneous uses such as wildlife habitat, harvesting, commerce/navigation, boating and aesthetics (Ecology 2006).

The lower portion of the Okanogan River (south of the U.S.-Canada boundary), including the 15.5 miles within the Wells Project Boundary was put on the 303(d) list for Dichlorodiphenyldichloroethylene (DDE), Dichlorodiphenyldichloroethane, DDD, and Polychlorinated Biphenyl (PCBs) concentrations above standards in 1994 (Ecology 2008). Water quality problems were attributed to irrigation return flows, livestock impacts on bank vegetation and stability, erosion from non-irrigated cropland, and forest harvest practices, such as road construction (NMFS et al. 1998). Subsequent assessments resulted in Ecology removing the lower Okanogan River within the action area from the 303(d) list in 2004.

Water temperatures in this portion of the river are known to exceed the state's water quality standards (WQS) for anadromous fish rearing and migration during summer months (Ecology 2008). Water temperature modeling demonstrated that with the Wells Project in place, water temperatures in the reservoir and the lower reaches Okanogan and Methow rivers do not increase by more than 0.3°C compared to the without-Wells Project condition. The analysis also showed that the intrusion of the Columbia River water into the lower 1-2 miles of the Okanogan River and lowest mile of the Methow River can significantly decrease the temperature of warm summer inflows from upstream, and can also moderate the cold winter temperatures by 1-3°C, reducing the spatial and temporal extent of freezing (Douglas PUD 2008). Based upon the model, exceedances of water temperatures for salmon rearing and migration, both within and upstream of the Wells Project, are believed to be a result of natural phenomena (low gradient, low instream flow, natural lake impoundments, arid conditions and solar radiation on the upstream waterbodies) and are not attributed to the presence of the Wells Project (Douglas PUD 2006). Despite temperatures in exceedance of the WQS for salmonids in some portions of the river, the Okanogan River watershed supports the Columbia Basin's largest run of anadromous sockeye and healthy, harvestable runs of summer/fall Chinook (NMFS et al. 1998). The Okanogan Basin also supports ESA-listed steelhead. The lower section of the Okanogan River within the action area is used by adult steelhead as a migration corridor and by juvenile steelhead for rearing and migration (NMFS et al. 1998).

2.3.2.3 Wells Tailrace

The Wells Tailrace, as defined in the Wells HCP, is the body of water from the base of Wells Dam to a point 1,000 feet downstream of the dam. The Wells Project Boundary extends to a point 1.2 miles downstream of the dam. The width of the tailrace at the downstream face of the powerhouse is 1,000 feet. The tailrace width is approximately 1,900 feet at its widest point.

The tailrace begins at the exit of the draft tubes and consists of natural bedrock. Rock riprap lines the immediate left and right banks of the tailrace to prevent erosion caused by currents produced during larger spill events. An excavated rock trap, approximately 13 feet deep and 30 feet wide, runs the length of the hydrocombine, immediately downstream of the draft tube exit sill. The trap was excavated into bedrock during construction of the dam based on the results of hydraulic model testing of tailrace scour during operation of the spillways. High spill volumes during early operations of the project filled the rock trap with riverbed materials as predicted by the model studies. The trap was re-excavated in 1967 to remove the deposited materials. The trap is cleaned out when accumulated debris approaches height in the trap that would create a potential for debris to fall back into the draft tube exits. The rock trap has been excavated twice since 1967, most recently in August 2006. Debris is removed by a barge-mounted crane with a 70-foot arm and a clamshell bucket, and placed on a second barge for removal. Material is deposited offsite in remote upland areas.

The tailwater of the Wells Project is influenced by the reservoir of the Rocky Reach Project, located 42 miles downstream. The tailwater level of the Wells Tailrace is a result of both the flow of water through Wells Dam and the forebay elevation maintained by the Rocky Reach Project. For example, a discharge of 200 thousand cubic feet per second (kcfs) from Wells Dam and a Rocky Reach Reservoir elevation at its normal elevation of 707 feet would result in an approximate tailwater elevation of 718 feet. A lesser discharge of 100 kcfs from Wells Dam and a Rocky Reach Reservoir elevation of 707 feet would result in an approximate tailwater elevation of 711 feet.

2.3.2.4 Wells and Methow Hatchery Programs

The Douglas PUD Hatchery Program is designed to address effects on anadromous fish that are attributed to the existence and operation of the Wells Project, mitigating for project related mortality of up to 7 percent for each listed species—UCR spring Chinook and steelhead not addressed by flow and passage measures. To meet HCP production goals, Douglas PUD owns and provides funding for the operation and maintenance of two hatchery facilities: the Wells Hatchery and the Methow Hatchery. The PUD funds WDFW to operate both the Wells and Methow hatchery programs.

2.3.2.5 Summary

Baseline conditions in the action area, including the lower reaches of the Methow and Okanogan rivers, are affected by a wide variety of past and present land management activities and natural phenomena such as wildfires and flood events in the Okanogan and Methow basins. We listed these in the 2003 opinion (NMFS 2003) to include the following in and upstream of the action area:

1. Habitat is eliminated, cut off, or blocked
2. Habitat is degraded
3. Reduced or altered flows (water withdrawals or water storage facilities)
4. Reduced channel migration, complexity, and flood-plain function
5. Altered channel morphology (increased width-to-depth ratios)
6. Reduced riparian vegetation (quantity and quality)
7. Water quality is degraded
8. Elevated late summer and fall temperatures

This section describes an environmental baseline of lower tributary and mainstem conditions that range from highly functional to severely degraded. We consider the effect of whether the proposed action jeopardizes listed species and adversely modifies critical habitat within the context of these baseline conditions.

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

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). NMFS did not identify any interrelated or interdependent effects of the action in this consultation. 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 those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. 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." Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not considered in this analysis.

2.4.1 Method of Analysis

In this step of its analytical 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. NMFS then looks at effects on individual fish and on the affected population(s). Finally, NMFS considers effects on the essential features of any designated critical habitat within the action area.

FERC's proposed action is to relicense the Wells Hydroelectric Project. The action includes continued operation and maintenance of the project along with several conservation measures.

The measures include continuation of the Wells Anadromous Fish Agreement and Habitat Conservation Plan, which includes a Passage Survival Plan, a Juvenile Passage Survival Plan, an Adult Passage Plan, a Tributary Conservation Plan, a Hatchery Compensation Plan, and a Predator Control Program. The licensee also proposes to implement an Aquatic Settlement, which includes a Water Quality Management Plan, a White Sturgeon Management Plan, and a Pacific Lamprey Management Plan, and a Bull Trout Management Plan. There are additional measures proposed in the Final License Application and in the DEIS that are not expected to affect listed species or their designated critical habitat.

2.4.2 Spring-run Chinook salmon

2.4.2.1 Analysis of Effects

The prospective FERC operating license incorporates all the terms and conditions of the Wells HCP. The objective of the Wells HCP is to achieve no net impact (NNI) throughout the HCP duration in terms of survival through the action area for each plan species including UCR spring-run Chinook salmon.[4] The Wells HCP outlines a schedule for meeting and maintaining NNI throughout the 50-year term of the agreement. NNI consists of two components: 1) a 91 percent combined adult and juvenile Project survival (CAJPS) standard for the reach from the Wells tailrace to the point at which a juvenile enters or an adult exits the reservoir and 2) up to 9 percent compensation for Wells Project related mortalities. The 9%, compensation to meet NNI is divided into two categories, up to 7% can be provided through funding a hatchery program and up to 2% through funding enhancements to tributary habitats used by UCR spring Chinook. The 91% CAJPS standard translates to approximately 98% adult survival and approximately 93% juvenile survival (0.98 x 0.93 = 0.91). The Wells Project presently meets the NNI criteria.

The Wells HCP also requires the formation of four committees that are used to implement, monitor and administer the agreement namely policy, coordinating, hatchery, and tributary committee.

The Wells HCP contains various plans for implementing the components of the agreement. These plans include the Passage Survival Plan (HCP Section 4), Wells Dam Juvenile Dam Passage Survival Plan (HCP Section 4.3), Tributary Conservation Plan (HCP Section 7), Hatchery Compensation Plan (HCP Section 8), Adult Passage Plan (HCP Section 4.4 and HCP Appendix A) and a Predator Control Program (HCP Section 4.3.3). These plans were developed specifically to enhance populations of Plan Species with particular emphasis placed upon the enhancement and recovery of spring Chinook and all are incorporated into the proposed license.

The Wells Project, with its conservation measures, is operated to facilitate upstream and downstream migration of spring Chinook salmon and to limit its adverse effects. Mitigation and operational activities address all affected components of the life history of UCR spring Chinook, as described below.

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[4] The other "Plan" species addressed by the HCP are ESA-listed UCR steelhead (Section 2.4.4) and unlisted UCR summer/fall-run Chinook salmon (*O. tshawytscha*), Okanogan sockeye salmon (*O. nerka*), and reintroduced coho salmon (*O kisutch*).

Spawning, Incubation, and Larval Development

Adult spring Chinook use the Wells Reservoir as a migration corridor and typically pass through the project in May and June to access spawning habitat in the Methow River. Reproduction and early development of spring Chinook occurs in the upper reaches and tributaries to the Methow rather than in the action area for this consultation. While Project-related hatchery production does affect conditions in the lower reaches of the Methow, the effects of these activities are considered in separate consultations on the Section 10 permits for these programs. The effects of habitat improvements under the HCP's Tributary Conservation Plan are also addressed in separate project-specific consultations. For this analysis, NMFS considers only the applicant's funding of the hatchery and habitat improvement programs, which are designed to mitigate for project-related mortality, as likely to increase the viability of UCR spring-run Chinook salmon.

Rearing and Migration within the Action

Area Spring Chinook spend the majority of their early development rearing in tributaries to the Wells Project. As these larval fish mature to fry and then yearling smolts, they emigrate downstream through the action area from April through June on their outbound journey to the ocean. Smolts emigrate at a relatively constant rate that provides little time for sedentary behavior such as feeding or holding in the lower Wells Project tributaries or reservoir. As a result, the lower Methow River and Wells Reservoir serve primarily as a migratory corridor as juveniles pass through.

Smolt exposure to Wells Project effects is for a brief duration and limited distance, primarily for fish migrating from the mouth of the Methow River to 1.2 river miles below Wells Dam (a distance of 7 miles). Survival standards set by the HCP and incorporated into the proposed license ensure that survival will be at or above 93 percent for spring Chinook smolts migrating through the Wells Project (reservoir plus dam) over 95 percent of the juvenile migration. Current monitoring indicates juvenile project survival is greater than 96 percent (Bickford et al 2011), contributing to the combined adult plus juvenile survival standard (91%).

Project-related conditions that smolts are likely to encounter during migration through the Action Area include reservoir stage fluctuations, reservoir impoundment, and exposure to predators. The Wells Project has a 10-foot operating range, but typically operates within the upper one to two feet of the reservoir on any given day. During the five year operation period from 2001 through 2005, the reservoir typically operated within the upper four feet (elevation 781 to 777 feet MSL in elevation) 95 percent of the time (DTA 2006). Infrequent operations resulting in fluctuations over four feet in a 24-hour period have occurred 1 percent of the time from 2001 through 2005 (DTA 2006). Reservoir stage fluctuation is a result of the flood control and water storage/release functions of the large Federal Columbia River projects upstream from the action area. When water is scheduled to arrive from an upstream reservoir, enough is released from Wells Reservoir to accommodate the incoming volume.

Reservoir impoundment and predator exposure are linked components of Wells Project effects that result from the reduced velocity and stability of the reservoir environment. The slowed downstream flow velocity within the reservoir increases the smolt travel time from the natal tributary to below the dam. The reservoir environment also favors northern pikeminnow, which

is a native predator of migrating smolts. The increased travel time within the reservoir results in elevated exposure to pikeminnow predation. To address this issue, a predator removal program was created under the HCP to reduce the number of pikeminnow in the reservoir and tailrace of Wells Dam; this program is incorporated into the proposed license.

Predator removal program under the proposed license

Increased travel time and larger populations of fish predators in Wells Reservoir are likely to increase rates of mortality for yearling Chinook salmon above those that would occur in an unimpounded reach. However, predator removal activities themselves can lead to harassment, capture and death of some juvenile salmon. To reduce predation rates, Section 4.3.3 of the Wells HCP, which is incorporated into the proposed license, requires Douglas PUD to implement a targeted northern pikeminnow, piscivorous bird and piscivorous mammal harassment and control program. In the 15-year history of the program, no Chinook salmon have been captured or killed in the course of implementing the NPRP, but from its inception in 1995, over 212,000 northern pikeminnow have been removed.

