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Public Utility District No. 1 of Douglas County

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Via Electronic Filing

August 29, 2011

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

Subject: Wells Hydroelectric Project No. 2149-152
Supplement to Draft Biological Assessment

Dear Secretary Bose:

The Public Utility District No. 1 of Douglas County, Washington (Douglas PUD), licensee for the Wells Hydroelectric Project (Wells Project), hereby encloses for filing a Supplement to the draft Biological Assessment (Supplement) filed with FERC on May 27, 2010. The enclosed Supplement includes an analysis of the effects of the Wells Project on newly designated critical habitat for bull trout. The Supplement also includes an analysis of Project effects on two newly designated Endangered Species Act (ESA) candidate species, North American wolverine and whitebark pine; and one ESA candidate species recently added to the Douglas County, Washington list of potentially occurring species, northern wormwood.

The enclosed Supplement was prepared in response to correspondence between the US Fish and Wildlife Service (FWS) and the FERC regarding the FERC's conclusions in the draft Biological Assessment (BA) and Draft Environmental Impact Statement (DEIS) for the relicensing of the Wells Project. Specifically, this Supplement contains the information requested by the FWS in letters to the FERC dated May 9, 2011 and August 5, 2011, which indicated that further analysis of bull trout critical habitat must be included in the draft BA before it can be made final by the FERC.

If you have any questions regarding Douglas PUD's Supplement to the Draft Biological Assessment or should you require further information, please contact me at (509) 881-2208 or sbickford@dcpud.org.

Sincerely,

Shane Bickford
Natural Resources Supervisor

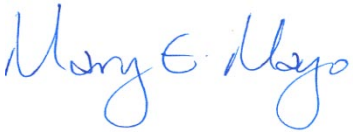
Enclosure

cc: Official Service List

CERTIFICATE OF SERVICE

I hereby certify that the foregoing documents have been served upon each person designated on the official service list compiled by the Secretary in this proceeding via electronic or first-class mail.

Dated on this 29th day of August 2011.



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Supplemental Draft Biological Assessment
And
Essential Fish Habitat Analysis

For the Proposed Action of Issuing a New Operating License for the Wells Hydroelectric Project

FERC No. 2149-152

Image courtesy of USFWS

Prepared by:

Public Utility District No. 1 of Douglas County
East Wenatchee, WA

August 2011

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APPENDIX A ESSENTIAL FISH HABITAT

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ACRONYMS

ac-ft ..... acre-feet
APP ..... Avian Protection Plan
ANS ..... Aquatic Nuisance Species
ANSMP ..... Aquatic Nuisance Species Management Plan
Aquatic RWG ..... Aquatic Resources Work Group
Aquatic SWG ..... Aquatic Settlement Work Group
BA ..... Biological Assessment
BIA ..... Bureau of Indian Affairs
BLM ..... Bureau of Land Management
BO ..... Biological Opinion
BPA ..... Bonneville Power Administration
BTMMP ..... Bull Trout Monitoring and Management Plan
BTMP ..... Bull Trout Management Plan
cfs ..... cubic ft per second
Chelan PUD ..... Public Utility District No. 1 of Chelan County
Colville ..... Confederated Tribes of the Colville Reservation
DO ..... dissolved oxygen
DPS ..... distinct population segment
Douglas PUD ..... Public Utility District No. 1 of Douglas County
Ecology ..... State of Washington Department of Ecology
ESA ..... Endangered Species Act
ESU ..... Ecologically Significant Unit
FCRPS ..... Federal Columbia River Power System
FERC ..... Federal Energy Regulatory Commission
FPC ..... Federal Power Commission
ft ..... foot or feet
GAP ..... Gas Abatement Plan
GBT ..... gas bubble trauma
GBD ..... gas bubble disease
GCFMP ..... Grand Coulee Fish Management Plan
Grant PUD ..... Public Utility District No. 2 of Grant County
HCA ..... Hourly Coordination Agreement
HCP or Wells HCP ..... Anadromous Fish Agreement and Habitat Conservation Plan
ILP ..... Integrated Licensing Process
ITP ..... Incidental Take Permit
ITS ..... Incidental Take Statement
JBS ..... Juvenile Bypass System
kcfs ..... thousand cubic feet per second
MSL ..... mean sea level
NMFS ..... National Marine Fisheries Service
NPDES ..... National Pollutant Discharge Elimination System
NPRP ..... Northern Pikeminnow Removal Program
NPS ..... National Park Service
NNI ..... no net impact