From 1995-1999, the NPRP implemented by Douglas PUD consisted mainly of experienced anglers using hook and line techniques to remove northern pikeminnow from Wells Project waters. Traditionally, hook and line angling has lacked the ability to target the predator species specifically. From 2000 to the present, the NPRP has used a setline fishing system, which has proven to be more effective at targeting northern pikeminnow. Further, setline gear (small hooks baited with dead crickets), which fishes deeper in the water column, has a low probability of catching Chinook. Lines are checked daily and any species other than northern pikeminnow is released. For the purposes of this analysis, NMFS makes the conservative assumption that no more than 20 juvenile and 4 adult Chinook will be captured and no more than 10 juveniles and 2 adults will be killed annually in the process of implementing the NPRP.

Implementation of the Aquatic Settlement Agreement

One objective of the White Sturgeon Management Plan (WSMP) is to enhance white sturgeon populations through artificial propagation. The increased number of sturgeon may result in elevated rates of predation on yearling Chinook. The WSMP has provisions for adaptive management of supplementation activities should conflict develop between stocked sturgeon and ESA-listed species. The WSMP, which is incorporated into the proposed license, includes an intensive monitoring and evaluation program that will be used to adjust the number of juvenile sturgeon stocked in the Wells Project and to inform harvest management for adult sturgeon to protect juvenile salmon. In the process of implementing the sturgeon studies, Douglas PUD is likely to capture no more than four adult spring Chinook and of these to kill no more than two annually.

Other predation threats include increases in the population of Pacific lamprey and bull trout attributed to the implementation of these respective management plans. Increases in these populations may result in an unknown reduction in juvenile Chinook abundance.

Piscivorous birds and mammals also pose a threat to juvenile spring Chinook. The primary focus of managing these threats is not removal but access deterrents such as hazing using propane cannons, pyrotechnics and the physical presence of hazing staff. Other access deterrents include

steel wires across the hatchery ponds and project tailrace, fencing and covers for hatchery ponds, and electric fencing. The minor increase in human activity because of these predator control measures is unlikely to injure or kill listed Chinook salmon. When hazing and other access deterrents fail, USDA Wildlife Services staff can implement options for lethal removal; NMFS (2003) previously considered the effects of lethal predator removal on UCR spring Chinook salmon.

The Aquatic Settlement Agreement (SA) also includes an Aquatic Nuisance Species Management Plan (ANSMP) that could affect Chinook. Douglas estimates that plan implementation may cause take of up to one-tenth of one percent of both juvenile and adult Chinook or up to two individual adult fish. The Resident Fish Management Plan (RFMP) includes studies that could also cause take of listed Chinook, again at an estimated rate of one-tenth of one percent of adult and juvenile fish. Douglas will also conduct bull trout studies for passage, stranding, and sub-adult monitoring that will likely cause incidental take of co-mingled Chinook. This annual take is estimated by Douglas at less than two adult Chinook in the passage studies and less than one-tenth of one percent of juvenile Chinook during surveys and monitoring.

Tributary Rearing and Migration

Some habitat improvement activities associated with the operation of the Wells Project are also expected to take place in spawning and rearing habitat in the upper portions of the Methow River basin. As described below, a separate Section 7 consultation is initiated for any project with a Federal nexus funded by the Wells Plan Species Account. Because the program is designed to mitigate for up to 2 percent loss of listed UCR spring-Chinook through the Project, the applicant's commitment to fund this program is likely to benefit UCR spring-run Chinook.

Tributary (Habitat) Conservation Plan

The Tributary Conservation Plan (TCP) found in Section 7 of the Wells HCP and incorporated into the proposed license, guides the funding and allocation of dollars from the Plan Species Account. The intended goal of the dollars allocated to the Plan Species Account is to compensate for up to two percent unavoidable adult and/or juvenile mortality of Plan Species passing through Wells Project. The purpose of the Plan Species Accounts is to fund protection and restoration of tributary habitats for Plan Species within the action area, and within the upper portions of the Methow and Okanogan rivers that are accessible to spring Chinook.

A detailed description of the TCP, the Plan Species Account, and its allowable uses can be found in Section 7 of the Wells HCP. Some direct and indirect effects to spring Chinook may occur resulting from implementation of actions funded by the TCP, as analyzed below and considered in this opinion. As stated above, a separate Section 7 consultation is initiated for any project with a Federal nexus funded by the Wells Plan Species Account so site-specific effects (e.g., construction-related disturbances) are not evaluated in this opinion.

The Tributary Committee, comprising representatives from various fisheries agencies and the Yakama Nation and Colville Confederated Tribes (signatories to the Wells HCP), is guided by the general strategy outlined in supporting documents (see TCP) to the Wells HCP. The premise of the TCP is to protect existing productive habitat and restore high priority habitats by

enhancing, when practical, natural processes that, over time, will create and maintain suitable habitat conditions without human intervention. The NMFS representative on the Tributary Committee ensures that any take resulting from these activities is minimized.

In accordance with the Wells HCP, the TCP provides funding to third-party conservation efforts in the Methow and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee are submitted to the TCP committee. Examples of projects funded by the TCP may include, but are not limited to: 1) providing access to currently blocked stream sections or oxbows; 2) removing dams or other passage barriers on tributary streams; 3) improving or increasing the hiding and resting cover habitat that is essential for these species during their relatively long adult holding period; 4) improving in-stream flow conditions by correcting problematic water diversion or withdrawal structures; or 5) purchasing (or leasing a perpetual basis) conservation easements to protect or restore important aquatic habitat and shoreline areas.

The Tributary Committee decides if the projects are funded. Projects must also be reviewed by state and Federal agencies before receiving permits for construction projects. Tributary habitat projects will be designed to benefit spring Chinook through the protection and enhancement of critical habitat (USFWS 2002). Projects that increase instream flow volume in the Methow Basin will benefit all life stages of spring Chinook by enhancing migration corridors, pool depth, in-stream cover, and preferred water temperatures.

Adult Upstream Passage through the Wells Reservoir and Facilities
Four specific components of the adult migrations upstream and downstream of Wells Dam may affect Chinook: delay at project fishways, fallback, passage success at Project structures, and injuries and mortalities resulting from upstream (via fishways) as well as downstream (via turbines, spillways, or juvenile bypass systems) passage through the Wells Project. Each of these components has the potential to increase adult mortality compared to the system without the Wells Project (NMFS 2002a).

Upstream passage of adult spring Chinook through the fish ladders at Wells Dam has historically occurred from April through early July. Wells Dam has two adult fish ladders, located on the east and west ends of the hydro combine. Each fishway contains a single main entrance, a collection gallery, a fish ladder, an adult count station, trapping facilities, and an exit in the forebay adjacent to the earthen embankment section of the dam.

Fishways are inspected daily to ensure debris accumulations are removed, automated fishway instruments are calibrated properly and lights in the fishway are functioning. Both upstream fishway facilities are operational year around with maintenance occurring on each fishway at different times during the winter to ensure that one upstream fishway is always operational. Maintenance activities on Wells fishways occur during the winter when spring Chinook are unlikely to pass Wells Dam.

Implementation of the Pacific Lamprey Management Plan (PLMP) could have impacts on ESA listed Chinook. The PLMP requires both structural and operational changes to the adult fish ladders at Wells Dam. The HCP CC and Aquatic Settlement Working Group (SWG) will study

these changes toward ensuring that negative effects of passage changes for the benefit of lamprey do not exceed the following effects on UCR spring Chinook:

- Up to 20 percent of adult spring Chinook experience increased delay.
- Less than 1 percent of adult spring Chinook handled during lamprey passage studies and of these, less than 0.1 percent killed or injured.
- Less than 50 adult spring Chinook incidentally captured and released during lamprey passage studies and of these, less than 4 adults killed or injured.

Passage Survival Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of juvenile and adult losses for each of the Plan Species, including UCR spring Chinook salmon, passing through the Wells Project. This section of the plan also contains specific survival standards that must be achieved within defined time frames in order for Douglas PUD to be considered in compliance with the terms of the Wells HCP (Douglas PUD 2002).

The Adult Passage Plan, contained within Section 4.4 and Appendix A, is a subcomponent within the larger Passage Survival Plan of the Wells HCP. The Adult Passage Plan is intended to ensure safe and rapid passage for adult Plan Species as they pass through the fish ladders at Wells Dam. The plan contains specific operating and maintenance criteria for the two adult fish ladders and the two adult fish ladder traps, and provides details regarding the implementation of passage studies on adult Plan Species including studies related to survival rates, timing, and rates of fallback.

Using available telemetry studies, NMFS (2002a) compared the migration rates of adult Chinook salmon, steelhead, and sockeye salmon through both impounded (dams and reservoirs) and unimpounded reaches of the Snake, mid-Columbia, and lower Columbia rivers. In each case, migration rates (miles/day) through the mid-Columbia River generally exceeded migration rates through unimpounded reaches of the Snake or Columbia rivers and were very similar to those observed in the other impounded reaches (13 to 36 miles/day versus 6 to 19 miles/day in unimpounded reaches or 15 to 40 miles/day in other impounded reaches, respectively). Additionally, calculation of adult conversion rates (the proportion of tagged individuals detected at location (Y) that were previously detected at location (X) illustrates the successful migration of adults through the mid-Columbia River (Table 1). Conversion rates include a combination of mortality attributable to non-project related causes (e.g., recreational and tribal harvest, predation, and disease) and dam passage, as well as non-detections resulting from straying and spawning below Wells Dam. The nearly 100 percent per-project survival of PIT-tagged adult spring Chinook through the mid-Columbia hydroelectric projects indicates the relative benign nature of adult project passage and a low mortality from all causes combined.

This body of information suggests that passage through the Wells Project is not likely to cause pre-spawning mortality or loss of condition. A brief delay at the dam is more than compensated for by a faster travel time through the reservoir NMFS (2002a). In addition, any delay that does occur is less likely to affect UCR spring Chinook, which hold in the rivers or streams for considerable periods of time prior to spawning than unlisted UCR summer/fall Chinook or

sockeye salmon, which spawn soon after completing their migration. This conclusion is supported by Table 1.

Table 1. Adult Conversion Rates from the PIT-tag detection arrays in the fishways at Priest Rapids to the PIT-tag detection arrays near the fishway exits at Wells Dam for All Available Release Groups of UCR spring Chinook salmon released above Wells (Douglas PUD and Anchor Environmental. 2012)

Stock species	Priest Rapids Dam	Wells Dam	Priest Rapids to Wells Total Conversion Rate	Priest Rapids to Wells Average Per Project Conversion Rate
All releases spring Chinook 2003-2010	667	646	97%	99.2%

Adult Downstream Passage through the Project Reservoir and Facilities

Fallback is defined as voluntary or involuntary movement of a fish downstream past a dam once upstream passage has been achieved. Adult spring Chinook that fall back through the dam after exiting the fish ladder could be injured by contact with structural features of the dam (spillways, turbines, and juvenile bypass, and fish ladder).

Fallback rates of spring Chinook salmon at the Project are probably low. Studies with spring- and summer/fall-run Chinook indicate that fallback rates at the Wells Project `are 3.6 to 5 percent (NMFS 2002a). Survival standards from the Wells HCP, which are incorporated into the proposed license, ensure that survival will be at or above 98 percent. Adult PIT-tag studies demonstrate that downstream survival through the Juvenile Bypass System (JBS) is greater than 98 percent for the project (Douglas PUD and Anchor Environmental, L.L.C. 2010). The majority of fallback takes place through the JBS, which is in operation during the entire spring Chinook migration and fallback time frame.

Passage success and survival at dams as measured using radio telemetry methods cannot be used to isolate specific cause-and-effect relationships between passage and reproductive success. In addition to possible project-related passage problems (inadequate attraction flow, poor design, project operations) numerous non-project related factors can result in failed passage. Fish that fail to ascend a dam may have been destined for a downstream spawning location, may have been injured as a result of natural or other factors or may have been injured or taken during commercial, ceremonial, and subsistence, or recreational fisheries. Tagging effects or loss of tags can also be manifested in the data set and affect these conclusions, none of which are related to operation of the facilities (NMFS 2002a). As a result, information obtained from radio telemetry studies provides a general rather than cause-and-effect assessment of passage success over dams, and can be used to develop an index to assess annual improvements in passage (NMFS 2002a).

NMFS has summarized the available radio telemetry studies in order to estimate per project adult survival for each of the ESA-listed species through the FCRPS dams and reservoirs on the mainstem lower Snake and Columbia rivers, which are similar to the mid-Columbia hydroelectric projects. Passage survival estimates at these FCRPS projects are generally

applicable to the FERC-licensed projects on the mid-Columbia River for both listed and unlisted species. Previous estimates of average per-project mortality rates were 2.4 percent for spring Chinook salmon (NMFS 2000a, based on data in NMFS 2000b). More recently, adult PIT-tag estimates from 2003-2011indicate per project survival is greater than 99 percent (see Table 1).

Juvenile Passage

The Passage Survival Plan contained within Section 4 of the Wells HCP and the proposed FERC license provides specific detail regarding the measurement of mortality rates for juvenile spring Chinook passing through Wells Dam. This section of the plan also contains specific survival standards that must be achieved within defined time frames in order for the licensee to be considered in compliance with the terms of the Wells HCP and the proposed license (Douglas PUD 2002).

Additionally, Section 4.3 of the Wells HCP contains specific criteria directed at the Wells JBS, spillway, and turbine operations. This section of the Wells HCP outlines specific bypass operational criteria, operational timing and evaluation protocols to ensure that at least 95 percent of the juvenile Plan Species, including spring Chinook, are provided a safe, non-turbine route through Wells Dam. The operational dates for the bypass are set annually by unanimous agreement of the parties to the Wells HCP, but are typically from early April through August. This plan also includes specific operating criteria for the turbines and spillways sufficient to maximize fish use and survival through the juvenile bypass system (USFWS 2004). The Wells bypass system is an important feature of the Wells Project that contributes significantly to Douglas PUD's ability to achieve the No Net Impact (NNI) survival standards outlined in the Wells HCP and that are incorporated into the proposed license.

The JBS uses five of eleven spillways equipped with constricting barriers to help attract and guide juvenile migrating fish. Since most juvenile salmon migrate near the surface, with the help of the bypass system, they successfully pass Wells Dam and avoid the turbine intakes located deeper in the forebay. Over the past several years, the HCP Coordinating Committee has agreed to initiate the operation of the bypass system on April 12 and to shut it down on August 26. This operating period is consistent with greater than 95% of juvenile spring Chinook downstream migration. Starting in 2012, the bypass system will be initiated on April 9 and will terminate on August 19, which will continue to cover~~s~~ greater than 95% of the yearling Chinook migration.

The JBS is an efficient method of bypassing fish away from turbines and safely over the dam. This configuration has demonstrated exceptionally high levels of protection while using 6-8 percent of the Columbia River flow. The efficiency and effectiveness of the bypass system are important factors in limiting the amount of spill, and therefore TDG (see Water Quality), while maximizing fish passage and survival.

Based upon information collected at other hydroelectric projects, juvenile fish survival is estimated to range from 90 to 93 percent for turbines, 98 to 99 percent for bypass systems, and 98 to 99 percent for spillways (NOAA 2003). Some juvenile mortality is associated with all dam passage routes; although the highest levels of mortality typically occur during passage through turbines. Consequently, an important objective of project operations aimed at improving juvenile survival is to route the highest possible proportion of juveniles past the project in a

manner that avoids passage through turbines. The proportion of smolts that pass a project through bypasses or over spillways is an important indicator of the effectiveness of fish passage protection measures.

Survival standards outlined in the Wells HCP and incorporated into the proposed license ensure that total juvenile survival past the project through all the dam passage routes will be at or above 93 percent. Douglas PUD has conducted four years of juvenile survival studies at the Wells project, which have shown an average survival rate of 96.3 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001; Bickford et al. 2011). This is the highest survival rate for any project on the Columbia or Snake rivers.

Hatchery Compensation Plan

The HCP, as described in Section 8 of the Wells HCP and as incorporated into the proposed license, was established to provide hatchery compensation for up to 7 percent of juvenile passage losses, incidental to the Project's purposes, of Plan Species including yearling UCR spring Chinook passing through Wells Dam. Effects of hatchery facilities and their operations are considered in separate consultations on their respective Section 10(a)(1)(A) permits (NMFS 2002c). The continued reliance on hatchery production beyond the specific permits is an assumption built into the HCP and this consultation, but the details of extending any hatchery program beyond these permits will be the subject of future consultations (presently underway) on hatchery and genetic management plans submitted to NMFS by the PUDs and any co-managers.

Water Quality

Several studies have assessed the water quality within the Wells Project and all indicate that Wells Reservoir is a healthy, riverine water body with no thermal or chemical stratification (EES 2006; Ecology 2008, 2009). Studies have also demonstrated that the water found within the mainstem portion of the action area is of high quality and is frequently in compliance with the State standards for all of the parameters measured. The seasonal water temperature exceedences that occur in the lower Methow and Okanogan rivers are due to conditions further upstream in the tributaries rather than in the mainstem Columbia.

To assess compliance with the State temperature standards, two 2D laterally-averaged temperature models (using CE-QUAL-W2) were developed that represent existing (or "with Project") conditions and "without Project" conditions of the Wells Project including the Columbia River from the Chief Joseph Dam tailrace to Wells Dam, the lowest 15.5 miles of the Okanogan River, and the lowest 1.5 miles of the Methow River. The results were processed to develop daily values of the seven-day average of the daily maximum temperatures (7-DADMax), and then compared for the two conditions (WEST. 2008). The model analyses demonstrated that "with Project" temperatures do not increase more than 0.3°C compared to ambient ("without Project") conditions anywhere in the reservoir, and that the Project complies with state water quality standards for temperature.[5] The analyses also show that backwater from the Wells

[5]NMFS (2008 = BioP on EPA's approval of WDOE's temp std [find at https://pcts.nmfs.noaa.gov/pls/pcts-pub/sxn7.pcts_upload.download?p_file=F8044/200702301_water_quality_02-05-2008.pdf`]) determined that EPA's approval of these standards was not likely to jeopardize UCR spring Chinook or destroy or adversely modify its designated critical habitat.

Project into the lowest 1-2 miles of the Okanogan River and lowest 1.5 miles of the Methow River can significantly decrease the temperature of warm summer inflows from upstream land use practices in these tributaries as well as moderate the cold winter temperatures by 1-3°C, reducing the extent and length of freezing (WEST. 2008).

Operation of the spillways can result in supersaturated levels of total dissolved gases. Supersaturated gases in fish tissues may pass from the dissolved state to the gaseous phase as internal bubbles or blisters. This condition, gas bubble trauma (GBT) or GBD, can be debilitating or even fatal. Injury and mortality of juvenile Chinook is also likely to occur because of contact with spillway or turbine structures. Douglas PUD closely monitors TDG level and as stated within Objective 1 of the Water Quality Management Plan and incorporated into the proposed license, Douglas PUD will implement "reasonable and feasible measures" to ensure that Wells Project is in compliance with TDG standards (Douglas PUD 2009).

Each year from 2003-2008, Douglas PUD implemented spill testing activities to examine the relationship between water spilled over the dam and the production of TDG, to better understand TDG production dynamics resulting from spill operations at Wells Dam. These results were subsequently used by IIHR-Hydroscience and Engineering of University of Iowa to develop and calibrate an unsteady state three-dimensional (3D), two-phase flow computational fluid dynamics (CFD) tool to predict the hydrodynamics of gas saturation and TDG distribution within the Wells tailrace. These tools were then used to reliably predict TDG production at Wells Dam and establish how preferred operating conditions and spillway configurations can be used as methods to manage TDG within water quality (WQ) numeric criteria (Politano et al. 2009). The final model run, performed by Iowa, showed that preferred spillway operating configurations were able to reduce tailrace TDG to levels within Washington State WQS (< 120%) during a flood event equal to 246 kcfs (Politano et al. 2009).

During periods of extremely high river discharge, even spillway operations at Wells Dam cannot keep tailrace levels of TDG from exceeding 120 percent. For example, in 2011, mean daily discharges in the mid-Columbia (measured at a United States Geological Survey (USGS) gage located 2.6 river miles downstream of Priest Rapids Dam) were an average of 61 percent higher during the spring fish spill season and 65 percent higher during summer compared to 2000 to 2010 (Keeler 2011). Part of the increased TDG was due to involuntary spill at Wells Project and part was due to concurrent maintenance activities at Grand Coulee Dam. Although some of these values were mitigated at Chief Joseph Dam through use of the newly installed spillway deflectors, TDG values as high as 130 percent were observed coming into the Wells Dam forebay (Corps 2011) and tailrace values ranged from 105.4 to 137.8 percent (Fish Passage Center 2011). However, this condition is highly unusual so the overall risk that spring Chinook in the action area will be exposed to TDG >120 percent is small.

Under the proposed action, Douglas PUD will monitor juvenile spring Chinook in the Rocky Reach bypass system for signs of GBT. Sampling is likely to affect >1 percent of the run encountered, with lethal take of less than 100 juvenile fish. Adults will also be monitored, but these will be fish already collected for hatchery broodstock or monitoring and evaluation or state stock assessments, and the take associated with this activity is considered as part of the consultations on the HGMP Section 10 permits.

Water Quantity

Fluctuations in the quantity of water discharged from large storage projects in the upper Columbia River (e.g., Chief Joseph and Grand Coulee dams) can alter reservoir environments downstream in ways that affect spring Chinook. These alterations include fluctuations in reservoir stage that can strand individuals in nearshore habitat or increase travel time and therefore exposure to predators. However, the Wells Project is a run-of-river project (average daily inflow equals daily outflow) and active storage capacity is limited to a range of one to two feet on a daily basis. Reservoir operations below 774 feet, which have the potential to strand fish in off-channel pools generally occur no more than once a year. Surveys during conditions that could have resulted in stranding were conducted in 2006 and 2008, but no stranding of spring Chinook was observed (Douglas 2008).

Riparian Cover

Impoundments are likely to have altered the riparian vegetation within the action area from previous conditions. For example, fluctuations in the elevation of Wells Reservoir are likely to influence the distribution and composition of riparian vegetation, which in turn affects cover, food production, temperature, and substrate. Thus, the effects of changes in riparian vegetation resulting from the proposed action are likely to be expressed in the survival rates of juvenile and adult Chinook. Currently, survival rates through the Project (reservoir plus dam) (>96 percent for juveniles and 98 percent for adults) are above the HCP standards. Thus, changes in riparian cover due to reservoir fluctuations are not limiting the survival of Chinook from the Methow population.

Project Maintenance & Repairs—Fish Ladders & Turbines

Douglas PUD will periodically dewater the fish ladders and turbines to conduct maintenance and repairs. While dewatering the fish ladders, the PUD will collect and release all (100 percent) of the spring Chinook it encounters. Of these, up to 5 adult and <35 juvenile Chinook are likely to be killed or injured each year.

Douglas PUD will collect and release up to 10 adults and 50 juvenile Chinook per dewatered turbine unit. Of these, up to 2 adults and 10 juveniles maybe killed or injured annually.

Research, Monitoring & Evaluation

Douglas PUD will conduct a number of fish passage survival and behavior studies under the proposed action, as described below. Numbers of spring Chinook expected to be handled, injured, or killed are shown in Table 2.

Table 2. Juvenile and adult passage studies and effects on UCR spring Chinook under the proposed action (per year).

Study or Program	Purpose	Annual Take
Adult Passage Plan	Monitoring and evaluation	Collect, tag, and release <5% of adults at Wells Dam. Lethal take of <10 adults (Sublethal take included as part of lethal take throughout the table.)
Juvenile Fish Passage Plan	Monitoring and evaluation	Collect, anesthetize, and release up to 5% of juveniles at Wells Dam. Collect, anesthetize, tag, transport, and release up to 2% of juveniles. Lethal take of <3% of juveniles that are collected, tagged and released. Lethal take of <2% of juveniles that are collected and released. Incidental collection and release of up to 20 adults; lethal take of no more than 2 adults.
Route specific[1] passage survival after structural modifications	Monitoring and evaluation	Collect, transport, anesthetize, tag and release up to 5,000 juvenile hatchery fish. Lethal take of up to 100% of the study fish.
Juvenile passage and behavior studies	Monitoring and evaluation	Collect, transport, anesthetize, tag and release up to 2% of juveniles and adults passing Wells. Lethal take on <1,000 juveniles. Incidental collection and release of up to 20 adults. Lethal take of no more than 2 adults.