PAD..... Pre-Application Document
PCE .....Primary Constituent Element
PGE..... Portland General Electric Company
PIT.....Passive Integrated Transponder
PLMP .....Pacific Lamprey Management Plan
PNCA .....Pacific Northwest Coordination Agreement
PME ..... Protection, Mitigation, and Enhancement measure
Project or Wells Project .....Wells Hydroelectric Project
PSE.....Puget Sound Energy, Inc.
RCO .....Recreation and Conservation Office
RCW .....Revised Code of Washington
RFMP .....Resident Fish Management Plan
RM .....river mile
RMP ..... Recreation Management Plan
ROW ..... right-of-way
RPM .....reasonable and prudent measures
RTE ..... rare, threatened and endangered
RRWG ..... Recreation Resources Work Group
SPCC .....Spill Prevention Control and Countermeasures Plan
Spring Chinook ..... Upper Columbia River Spring-Run Chinook
Steelhead ..... Upper Columbia River Steelhead
TCP .....Tributary Conservation Plan
TDG .....total dissolved gas
TMDL ..... Total Maximum Daily Load
TRWG ..... Terrestrial Resources Work Group
UCR .....Upper Columbia River
UCSRP ..... Upper Columbia Salmon Recovery Plan
US .....United States
USDA……..……United States Department of Agriculture
USACE .....United States Army Corps of Engineers
USBR .....United States Bureau of Reclamation
USEPA..... United States Environmental Protection Agency
USFWS ..... United States Fish and Wildlife Service
WAC .....Washington Administrative Code
WBMP ..... Wildlife and Botanical Management Plan
WDFW ..... Washington Department of Fish and Wildlife
Wells Project or Project .....Wells Hydroelectric Project
WQAP .....Water Quality Attainment Plan
WQI .....water quality index
WQMP .....Water Quality Management Plan
WQS .....Washington State Water Quality Standards
WRIA.....Water Resources Inventory Area
WSMP ..... White Sturgeon Management Plan
WWA .....Wells Wildlife Area
Yakama .....Confederated Tribes and Bands of the Yakama Nation

1.0 INTRODUCTION

This document presents a Supplemental Draft Biological Assessment (BA) prepared by the Public Utility District No. 1 of Douglas County (Douglas PUD) to describe the potential effects of the relicensing of the 774.3 MW Wells Hydroelectric Project (Wells Project or Project) on listed or candidate species and designated critical habitat under the Endangered Species Act (ESA). Douglas PUD is the Federal Energy Regulatory Commission's (FERC) designated non-federal representative for informal Endangered Species Act consultation.

Douglas PUD's existing FERC license for the Wells Project expires on May 31, 2012. Relicensing of the Project will allow Douglas PUD to continue the generation of electricity to serve local customers as well as tribal and utility power purchasers throughout the Pacific Northwest.

From 1969 to date, Douglas PUD has cooperatively entered into 16 major agreements related to protection, mitigation and enhancement measures (PMEs) for aquatic and terrestrial resources in the vicinity of the Wells Project. Of note among these are Douglas PUD's Anadromous Fish Agreement and Habitat Conservation Plan (Wells HCP), initiated specifically for the relicensing of the Wells Project and the Bull Trout Monitoring and Management Plan (BTMMP), an effort designed to monitor incidental take associated with the Wells Project and guide the management and protection of bull trout and habitat within the Project area. Douglas PUD is not proposing any changes to Wells Project operations beyond the implementation of the existing and new resource management plans and settlement agreements.

New resource management plans and settlements proposed for inclusion in a new license are the measures contained within theWells HCP, the Aquatic Settlement Agreement (White Sturgeon, Pacific Lamprey, Bull Trout, Resident Fish, Water Quality and Aquatic Nuisance Species management plans), the Wildlife and Botanical Management Plan, Avian Protection Plan, Historic Properties Management Plan, Recreation Management Plan, and Douglas PUD's Land Use Policy.

The purpose of this BA is to review the proposed action of issuing a new operating license for the Wells Project, including all existing and proposed management plans and agreements, in sufficient detail to determine whether the proposed action may affect any of the threatened, endangered or candidate species and designated critical habitats listed below. The BA is prepared in accordance with Section 7 of the Endangered Species Act (16 U.S.C. 1536(c)), and follows the standards established in 50 CFR 402.12.