[1] Bypass, spillway, and turbine routes

By ensuring that the HCP passage survival standards are met, these studies will support the abundance of the Methow population of UCR spring Chinook. Amounts of take are very small (not likely to have a measurable effect on the abundance of the Methow population).

2.4.3 UCR Spring Chinook Salmon Designated Critical Habitat

The PCE of critical habitat that occurs within the action area for this consultation is “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." Project effects on freshwater juvenile and adult migration corridors including obstructions, predation, and water quality and quantity are summarized in Table 3.

Table 3. Project effects on UCR spring Chinook critical habitat

PCE feature	Project effect
Juvenile rearing and downstream migration free of obstruction and excessive predation	Not significant. Survival standards incorporated into the proposed license ensure that survival past the Wells project will be at or above 93%. Currently, juvenile survival rate is >96%. Northern pikeminnow and piscivorous bird and mammal harassment and control programs will reduce predation on juvenile Chinook. At hatchery ponds and the Wells tailrace, piscivorous bird and mammal predation is managed by hazing, steel wires, fencing and covers for hatchery ponds, and electrical fencing. USDA Wildlife Services can implement lethal removal.
Riparian cover	Effects of changes in riparian vegetation resulting from reservoir fluctuations are likely to be expressed in the Project survival rates of juvenile and adult Chinook. These are >96 percent and 98 percent, respectively.
Adult passage	Not significant. Currently, the survival rate from Wells tailrace to the point at which an adult leaves the reservoir is >98%. Fallback rates are low (about 5%) and most Chinook fall back through the JBS where survival rates are high (98%).
Water quality	Warm summer temperatures in lower reaches of Methow River are reduced when mainstem water from Wells Reservoir backs up into this reach. TDG levels rarely exceed 120% in the tailrace of Wells Dam, except during extreme high spring flows.
Water quantity	Wells Project is operated in a run-of-river mode (daily inflow from Grand Coulee and Chief Joseph equals daily discharge at Wells). Wells Project is not operated for consumptive water use (to support water withdrawals).

2.4.4 UCR Steelhead

2.4.4.1 Analysis of Effects

As described for UCR spring-run Chinook, the objective of the Wells HCP is to achieve NNI in terms of survival through the action area for each plan species including UCR steelhead. The Wells HCP outlines a schedule for meeting and maintaining NNI throughout the 50-year term of the agreement. NNI consists of two components: 1) a 91 percent combined adult and juvenile survival standard for the reach from the Wells tailrace to the point at which a juvenile enters or an adult exits the reservoir, and 2) up to nine percent compensation for Wells Project related mortalities. The 9 percent, compensation to meet NNI is subdivided into two categories, up to 7 percent can be provided through funding a hatchery program and up to 2 percent through funding enhancements to tributary habitats used by UCR steelhead. The 91 percent CAJPS standard translates to approximately 98 percent adult survival and approximately 93 percent juvenile survival (0.98 x 0.93 = 0.91). The Wells HCP also requires the formation of four committees that are used to implement, monitor and administer the agreement, namely policy, coordinating, hatchery, and tributary committee.

The Wells HCP contains various plans for implementing the components of the agreement. These plans include the Passage Survival Plan (HCP Section 4), Wells Dam Juvenile Dam Passage Survival Plan (HCP Section 4.3), TCP (HCP Section 7), Hatchery Compensation Plan (HCP Section 8), Adult Passage Plan (HCP Section 4.4 and HCP Appendix A) and a Predator Control Program (HCP Section 4.3.3). These plans were developed specifically to enhance populations of Plan Species with particular emphasis placed upon the enhancement and recovery of steelhead and all are incorporated into the proposed license.

The Wells Project, with its conservation measures, is operated to facilitate upstream and downstream migration of steelhead and to limit adverse effects. Mitigation and operational activities address all affected components of the life history of UCR steelhead, as described below.

Spawning, Incubation, and Larval Development

Adult steelhead use the Wells reservoir as a migration corridor and typically pass through the Project from June through October to access spawning habitat within the Methow and Okanogan basins. All spawning, incubation, and larval development occurs in these areas, which are upstream of the action area for this consultation. While Project-related hatchery production does occur in the lower reaches of the Methow and Okanogan rivers, the effects of these activities are considered in separate consultations on Section 10 permits for these programs. The effects of habitat improvements under the HCP's Tributary Habitat Conservation Plan are also addressed in separate project-specific consultations. For this analysis, NMFS considers the applicant's funding of the hatchery and habitat improvement programs, which are designed to mitigate for project-related mortality, as likely to increase the viability of UCR steelhead.

Rearing and Migration within the Action Area

Steelhead develop and rear upstream of the action area in the mainstem and tributaries of the Methow and Okanogan rivers. Their use of tributaries for rearing is variable, depending upon population size, and both weather and flow conditions at any given time. Generally, juveniles rear in tributaries for two to three years (range from one to seven years) before migrating downstream through the mainstem Columbia River in March to early June as smolts (Peven et al. 1994). Juvenile smolts have been observed passing through the Project during April through June. Steelhead smolts typically feed during their seaward migration, although mid-Columbia reservoirs, such as Wells, serve primarily as migration corridors rather than as rearing habitat (Chapman et al. 1994).

Smolt exposure to conditions created by the Wells Project is for a brief duration over a limited distance. Survival standards set by the HCP and incorporated into the proposed license ensure that survival through the Wells Project (dam plus reservoir) will be at or above 93 percent for steelhead smolts over 95 percent of the juvenile migration. Current monitoring indicates juvenile project survival for steelhead (reservoir plus dam) is greater than 96 percent, contributing to the combined juvenile plus adult survival standard (91 percent). Compared to survival rates before the HCP was implemented, the 93 percent juvenile project survival standard represents an increase of 1.6 to 4.9 percent for steelhead (NMFS 2003). These are 94 to 97 percent of the survival estimates for juveniles migrating through a hypothetical free-flowing river of equal length to the Wells Project (Appendix A in NMFS 2003).

Project-related conditions that are likely to affect smolts during migration through the Action Area include reservoir stage fluctuations, reservoir impoundment, and exposure to predators. Reservoir stage fluctuation (one to two feet daily) is a result of the flood control and water storage/release functions of the large Federal Columbia River projects upstream from the action area. Reservoir operations below 774 feet MSL occur occasionally but are generally rare events unlikely to overlap with the timing of migration. Surveys have been conducted during reservoir elevations below 774 feet MSL and no steelhead stranding was documented (DTA 2006).

The reservoir environment can provide mixed benefits to steelhead depending upon the life stage being exposed. After adult fish migrate upstream past a dam, they must swim through a reach of river that has changed substantially from its historical, free-flowing conditions. The reservoirs have reduced water velocity and increased holding area compared to natural river conditions. These changes could benefit migrating adults by decreasing travel times and adult energy expenditure. Inversely, the slower water velocities can affect the outmigration of juveniles by causing extended travel times and increased exposure to reservoir predators.

Predator Removal Program under the Proposed License

Section 4.3.3 of the Wells HCP includes the requirement that Douglas PUD implement a northern pikeminnow and piscivorous bird harassment and control program to reduce predation on anadromous salmonids in the mid-Columbia Basin and this requirement is incorporated into the proposed license. It is expected that the predator control efforts directly benefit steelhead by removing predators that prey on outmigrating juveniles.

The NPRP has included a northern pikeminnow bounty program, participation in fishing derbies and tournaments, hook and line fishing by experienced anglers and the use of setline fishing equipment. Currently only setline fishing is being used in the Project. These efforts are designed to provide an immediate and substantial reduction in the predator populations present within the waters of the Wells reservoir. The ongoing harvest of northern pikeminnow from these waters will further decrease predator abundance. Yearly removal efforts will also keep the northern pikeminnow population in a manageable state that controls predation. Although there is some risk of injury or mortality to listed steelhead, NMFS has determined that the NPRP results in a net benefit to listed anadromous Columbia River salmonids (NMFS 1998).

From 1995 through 1999, Douglas PUD's NPRP consisted mainly of experienced anglers using hook-and-line removal techniques. Traditionally, hook-and-line angling has lacked the ability to target species specifically so from 2000 to the present, the NPRP has shifted to a setline fishing system. This system has proven to be more cost efficient and effective at targeting northern pikeminnow. Setline fishing gear has a low probability of catching steelhead by fishing deeper in the water column using small hooks typically baited with dead crickets. Lines are checked daily in order to release any species other than northern pikeminnow. To date no steelhead have been caught by setline operations. For the purposes of this analysis, we make the conservative assumption that no more than 20 juvenile and 4 adult steelhead will be captured and no more than 10 juveniles and 2 adults will be killed annually in the process of implementing the Northern Pikeminnow Removal Program.

Implementation of the Aquatic Settlement Agreement

Increased predation may result from the enhancement of white sturgeon, bull trout, and Pacific lamprey in the Wells Reservoir. For example, Douglas PUD is required in its sturgeon management plan to enhance white sturgeon populations through artificial propagation. The increased number of sturgeon may result in an elevated potential for predation of yearling steelhead. The WSMP has provisions for adaptive management of supplementation activities should conflict develop between stocked sturgeon and listed steelhead. The WSMP, which is incorporated into the terms of the proposed license, includes an intensive monitoring and evaluation program that will be used to adjust the number of juvenile sturgeon stocked in the Wells Project and will be used to inform harvest management for adult sturgeon. In the process of implementing the sturgeon studies, Douglas PUD is likely to capture no more than four adult steelhead and of these to kill no more than two per year.

The other component of the predator control program is the implementation of control measures for piscivorous birds and mammals. The focus of these programs is not removal but hazing and access deterrents. Hazing includes propane cannons, pyrotechnics and the physical presence of hazing staff. Other access deterrents include steel wires across the hatchery ponds and tailrace,

fencing and covers for hatchery ponds, and electric fencing. The minor increase in human activity as a result of these predator control measures is unlikely to injure or kill listed steelhead. When hazing and other access deterrents fail, USDA Wildlife Services can implement options for lethal removal. NMFS (2003) previously considered the effects of lethal predator removal on UCR steelhead.

The Aquatic SA also includes an ANSMP that could affect steelhead. Douglas estimates that plan implementation may cause take of up to one-tenth of one percent of both juvenile and adult steelhead or up to two individual adult fish. The Resident Fish Management Plan includes studies that could also cause take of listed steelhead, again at an estimated rate of five-one-hundredth of one percent of adult and juvenile steelhead. Douglas will also conduct bull trout studies for passage, stranding, and sub-adult monitoring that will likely cause incidental take of co-mingled steelhead. This annual take is estimated by Douglas at less than two adult steelhead for passage studies and less than five-one-hundredths of one percent of juvenile and adult steelhead during the surveys and monitoring.

Tributary Rearing and Migration

Some habitat improvement activities associated with the operation of the Wells Project are also expected to take place in spawning and rearing habitat in the upper portions of the Methow and Okanogan River basins. As described below, a separate Section 7 consultation is initiated for any project with a Federal nexus funded by the Wells Plan Species Account. Because the program is designed to mitigate for a loss of up to 2 percent of listed UCR steelhead through the project, the applicant's commitment to fund this program is likely to benefit UCR steelhead.

Tributary (Habitat) Conservation Plan

The TCP found in Section 7 of the Wells HCP and incorporated into the terms of the proposed license guides the funding and allocation of dollars from the Plan Species Account. The intended goal of the dollars allocated to the Plan Species Account is to compensate for up to two percent unavoidable adult and/or juvenile mortality for Plan Species passing through Wells Dam. The intent of the Plan Species Accounts is to provide dollars to protect and restore tributary habitats for Plan Species within the Wells Project Boundary and within the portions of the Methow and Okanogan rivers that are accessible to Plan Species.

A detailed description of the TCP, the Plan Species Account, and its allowable uses by the Tributary Committee can be found in Section 7 of the HCP. Some direct and indirect effects to steelhead may occur resulting from implementation of actions funded by the TCP, as analyzed below and considered in this opinion. However, a separate Section 7 consultation will be initiated for any project with a Federal nexus funded by the Wells Plan Species Account so these effects are not analyzed in this opinion.

The Tributary Committee, comprising representatives from various fisheries agencies and the Yakama Nation and Colville Confederated Tribes (signatories to the Wells HCP), will be guided by the general strategy outlined in supporting documents (see TCP) to the HCP. The goal of the TCP is to protect existing productive habitat and restore high priority habitats by enhancing, when practical, natural processes that, over time, will create and maintain suitable habitat

conditions without human intervention. The NMFS representative on the Tributary Committee ensures that any take of steelhead resulting from these activities is minimized.

The TCP provides funding to third party conservation efforts in the Methow and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee are submitted to the TCP committee. Examples of projects funded by the TCP include, but are not limited to: 1) providing access to currently blocked stream sections or oxbows; 2) removing dams or other passage barriers on tributary streams; 3) improving or increasing the hiding and resting cover habitat that is essential for these species during their relatively long adult holding period; 4) improving in-stream flow conditions by correcting problematic water diversion or withdrawal structures; and 5) purchasing (or leasing on a perpetual basis) conservation easements to protect or restore important aquatic habitat and shoreline areas.

The Tributary Committee decides if the projects meet criteria for funding. Projects must be reviewed by state and Federal agencies before receiving permits for construction projects. Habitat preservation projects will benefit steelhead through the protection and enhancement of critical habitat (USFWS 2002). Projects that increase instream flow volume in the Methow Basin will benefit all life stages of steelhead by enhancing migration corridors, pool depth, in-stream cover, and preferred water temperatures.

Habitat restoration projects will require a period of construction that may result in short term disturbances such as noise, increased turbidity, and human presence. These projects are expected to result in positive benefits for steelhead by creating additional aquatic habitat or removing upstream migration barriers, steelhead access to historically used watersheds.

Some potential activities (e.g., removal of large stream channel blockages or reconnecting side channels, etc.), may produce short-term unavoidable negative effects (e.g., incidental injury or mortality of individual fish, temporarily increase sediment loads and turbidity, etc.) as a result of funding restoration projects in the Methow or Okanogan rivers. In-stream restoration projects that have the potential to disturb steelhead or steelhead habitat will be required to go through a separate ESA Section 7(a)(2) consultation.

Adult Upstream Passage through Project Reservoir and Facilities

Four specific components of the adult migrations upstream and downstream of Wells Dam may affect steelhead: adult migrational delay at project fishways, fallback, and injuries and mortalities from upstream (via fishways) as well as downstream (via turbines, spillways, or JBS) passage through the Wells Project. Each of these components has the potential to increase adult mortality compared to a natural system (NMFS 2002a).

Upstream passage of steelhead through the fish ladders at Wells Dam has historically occurred from June through October, with peak passage typically occurring in September. Wells Dam has two adult fish ladders, located on the east and west ends of the hydrocombine. Each fishway contains a single main entrance, a collection gallery, a fish ladder, an adult count station, trapping facilities, adult PIT-tag detection equipment, and an exit in the forebay adjacent to the earthen embankment section of the dam.

Fishways are inspected daily to ensure debris accumulations are removed, automated fishway instruments are calibrated properly and lights in the fishway are functioning. Both upstream fishway facilities are operational year around with maintenance occurring on each fishway at different times during the winter to ensure that one upstream fishway is always operational. Maintenance activities on Wells fishways occur during the winter when steelhead are unlikely to pass Wells Dam.

Implementation of the Pacific Lamprey Management Plan (PLMP) could have impacts on ESA listed steelhead. The PLMP requires both structural and operational changes to the adult fish ladders at Wells Dam. These changes will be studied by the HCP CC and Aquatic SWG toward ensuring that negative effects of passage changes for the benefit of lamprey do not exceed the following effects on UCR steelhead:

- Up to 20 percent of adult steelhead experience increased delay.
- Less than 1 percent of adult steelhead handled during lamprey passage studies and of these, less than 0.1 percent killed or injured.
- Less than 50 adult steelhead incidentally captured and released during lamprey passage studies and of these, less than 4 adults killed or injured.

Passage Survival Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the measurement of juvenile and adult losses for each of the Plan Species, including UCR steelhead, passing through Wells Dam. Losses may accrue during broodstock collection, radio tagging, or lamprey trapping. This section of the plan also contains specific survival standards that must be achieved within defined time frames in order for the licensee to be considered in compliance with the terms of the Wells HCP (Douglas PUD 2002).

The Adult Passage Plan, contained within Section 4.4 and Appendix A, is a subcomponent within the larger Passage Survival Plan of the Wells HCP. The Adult Passage Plan is intended to ensure safe and rapid passage for adult Plan Species as they pass through the fish ladders at Wells Dam. The plan contains specific operating and maintenance criteria for the two adult fish ladders and the two adult fish ladder traps, and provides details regarding the implementation of passage studies on adult Plan Species including studies related to survival rates, timing and rates of fallback.

Telemetry studies conducted on adult steelhead from 1998 through 2002 provide adult passage information on upstream and downstream movements, including passage at Wells Dam. Passage time through the reservoirs is typically faster, and energy expenditures are less than would be expected for fish migrating through an unimpounded river (NMFS et al. 2002a).

NMFS et al. (2002a) compared the migration rates of adult steelhead through both impounded (dams and reservoirs) and unimpounded reaches of the Snake, mid-Columbia, and lower Columbia rivers. In each case, migration rates (miles/day) through the mid-Columbia River generally exceeded migration rates through unimpounded reaches of the Snake or Columbia rivers and were very similar to those observed in other impounded reaches (13 to 36 miles/day versus 6 to 19 miles/day in unimpounded reaches in the Snake/Columbia or 15 to 40 miles/day in

other impounded reaches, respectively). Similar observations were also found during comparison of migration rates of steelhead through the mid-Columbia River when compared to unobstructed reaches of the Skeena and Fraser River. (English et al. 2006) found that the median migration rate through the mid-Columbia River (Priest Rapids tailrace to Wells forebay) was 12.5 miles/day, which exceeds the rates observed in free-flowing reaches of the Skeena River (7.9 to 11.1 miles/day) and the Fraser River (5.3 miles/day).

This body of information suggests that passage through the Wells Project is not likely to cause pre-spawning mortality or loss of condition. A brief delay at the dam is more than compensated for by faster travel through the reservoir (NMFS et al. 2002a). In addition, any delay that does occur is less likely to affect UCR steelhead, which hold in the rivers or streams for considerable periods of time prior to spawning than unlisted UCR summer/fall-run Chinook salmon or sockeye, which spawn soon after completing their migration.

Adult Downstream Passage through Project Reservoir and Facilities

Fallback is defined as voluntary or involuntary movement of a fish downstream past a dam once upstream passage has been achieved. If adult steelhead fall back through the dam once they have exited the fish ladder, they could be injured by contact with structural features of the dam (spillways, turbines, juvenile bypass, and fish ladder).

Alexander et al. (1998) reported 1 of 20 steelhead (5 percent) fell back below Wells Dam, and English et al. (2001) reported a 6.8 percent fallback rate for steelhead at Wells Dam in 1999, noting that this was consistently lower than the fallback rates at other mid-Columbia River dams (range: 7 to 12 percent). English et al. (2001) reported that, of the 11 fish that fell back at Wells in 1999, 4 re-ascended the ladder, 6 were found in spawning areas downstream of Wells Dam; only 1 fish was classified as an involuntary fallback during the sampling period. Ninety-four percent of the 11 fallback fish were of hatchery origin and 70 percent of these (7 fish) and all four of the wild-origin steelhead that passed the dam were last detected either upstream of the dam or at known spawning areas. Most of the hatchery fish that remained below Wells Dam overwintered in the Wells Hatchery outfall. Adult steelhead PIT-tag studies indicate that upstream survival past Wells Dam has been greater than 98 percent per dam since 2004 when the HCP was implemented (Douglas and Anchor 2010).

Steelhead kelts migrating downstream of the Wells Project would pass downstream in the same manner as juvenile downstream migrants. English et al. (2001) estimated a 34 to 69 percent kelting rate for the mid-Columbia River steelhead stocks. Although direct survival information was not developed during this study, it is reasonable to assume that adult survival during fallback and kelt (post-spawning steelhead) passage is higher passing through the JBS rather than through turbines. Most kelts likely use the surface-oriented JBS. Kelts are most likely to be passing downstream of the dam during late April through June when the JBS system is in full operation. Some mortality may occur through the turbines, but overall survival is expected to be high when non-turbine routes of passage are in operation, including the JBS or spillways.

As described for Chinook, passage success and survival at dams as measured using radio telemetry methods cannot be used to isolate specific cause-and-effect relationships between passage and reproductive success. As a result, adult PIT-tag studies have shown that minimum

per-project survival rates through the mid-Columbia reach exceed 98% per project, demonstrating that adult mortality rates are extremely low, irrespective of cause (Douglas PUD and Anchor 2011) as shown in Table 4. As described above for spring Chinook, conversion rate calculations include all sources of mortality or non-detection, both non-project and project related. Steelhead included in conversion rate calculations is subjected to popular recreational fisheries between Priest Rapids and Wells dams.

Table 4. Adult Steelhead Conversion Rates for all Available Release Groups.

Stock Species	Priest Rapids Dam	Wells Dam	Priest Rapids Dam to Wells Total Conversion Rate[a]	Priest Rapids to Wells Average Per Project Conversion Rate (5^{th} root)
All Releases Summer Steelhead 2004-2011	947	532	93.0%	98.2%

[a] Measured from the tailrace of Priest Rapids Dam to the exit in the fishways at Wells

Juvenile Passage

The Passage Survival Plan contained within Section 4 of the Wells HCP and incorporated into the proposed FERC license provides specific detail regarding the measurement of mortality rates for juvenile steelhead passing through Wells Dam. This section of the plan also contains specific survival standards that must be achieved within defined time frames in order for the licensee to be considered in compliance with the terms of the Wells HCP and the FERC license (Douglas PUD 2002).

Section 4.3 of the Wells HCP contains specific criteria directed at the operation of the Wells JBS, spillway, and turbine operations. This section of the Wells HCP outlines detailed bypass operational criteria, operational timing and evaluation protocols to ensure that 95 percent of the juvenile plan species migrants, including steelhead, are provided a safe, non-turbine passage route through Wells Dam. The operational dates for the bypass are set annually by unanimous agreement of the parties to the Wells HCP, but are typically from early April to late August. The Wells bypass system is an important feature of the Wells Project that contributes significantly to Douglas PUD's ability to achieve the NNI survival standards outlined in the Wells HCP and incorporated into the proposed license.

The JBS uses five of eleven spillways equipped with constricting barriers to help attract and guide juvenile migrating fish. Since most juvenile salmon and steelhead migrate near the surface, with the help of the JBS, they successfully pass Wells Dam and avoid the turbine intakes located deeper in the forebay. Over the past several years, the HCP committee has agreed to initiate the operation of the JBS on April 12 and to shut it down on August 26. This operating period is consistent with the 95% passage migration period for juvenile steelhead migrating downstream through the Wells Project. The HCP CC has chosen to modify the bypass operating dates starting in 2012. Beginning in 2012, the bypass system will be initiated on April 9 and will terminate on August 19, which will continue to cover more than 95 percent of the juvenile steelhead migration.

The JBS is an efficient method of bypassing fish away from turbines and safely over the dam. This configuration has demonstrated exceptionally high levels of protection while utilizing only 6-8 percent of the Columbia River flow. The efficiency and effectiveness of the JBS are important factors in limiting the amount of spill, and therefore TDG (see Water Quality), while maximizing fish passage and survival.

Based upon information collected at other hydroelectric projects, juvenile steelhead survival is estimated to range from 90 to 93 percent for turbines, 98 to 99 percent for bypass systems, and 98 to 99 percent for spillways (NOAA 2003). Some juvenile mortality is associated with all dam passage routes; although the highest levels of mortality typically occur during passage through turbines. Consequently, an important objective of project operations aimed at improving juvenile survival is to route the highest possible proportion of juveniles past the project through spillways and juvenile fish bypass facilities and avoid passage through turbines.

Survival standards outlined in the HCP and incorporated into the proposed license ensure that total juvenile project survival through all passage routes will be at or above 95 percent. Douglas PUD has conducted four years of juvenile project survival studies at the Wells project, which have shown an average project survival rate of 96.3 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001; Bickford et al. 2011). This is the highest project survival rate for any project on the Columbia or Snake rivers.

Hatchery Compensation Plan

The Hatchery Compensation Plan, as described in Section 8 of the Wells HCP and incorporated into the proposed license, was established to fund hatchery compensation for up to 7 percent of juvenile passage losses, incidental to the Project's purposes, of Plan Species including juvenile steelhead passing through Wells Dam. Effects of hatchery facilities and their operations are considered in separate consultations on their respective Section 10(a)(1)(A) permits (e.g., NMFS 2002c). The continued reliance on hatchery production beyond the specific permits is an assumption built into the HCP and this consultation, but the details of extending any hatchery program beyond these permits will be the subject of future consultations (presently underway) on hatchery and genetic management plans submitted to NMFS by the PUDs and any co-managers.

Water Quality

Steelhead require specific water quality characteristics that include cool water with moderate to high levels of dissolved oxygen. Several studies have assessed the water quality within the action area and all indicate that Wells Reservoir is a healthy, riverine water body with no thermal or chemical stratification. Studies have also demonstrated that the water found within the mainstem portion of the action area is of high quality and is frequently in compliance with State water quality standards for all of the parameters measured. Seasonal water temperature exceedances primarily occur in the lower Okanogan River and are due to conditions further upstream in the tributary rather than the proposed action.

To assess compliance with the State temperature standards, two 2D laterally-averaged temperature models (using CE-QUAL-W2) were developed that represent existing (or "with Project") conditions and "without Project" conditions in the Columbia River from the Chief Joseph Dam tailrace to Wells Dam, the lowest 15.5 miles of the Okanogan River, and the lowest

1.5 miles of the Methow River. The results were processed to develop daily values of the seven-day average of the daily maximum temperatures (7-DADMax), and then compared for the two conditions (West Consultants, Inc. 2008). The model analyses demonstrated that "with Project" temperatures in the Columbia, Okanogan and Methow rivers do not increase more than 0.3°C compared to ambient ("without Project") conditions anywhere in the reservoir, and that the Project complies with state water quality standards for temperature.[6] The analyses also show that backwater from the Wells Project can reduce the very high summer temperatures observed in the lower Okanogan and Methow rivers. The intrusion of Columbia River water into the lowest 1-2 miles of the Okanogan River and lowest 1.5 miles of the Methow River can significantly decrease the temperature of warm summer inflows from upstream, and can moderate the cold winter temperatures by 1-3°C, reducing the extent and length of freezing (WEST 2008).

The lower Okanogan is used by steelhead as a migration corridor to access spawning habitat in the upper reaches and as a result, exposure to elevated water temperatures is relatively brief. Operation of the spillways can result in supersaturated levels of total dissolved gases, creating the conditions that cause GBT or GBD Douglas PUD closely monitors TDG levels and will implement "reasonable and feasible measures" to ensure that Wells Project complies with TDG standards (Douglas PUD 2009).

Each year from 2003-2008, Douglas implemented spill testing activities to examine the relationship between water spilled over the dam and the production of TDG, to better understand TDG production dynamics resulting from spill operations at Wells Dam. These results were subsequently used by IIHR-Hydroscience and Engineering of University of Iowa to develop and calibrate an unsteady state three-dimensional (3D), two-phase flow CFD tool to predict the hydrodynamics of gas saturation and TDG distribution within the Wells tailrace. These tools were then used to reliably predict TDG production at Wells Dam and establish how preferred operating conditions and spillway configurations can be used as methods to manage TDG within WQ numeric criteria (Politano et al. 2009). The final model run, performed by Iowa (Politano et al. 2009), showed that preferred spillway operating configurations were able to reduce tailrace TDG to levels well within Washington State WQS (< 120%) during a flood flow event equal to 246 kcfs (Politano et al. 2009). These studies have helped Douglas PUD modify spill operations and limit the elevated levels of TDG.

During periods of extremely high river discharge, even spillway operations at Wells Dam cannot keep tailrace levels of TDG from exceeding 120 percent. For example, in 2011, mean daily discharges in the mid-Columbia (measured at a USGS gage 2.6 river miles downstream from Priest Rapids Dam) were an average of 61 percent higher during the spring fish-spill season and 56 percent higher during summer compared to 2000-2010 (Keeler 2011). Part of the increased TDG was due to involuntary spill at Wells Project (flow in excess of powerhouse capacity) and part was due to concurrent maintenance activities at Grand Coulee Dam. The Corps was able to use newly installed spillway deflectors at Chief Joseph Dam to reduce some of the TDG load, but values as high as 130 percent were observed coming into Wells forebay (Corps 2011) and

[6] NMFS (2008) determined that EPA's approval of these standards was not likely to jeopardize UCR steelhead or destroy or adversely modify its designated critical habitat.

tailrace values ranged from 105.4 to 137.8 percent (Fish Passage Center 2011). However, this condition was highly unusual, and it is unlikely that the maintenance problem at Grand Coulee will overlap with this flow regime again so that the overall risk that UCR steelhead in the action area will be exposed to TDG >120 percent is small.

Under the proposed action, Douglas PUD will monitor juvenile steelhead in the Rocky Reach bypass system for signs of GBT. Sampling is likely to affect >1 percent of the run encountered, with lethal take of less than 100 juvenile fish. Adults will also be monitored, but these will be fish already collected for hatchery broodstock or monitoring and evaluation or state stock assessments, and the take associated with this activity is considered as part of the consultations on the HGMP Section 10 permits.

Water Quantity

Fluctuations in the quantity of water discharged from large storage projects in the upper Columbia River (e.g., Chief Joseph and Grand Coulee dams) can alter reservoir environments downstream in ways that affect steelhead. These alterations include fluctuations in reservoir stage that can strand individuals in near shore habitat or increase water (and smolt) travel time and therefore exposure to predators. However, the Wells Project is a run-of- river project meaning that average daily inflow equals daily outflow and active storage capacity is limited to a range of one to two feet on a daily basis. Reservoir elevations below 774 feet MSL, which have the potential to strand fish in large off-channel pools generally occur no more than once a year. Surveys conducted during conditions that could have resulted in stranding were conducted in 2006 and 2008 and no stranding of steelhead was observed (LGL and Douglas PUD 2008).

Riparian Cover

Impoundments are likely to have altered the riparian vegetation within the action area from previous conditions. For example, fluctuations in the elevation of Wells Reservoir are likely to influence the distribution and composition of riparian vegetation, which in turn affects cover, food production, temperature, and substrate. Thus, the effects of changes in riparian vegetation resulting from the proposed action are likely to be expressed in the survival rates of juvenile and adult steelhead. Currently, survival rates through the reservoir plus dam (>96 percent for juveniles and 98 percent for adults) are above the HCP standards. Thus, changes in riparian cover due to reservoir fluctuations are not limiting the survival of juvenile steelhead from the Methow and Okanogan populations.

Project Maintenance & Repairs—Fish Ladders & Turbines

Douglas PUD will periodically dewater the fish ladders and turbines to conduct maintenance and repairs. While dewatering the fish ladders, the PUD will collect and release all (100 percent) of the steelhead it encounters. Of these, up to 5 adult and <35 juvenile steelhead are likely to be killed or injured each year.

Douglas PUD will collect and release up to 10 adults and 50 juvenile steelhead per dewatered turbine unit. Of these, up to 2 adults and 10 juveniles will be killed or injured.

Research, Monitoring & Evaluation

Douglas PUD will conduct a number of fish passage survival and behavior studies under the proposed action, as described below. Numbers of steelhead expected to be handled, injured, or killed are shown in Table 5.

Table 5. Juvenile and adult passage studies and effects on UCR steelhead under the proposed action (per year).

Study or Program	Purpose	Annual Take
Adult Passage Plan	Monitoring and evaluation	Collect, tag, and release <5% of adults at Wells Dam. Lethal take of <10 adults. Lethal take includes any sublethal take.
Juvenile Fish Passage Plan	Monitoring and evaluation	Collect, anesthetize, and release up to 5% of juveniles at Wells Dam. Collect, anesthetize, tag, transport , and release up to 2% of juveniles Lethal take of <3% of juveniles that are collected, tagged and released. Lethal take of <2% of juveniles that are collected and released. Incidental collection and release of up to 20 adults; lethal take of no more than 2 adults.
Route specific[1] passage survival after structural modifications	Monitoring and evaluation	Collect, transport, anesthetize, tag and release up to 5,000 juvenile hatchery fish. Lethal take of up to 100% of the study fish.
Juvenile passage and behavior studies	Monitoring and evaluation	Collect, transport, anesthetize, tag and release up to 2% of juveniles and adults passing Wells. Lethal take on <1,000 juveniles. Incidental collection and release of up to 20 adults. Lethal take of no more than 2 adults.

[1] Bypass, spillway, and turbine routes

By ensuring that the HCP passage survival standards are met, these studies will support the abundance of the Methow and Okanogan populations of UCR steelhead. Amounts of take are very small (not likely to have a measurable effect on the abundance of either population).

2.4.5 UCR Steelhead Critical Habitat

The PCE of critical habitat that occurs within the action area is "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." Project effects on freshwater and juvenile and adult migration corridors for steelhead,

including obstructions, predation, and water quality and quantity, are summarized in Table 6. Safe passage is captured in juvenile and adult survival rates.

Table 6. Project effects on UCR steelhead critical habitat.

PCE Feature	Project Effect
Juvenile rearing and downstream migration free of obstruction and excessive predation	Survival standards incorporated into the proposed license ensure that survival past the concrete at Wells Dam will be at or above 93%. Currently, juvenile survival rate is >96%. Northern pikeminnow and piscivorous bird and mammal harassment and control programs reduce predation on juvenile Chinook. At hatchery ponds and the Wells tailrace, piscivorous bird and mammal predation is managed by hazing, steel wires, fencing and covers for hatchery ponds; and electrical fencing. USDA Wildlife Services can implement lethal removal.
Riparian cover	Effects of changes in riparian vegetation resulting from reservoir fluctuations are likely to be expressed in the Project survival rates of juvenile and adult steelhead. These are >96 percent and 98 percent, respectively.
Adult passage	Currently, the survival rate from Wells tailrace to the point at which an adult leaves the reservoir is >98%. Fallback rates are low and most steelhead fall back, and kelts migrate, through the JBS where survival rates are high (98%). Kelts pass downstream during late April through June when the JBS is operating.
Water quality	Warm summer temperatures in lower reaches of Methow and Okanogan rivers are reduced when cooler mainstem water from Wells Reservoir backs up into these reaches. However, warm water releases from upstream mainstem reservoirs occasionally cause elevated temperatures. TDG levels are likely to exceed 120% in the tailrace of Wells Dam only during periods of involuntary spill.
Water Quantity	Wells Project is operated in a run-of-river mode (daily inflow from Grand Coulee and Chief Joseph equals' daily discharge at Wells). Wells Project is not operated for consumptive use (to support water withdrawals).

2.5 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Guidance for determining cumulative effects in the Endangered Species Consultation Handbook (USFWS and NMFS 1998) states the following:

"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."

Notable identified activities that meet state, tribal or local agency involvement included the Washington State legislation to enhance salmon recovery through tributary enhancement programs, Washington State Total Maximum Daily Load (TMDL) development and implementation, tribal efforts to restore native culturally important fish populations and public land use in the action area.

Washington State

Several legislative measures have been passed in the State of Washington to facilitate the recovery of listed species and their habitats, as well as the overall health of watersheds and ecosystems. The 1998 Salmon Recovery Planning Act provides the basis for developing watershed restoration projects and establishes a funding mechanism for local habitat restoration projects. The Salmon Recovery Planning Act also created the Governor's Salmon Recovery Office to coordinate and assist in the development of salmon recovery plans.

The Statewide Strategy to Recover Salmon is also designed to improve watersheds, while the 1998 Watershed Planning Act encourages voluntary water resource planning by local governments, citizens, and Tribes in regards to water supply, water use, water quality, and habitat at the WRIA level. The Salmon Recovery Funding Act established a board to approve localized salmon recovery funding activities.

WDFW and Tribal co-managers implemented the Wild Stock Recovery Initiative in 1992 and completed comprehensive management plans that identify limiting factors and habitat restoration activities. These plans also include actions in the harvest and hatchery components.

Although the Washington legislature amended the Shoreline Management Act to increase protection of shoreline fish habitat, a recent court challenge will delay implementation and possibly require additional amendments. Washington State's Forest and Fish Policy is designed to establish criteria for non-Federal and private forest activities that will improve environmental

conditions for listed species, primarily to minimize impacts to fish habitat through protection of riparian zones and instream flows.

The State of Washington is under a court order to develop TMDL management plans on each of its 303(d) water-quality-listed streams, which will result in water quality improvements. The State also established an ongoing program in 2000 to buy or lease water rights for instream flow purposes. The mainstem Columbia River was closed by the State to new water rights appropriations in 1995. These programs should improve water quantity and quality in the State over the long term.

In addition to the programs and initiatives identified for Washington, similar programs have been or are being developed in Idaho and Montana. Although these programs would have a greater effect on the Snake River fish populations, they are likely to benefit the mid-Columbia River stocks as they migrate through the lower Columbia River.

Any activities that may result in changes to the aquatic environment potentially affecting implementation of Douglas PUD's plans, operations or facilities, will require consultation by the acting party with Douglas PUD (if Douglas PUD is not the acting party) and result in consultation with Federal agencies. Alterations to water quality and salmon improvement projects in the action area would all trigger Federal consultation and not meet the criteria for a cumulative effect. As a result, the Washington State activities described above are not considered cumulative effects based upon the criteria established by NMFS and USFWS.

Tribes

The Nez Perce, Umatilla, Warm Springs, and Yakama Tribes have developed a joint restoration plan for anadromous fish in the Columbia River basin, known as the Wy-Kan-Ush-Mi Wa-Kish-Wit, or Spirit of the Salmon plan (CRITFC 2002). The plan emphasizes the reliance on natural production and healthy river ecosystems, and addresses hydroelectric operations on the mainstem Columbia and Snake Rivers; habitat protection and restoration throughout the basin (including the Columbia River estuary); fish production and hatchery reforms; and in-river and ocean harvest reforms. The plan provides a framework for restoring anadromous or migratory fish stock (specifically salmon, steelhead, Pacific lamprey, and white sturgeon) in areas upstream of Bonneville Dam. Past activities under the plan are in the baseline, while future activities pursuant to the plan should have positive cumulative effects on anadromous and migratory species and their habitat, and includes the objectives of:

- halting the decline of salmon, lamprey, and sturgeon populations in areas upstream of Bonneville Dam within 7 years;
- rebuilding salmon populations upstream of Bonneville Dam to annual run sizes of 4 million fish within 25 years in a manner that supports Tribal ceremonial, subsistence, and commercial harvests; and
- increasing lamprey and sturgeon populations to naturally sustaining levels within 25 years in a manner that supports Tribal harvests.

In order for the tribes to achieve the objectives identified above, they are working with Douglas PUD to implement relevant activities. Some of these activities are being implemented by

Douglas PUD within the HCP, the Aquatic Settlement Agreement and other Resource Management Plans described within this document. Any additional activities outside of the current descriptions would require additional Federal consultation and thus are not considered cumulative effects.

Public

Changes in land use activity may occur as a result of public activity or programs being implemented by Douglas PUD. For instance, change of ownership and/or land use may result from tributary conservation efforts to restore or enhance habitat. These restoration planning efforts would require Federal consultation before implementation, and if approved would become part of the Project environmental baseline. Douglas PUD would address effects from public use of the action area in the project environmental baseline and/or through consultation. Therefore, future public land use activities would not be considered as potential cumulative effects.

Summary of Cumulative Effects

Several activities by state, tribal and public entities were identified as reasonably likely to occur within the action area. Activities potentially affecting implementation of Douglas PUD's plans, operations or facilities, would require coordination with Douglas PUD. If these activities had not been addressed in prior consultations, Douglas PUD would be required to initiate section 7(a)(2) consultation. Therefore, no cumulative effects were identified based upon the NMFS and USFWS criteria.

2.6 Integration and Synthesis

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

2.6.1 Current Rangewide status of UCR spring-run Chinook salmon and UCR steelhead

Upper Columbia River spring-run Chinook salmon is listed as Endangered and UCR steelhead is listed as Threatened (NMFS 2011). None of the extant Chinook populations is meeting the VSP criteria for abundance and productivity. Numbers of natural origin spawners have increased in recent years compared to the period 1981-2003 while productivity has declined. UCR steelhead are similar to Chinook in that the most recent estimates of natural origin spawners (Ford et al. 2010) are higher than those from the previous period (Good et al. 2005) while productivity remains low.

2.6.2 Environmental baseline

Habitat within the action area for UCR spring-run Chinook salmon and UCR steelhead has been modified and degraded by anthropogenic actions such as urban development, logging, grazing, hydroelectric energy development and generation, water storage projects, irrigation withdrawals, and agricultural runoff. These changes are associated with the loss of important spawning and rearing habitat and the loss of or degradation of migration corridors. Hatchery practices have reduced population productivity and genetic diversity and have influenced the distribution (spatial structure) of the ESU and DPS.

Douglas PUD has been operating its juvenile bypass system consistent with the HCP's requirements since ESA formal consultation was completed (NMFS 2000b). Studies with juvenile spring Chinook and steelhead have demonstrated high passage survival rates and for adults, rapid ladder ascension, low fall back, and high passage survival rates. Water quality in the action area has generally been high although TDG has become elevated both due to upstream operations (Grand Coulee and Chief Joseph dams) and spill at Wells Dam during extreme high flow conditions.

Under the environmental baseline, the status of critical habitat in portions of the action area has become degraded. Since implementation of the HCP, the critical habitat PCE of juvenile and adult migration corridors in the mainstem Columbia within the action area has become functional.

2.6.3 Effects of the proposed action

2.6.3.1 Effects of the proposed action on UCR spring-run Chinook salmon and designated critical habitat

Wells Project affects the viability of the Methow River spawning population as described below.

Passage Survival
Juvenile Chinook dam passage survival rates average >96 percent. Survival through the Project (dam plus reservoir) is also >96 percent. Adults experience brief delays at fishways, but travel through the reservoir faster than in an unimpounded reach with average per-project conversion rates (Priest Rapids to Wells) >98 percent. An estimated three to five percent of adult Chinook fall back below Wells Dam, mostly through the Juvenile Bypass System where passage survival is about 98 percent. Thus, the proposed license is likely to support the abundance and productivity of the Methow River spring Chinook population and the functioning of adult and juvenile migration corridors within the action area.

Predator Removal
Travel time for juvenile Chinook through Wells Reservoir is slower than in an unimpounded reach, increasing exposure to predators. Douglas PUD controls the size of the predator population by removing northern pikeminnows with setlines. Douglas PUD uses human hazing and steel wires to exclude bird and mammal predators from the Project forebay and tailrace. Lethal removal by U.S. Department of Agriculture is available, if needed. Therefore, predator control activities under the proposed license are likely to support the abundance and productivity

of Methow River spring Chinook and the functioning of adult and juvenile migration corridors within the action area.

NMFS assumes that no more than 20 juvenile Chinook and 4 adults will be captured and no more than ten juveniles and two adults will be killed per year in the process of implementing predator control activities. Predation magnitude due to the presence of the project is unknown.

Water Quality
Based on hydrologic modeling, the existence and operation Project is likely to increase temperatures in the mainstem Columbia River no more than 0.3^{o} C above ambient. Studies have shown that backwater from Wells Reservoir actually reduces summer temperatures in the lower Methow River as well as moderating cold winter temperatures.

The preferred spillway configuration has reduced TDG in the Wells tailrace to <120 percent during a flood event equal to 246 kcfs. However, the extremely high discharge event in spring 2011, combined with extra gas production at Grand Coulee Dam due to maintenance activities, resulted in TDG in the Wells tailrace >130 percent. It therefore is likely that, except in the most extreme flow/runoff conditions (which can elevate TDG), water quality due to the Wells Project will support the abundance and productivity of Methow spring Chinook and the functioning of adult and juvenile migration corridors within the action area.

Water Quantity
Fluctuations in reservoir elevation that could strand juvenile Chinook in off-channel pools generally occur no more than once per year. Therefore, effects of the Project on water quantity are likely to support the abundance and productivity of Methow spring Chinook and the functioning of adult and juvenile migration corridors within the action area.

Riparian Cover
The impoundment of water in Wells Reservoir alters cover, food production, temperature, and substrate. Based on juvenile Chinook survival rates—>96 percent through the dam and reservoir, these habitat alterations are likely to support the abundance and productivity of the Methow spring Chinook population and the functioning of adult and juvenile migration corridors within the action area.

Tributary (Habitat) Conservation Plan
The Tributary Conservation Plan guides the funding and allocation of dollars to habitat improvement projects. Effects of specific habitat projects on the species and its designated critical habitat are considered in separate consultations, but funding the program is likely to benefit UCR spring Chinook salmon.

Hatchery Conservation Plan
Douglas PUD funds implementation of the Hatchery Compensation Plan to compensate for juvenile project passage losses up to 7 percent of the juveniles passing Wells Dam. Effects of hatchery facilities and operations on the species and its designated critical habitat are considered in separate consultations, but funding the program is likely to benefit UCR spring Chinook salmon.

2.6.3.2 Effects of the proposed action on UCR steelhead and designated critical habitat

The proposed action will affect two populations of UCR steelhead: Methow and Okanogan. Effects will be the same as those described for UCR spring Chinook salmon with one principal difference: the Project affects an additional life history stage for steelhead—kelts. These are adult steelhead that have survived spawning and are moving back downstream toward the ocean. Kelts from the Methow and Okanogan populations are likely to pass Wells during late April through June when the Juvenile Bypass System is in operation. The dam passage survival rate of these adult downstream migrants is approximately 98 percent. Thus, the proposed action is likely to support the abundance, productivity, and spatial structure of the Methow and Okanogan steelhead populations and the functioning of adult and juvenile migration corridors within the action area.

2.6.4 Cumulative Effects

NMFS did not identify any cumulative effects associated with the proposed action.

2.6.5 Summary—Integration and Synthesis

2.6.5.1 Summary for UCR Spring Chinook Salmon and designated critical habitat

The UCR spring-run Chinook ESU is listed as Endangered. Abundance has increased in recent years although productivity has declined. One of the historical populations (Okanogan River) has become extirpated and high numbers of hatchery-origin spawners degrades diversity.

Of the three extant spawning populations in the ESU, the Methow River population is likely to be affected by the proposed action. Habitat within the action area that had become degraded, including passage conditions at Wells Dam, has improved under the HCP and this is likely to continue under the proposed action. That is, the proposed FERC license continues to support the viability of the UCR spring Chinook ESU and the functioning of PCEs (juvenile and adult migration corridors) of critical habitat.

2.6.5.2 Summary for UCR Steelhead and designated critical habitat

The UCR steelhead DPS is listed as Threatened. Abundance has increased in recent years although productivity remains low. All four historical populations still exist; population diversity is degraded by high numbers of hatchery-origin spawners.

Of the four spawning populations, the Methow and Okanogan River populations are likely to be affected by the proposed action. Habitat that had become degraded, including passage conditions at Wells Dam, has improved under the HCP and this is likely to continue under the proposed action. That is, the proposed FERC license continues to support the viability of the UCR steelhead DPS and the functioning of the PCEs of critical habitat.

2.7 Conclusion

After reviewing the current status of the listed species (high risk for UCR Chinook and UCR steelhead), the environmental baseline within the action area (degraded), the effects of the proposed action (continuation of baseline conditions with improved upstream and downstream migration survival and hatchery practices), and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of UCR spring-run Chinook or UCR steelhead or to destroy or adversely modify their designated critical habitat.

2.8 Incidental Take Statement

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

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

2.8.1 Amount or Extent of Take

Take of listed UCR Chinook and UCR steelhead is described in detail in section 2.4. Each element of the proposed action expected to have incidental take is summarized in Table 7.

Table 7. Summary of Anticipated Incidental Take

Authorized Study or Program	Gear	Action	Take Estimate
Wells hydro O & M permit 1391	Turbines, spillway, bypass.	Project operations.	Up to 9% of adults and juveniles of each species, combined, annually for the term of the license and the HCP.
Adult & juvenile passage plan studies.	Fish ladder, traps, angling, seining.	Collect, anesthetize, tag, sample for biological information, release.	Collect, tag and release less than 5% of annual adult run at Wells Dam. Less than 10 adults killed annually from the adult passage studies.
Ladder maintenance & repair.			Collect and release up to 100% of fish encountered in fish ladders annually. Lethal take of up to 5 adults and less than 35 juveniles of each species.

Authorized Study or Program	Gear	Action	Take Estimate
Juvenile fish passage plan studies.			Annually collect, anesthetize and release up to 5% of each smolt migration at Wells Dam. Collect, transport, anesthetize, tag and release up to 2% of each run. Lethal take of less than 3% of juveniles that are captured, tagged and released and less than 2% of the fish collected and released. Incidental collection and release up to 20 adults. Lethal take of no more than 2 adults.
Route specific Bypass/spill/turbine passage survival. Route Specific Survival after structural modifications.			Annually collect, transport, anesthetize, tag and release up to 5,000 juvenile hatchery fish. Lethal take of up to 100% of the study fish.
Juvenile Passage Survival and/or Behavior Studies.			Annually collect, transport, anesthetize, tag and release up to 2% of run past Wells, lethal take on less than 1,000 juveniles. Incidental collection and release up to 20 adults. Lethal take of no more than 2 adults.
Turbine dewatering for maintenance.			Annually collect and release up to 10 adults and 50 juveniles found within a dewatered turbine unit. Lethal take of up to 2 adults and 10 juveniles.
HCP Predator Control Measures	Set lines; angling; traps; seine, gill, cast, and trammel nets; spear	Pikeminnow/other piscivorous fish removal/predation studies. Collect and euthanize, or tag and release	Incidental capture of up to 20 juveniles and 4 adults and lethal take of no more than 10 juveniles and 2 adults per year

Authorized Study or Program	Gear	Action	Take Estimate
		predators.	
HCP Tributary Enhancement Measures		Various habitat conservation actions to enhance the production of permit species and bull trout upstream of Wells Dam.	To be identified on a case-by-case basis.
Sturgeon MP Monitoring and Evaluation Program.		Broodstock Collection and Breeding Plan. Incidental encounter during sturgeon activity.	Annual incidental capture of no more than 4 adults and lethal take of no more than 2 adults. Incidental capture of up to 20 juveniles and 4 adults and lethal take of no more than 10 juveniles and 2 adults per year. Incidental capture of up to 20 juveniles and lethal take of no more than 10 juveniles.
Lamprey MP		Changes in fish ladder operations, configuration, changes in juvenile fish bypass system operations, juvenile lamprey substrate sampling, dredge sampling, diving and deepwater electro shocking, ladder traps at Wells, Rocky Reach, McNary or Bonneville.	Annual passage delay of less than 20% of the adult permit species at Wells Dam. Less than 1% of run encountered, Lethal take of less than 0.1% of run. Less than 50 adult HCP permit species incidentally captured and released. Less than 4 adults killed from collection and release.

Authorized Study or Program	Gear	Action	Take Estimate
Bull Trout MP	Ladder traps at Wells and Rocky Reach. Twisp Weir. seine and dip net, Screw trap, dip net, anesthetize, pit tag, hook and line	Incidental encounter of HCP permit species during bull trout trapping and surveys. PIT-tagging of subadult and adult bull trout captured during the implementation of hatchery actions.	Less than 100 juvenile permit species captured and released annually. Lethal take of up to 10 juvenile permit species. Non-lethal encounters with adult spring Chinook and steelhead.
Resident Fish MP	Beach Seining, purse seine, fyke net, trap net, hydroacoustics, angling, snorkeling, electroshocking, spear, long line, electroshocking.	Seasonal habitat use and community diversity/ assemblage. Resident predator diet analysis/or removal.	Annually collect and release up to 1% of juvenile permit species above Wells, lethal take on less than 1,000 juveniles. Incidental collection and release up to 5 adults. Lethal take of no more than 2 adults.
ANS MP		Nuisance Species Monitoring.	Annual incidental collection and release up to 1 adult and up to 5 juveniles. No adult and up to 1 subadult lethally taken.
Water Quality MP	Wells and Rocky Reach juvenile bypass sampling, adult ladder trap at Wells Dam.	Monitoring for Gas Bubble Trauma.	Annual less than 1% of run encountered. Lethal take of less than 100 juvenile fish.

[1] Adult spring Chinook and steelhead used for GBT monitoring will use fish already collected for hatchery broodstock, hatchery monitoring and evaluation or state stock assessment purposes. NMFS considers the effects of this take in separate consultations on its issuance of ESA section 10 permits for the Hatchery Genetic Management Plans associated with the HCP.

2.8.2 Effect of the Take

NMFS determined in this opinion that the level of anticipated take associated with the continued existence and operation of the Wells Hydroelectric Project would not be likely to jeopardize the continued existence of UCR spring-run Chinook salmon or UCR steelhead nor adversely modify their designated critical habitat. FERC's proposed action to grant a license to Douglas County PUD is consistent with the 2004 HCP, which includes conservation measures that are expected to increase survival of both species.

Except for fish passage, most of the tabulated incidental take is anticipated to occur during implementation of specific HCP and license conservation measures. Most of these activities are expected to continue for the term of the license and the HCP. Certain actions are limited to the time period of studies or project construction or program development they are associated with.

The incidental take shown in Table7 is the maximum amount of incidental take that NMFS estimates will occur as a result of the proposed action. This incidental take, which is exempted by this statement, would be exceeded if the licensee fails to execute the measures in strict accordance with the HCP and the proposed license. If take exceeds the amount or extent specified herein, NMFS will evaluate conditions using the best available science and determine whether reinitiation of consultation is required.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

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

The following RPMs are necessary and appropriate to minimize the effect of anticipated incidental take of UCR spring-run Chinook salmon and UCR steelhead. FERC must require the licensee to minimize incidental take as follows:

1. Minimize incidental take from the operation of the project by requiring the licensee to adhere to all the measures in the Anadromous Fish Agreement and Wells Habitat Conservation Plan as approved and adopted by the Commission in 2004 and incorporated into the proposed license.

2. Minimize incidental take from the unanticipated release of hazardous substances, toxics, excessive sediment, debris, and other materials into the Columbia River and its tributaries, the fish passage and rearing facilities by following provisions of the Water Quality Management Plan.

3. Minimize incidental take from in-water and near-water construction activities by using BMPs for the proposed action to avoid or minimize adverse effects to water quality and aquatic resources.

4. FERC shall include the standard license reopener clause in any license issued for this project to ensure continuing agency discretion throughout the life of the license as may be necessary to protect species listed under the ESA.

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

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

1. Require the Licensee to monitor fish populations and habitat and passage as described in the provisions of the Anadromous Fish Agreement and Wells Habitat Conservation Plan that relate to Upper Columbia River Spring Chinook and Upper Columbia River steelhead (including, but not limited to fish passage, fish supplementation, aquatic habitat conditions [e.g., flows and habitat restoration], construction, monitoring, and fish sampling) for this project. The Licensee must report all incidental take that occurs during these activities to NMFS. The Licensee must report the results of monitoring fish and fish passage and water quality annually to NMFS. This may be concurrent with the Project annual reports to FERC and shall be provided to NMFS by March 31 for take, which occurred in the prior calendar year. Listed fish must be handled with extreme care and kept in water, with adequate circulation, to the maximum extent possible during sampling and monitoring. When a mix of species are captured or collected, ESA-listed fish must be processed first, to the extent possible, to minimize stress. Listed fish must be transferred using a sanctuary net (which holds water during transfer) whenever practical to prevent the added stress of being dewatered. Require the Licensee to monitor juvenile and adult mortality to ensure that incidental take levels are not exceeded. The Licensee must develop the monitoring measures in conjunction with NMFS, and receive our approval of the monitoring plan.

   Incidental take should be reported to:

   National Marine Fisheries Service
   Hydropower Division, FERC and Water Diversions
   Attention: Keith Kirkendall, Branch Chief
   1201 NE Lloyd Blvd., Suite 1100
   Portland, OR 97232

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

1. Follow and implement all terms and conditions of the Wells project Aquatic Settlement Agreement Water Quality Management Plan.

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

1. Require the Licensee to use best management practices in all construction work, including adhering to certain timing restrictions. Spill control equipment must be on site and in quantities sufficient to effectively contain and recover accidental release of chemicals. Project personnel must be familiar with spill control equipment operation and procedures prior to the initiation of work. Instream work shall be conducted according to BMPs, consistent with WDFW's Hydraulic Code (RCW 77-55) by conforming to a Hydraulic Project Approval (WAC 220-110) obtained from WDFW. In the event that the regulations are significantly modified or repealed during the license term, the terms in effect in 2011 shall continue in force for the term of the license to protect fish and their habitat.

2.9 Conservation Recommendations

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

NMFS has no conservation recommendations to make at this time.

2.10 Reinitiation of Consultation

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

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

2.11 "Not Likely to Adversely Affect" Determination

Southern Resident Killer Whale

Species Determination

The final rule listing SR killer whales as endangered identified several potential factors that may have caused their decline or may be limiting recovery. These are: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel traffic. The rule also identified oil spills as a potential risk factor for this species. The final recovery plan includes more information on these potential threats to SR killer whales (NMFS 2008c).

The SR killer whales spend considerable time in the Georgia Basin from late spring to early autumn, with concentrated activity in the inland waters of Washington State around the San Juan Islands, and then move south into Puget Sound in early autumn. While these are seasonal patterns, SR killer whales have the potential to occur throughout their range (from central California north to the Queen Charlotte Islands) at any time during the year.

SR killer whales consume a variety of fish and one species of squid, but salmon, and Chinook salmon in particular, are their primary prey (review in NMFS 2008c). Ongoing and past diet studies of Southern Residents conduct sampling during spring, summer and fall months in inland waters of Washington State and British Columbia (i.e., Ford and Ellis 2006; Hanson et al. 2010).

Therefore, our knowledge of diet is specific to inland waters. Less is known about diet of Southern Residents off the Pacific Coast. However, chemical analyses support the importance of salmon in the year-round diet of Southern Residents (Krahn et al. 2002; Krahn et al. 2007). The predominance of Chinook salmon in the Southern Residents' diet when in inland waters, even when other species are more abundant, combined with information indicating that the killer whales consume salmon year round, makes it reasonable to expect that Southern Residents predominantly consume Chinook salmon when available in coastal waters.

The SR killer whale does not occur within the Columbia River or the action area for this consultation and therefore, direct effects of the proposed action are not anticipated. The proposed action may indirectly affect SR killer whales by reducing their prey (UCR spring Chinook). The proposed action is not anticipated to affect prey quality; however, the project may affect the quantity of prey available to Southern Residents. As described in the ITS, NMFS quantifies the amount of take as up to 9 percent of the annual run of UCR spring Chinook salmon.

NMFS anticipates that any salmonid take up to the aforementioned maximum extent would result in a significant short-term reduction in prey resources for SR killer whales that may intercept this species within its range. However, the proposed license includes an HCP with a commitment to offset these losses by funding tributary habitat improvements and hatchery programs. The objective of the Wells HCP is to achieve no net impact in terms of survival through the action area for each plan species including UCR spring-run Chinook salmon. The 2004 HCP and the proposed license will continue to positively affect the recovery of UCR spring Chinook salmon and should benefit killer whales in the longer term. This Biological Opinion concludes that the proposed action that the proposed action is not likely to jeopardize the continued existence of UCR spring-run Chinook or UCR steelhead or to destroy or adversely modify their designated critical habitat. Therefore, the net effect of the proposed action on SR killer whale prey is insignificant and NMFS concurs with FERC's determination that the proposed license may affect, but is not likely to adversely affect killer whales.

Southern Resident Critical Habitat Determination

Critical habitat for the SR killer whale includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. The proposed action has no effect in this area. Therefore, NMFS finds that the proposed license has no effect on SR killer whale critical habitat.

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

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

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

3.1 Essential Fish Habitat Affected by the Project

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

3.2 Adverse Effects to Essential Fish Habitat

Based on information provided in the BA (Douglas PUD 2011) and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have the adverse effects on EFH designated for Pacific Coast salmon described in Section 2.4 (Effects of the Action).

3.3 Essential Fish Habitat Conservation Recommendations

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

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

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

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

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

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 NMFS 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 biological 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.

5. REFERENCES

Alexander, R.F., K.K. English, B.L. Nass, and S.A. Bickford. 1998. Distribution, timing and fate of radio-tagged adult Sockeye, Chinook, and Steelhead tracked at or above Wells Dam on the Mid-Columbia River in 1997. Prepared for the Public Utility District No. 1 of Douglas County, East Wenatchee, WA.

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