The species and designated critical habitats considered in this document are:

LISTED SPECIES

Endangered

Upper Columbia River Spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
Pygmy rabbit (*Brachylagus idahoensis*) – Columbia Basin distinct population segment
Gray wolf *(Canis lupus)* [west of U.S. 97 and State Highway 17]
Hackelia venusta (Showy stickseed), plant
Sidalcea oregana var. *calva* (Wenatchee Mountains checker-mallow), plant

Threatened

Upper Columbia River steelhead (*Oncorhynchus mykiss*)
Bull trout *(Salvelinus confluentus)* – Columbia River distinct population segment
Canada lynx (*Lynx canadensis*)
Grizzly bear (*Ursus arctos horribilis*)
Northern spotted owl (*Strix occidentalis caurina*)
Spiranthes diluvialis (Ute ladies'-tresses), plant
Marbled murrelet *(Brachyramphus marmoratus)*

CANDIDATE SPECIES

Greater sage grouse *(Centrocercus urophasianus)* – Columbia Basin distinct population segment
Washington ground squirrel *(Spermophilus washingtoni)*
Fisher *(Martes pennant)* - *West* Coast distinct population segment (west of the Okanogan River)
Yellow-billed cuckoo (*Coccyzus americanus*)

DESIGNATED CRITICAL HABITAT

Critical Habitat for Upper Columbia River Spring-run Chinook salmon
Critical Habitat for Upper Columbia River steelhead
Critical Habitat for Columbia River bull trout
Bull Trout

1.1 LICENSE HISTORY

On July 12, 1962, the Federal Power Commission (FPC), predecessor to the FERC, issued a 50-year license to build and operate the Wells Project to Douglas PUD. The term of the license runs through May 31, 2012. Construction of the Project began in the fall of 1963 and commercial operation began on September 1, 1967. The initial design and license for the Wells Project called for the construction of seven turbine generating units. On February 2, 1965, the FPC approved an application to amend the original license to include three additional generating units. The three additional units began commercial operation on January 24, 1969.

Pursuant to the requirements of the FERC's Integrated Licensing Process (ILP), Douglas PUD filed a Pre-Application Document (PAD) and Notice of Intent to relicense the Wells Project on December 1, 2006. Douglas PUD is currently progressing through the ILP and filed a Final License Application on May 27, 2010.

1.2 ESA CONSULTATION

In August 1993, Douglas PUD, Chelan PUD, and Grant PUD (collectively "mid-Columbia PUDs") initiated discussions to develop a long-term, comprehensive program for managing fish and wildlife that inhabit the mid-Columbia River basin (the portion of the Columbia River from the tailrace of Chief Joseph Dam to the confluence of the Yakima and Columbia rivers).

These discussions subsequently focused on the development of an agreement relating to anadromous salmonids, specifically: upper Columbia River (UCR) spring and summer/fall runs of Chinook salmon (*Oncorhynchus tshawytscha*); Okanogan River sockeye salmon (*O. nerka*); coho salmon (*O. kisutch*); and UCR summer-run steelhead (*O. mykiss*) (collectively, the Plan Species) which are under the jurisdiction of the National Marine Fisheries Service (NMFS). Douglas PUD already had a long-term anadromous fish settlement in place, but engaged in this process as an opportunity to define the fish mitigation strategy and requirements for the new Wells Project license.

As part of this process, Douglas PUD worked cooperatively with various state and federal fisheries agencies, local tribes and environmental organizations, including NMFS, the United States Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDFW), the Confederated Tribes of the Colville Reservation (Colville), the Confederated Tribes and Bands of the Yakama Nation (Yakama), the Confederated Tribes of the Umatilla Indian Reservation, and American Rivers, to develop the first hydropower Habitat Conservation Plan for anadromous salmon and steelhead. The plan commits Douglas PUD to a 50-year program to ensure that the Wells Project has no net impact (NNI) on mid-Columbia salmon and steelhead runs. The Wells HCP requires that this be accomplished through a combination of juvenile and adult fish passage measures

at the dam, off-site hatchery programs and evaluations, and habitat restoration work conducted in tributary streams upstream of Wells Dam.

On July 30, 1998, following five years of negotiations, Douglas PUD submitted an unexecuted form of an Application for Approval of the Wells HCP to the FERC and to NMFS. Furthermore, to expedite formal consultation, biological evaluations of the effects (of implementing the HCP) on ESA-listed species under the jurisdiction of the USFWS were also prepared by Douglas PUD.

USFWS requested consultation under Section 7 of the ESA regarding the effects of hydroelectric project operations on bull trout (*Salvelinus confluentus*) in the Columbia River (letter from M. Miller, USFWS, to M. Robinson, FERC, dated January 10, 2000). The request for consultation was based on observations of bull trout in the study area. In its reply to the USFWS, the FERC noted that there was virtually no information on bull trout in the mainstem Columbia River. In response to requests from the USFWS, the mid-Columbia PUDs initiated bull trout collection, tagging and monitoring at their respective dams as a way to monitor incidental take and to gain insight into bull trout behavior.

In late 2003, the Wells HCP was reviewed and approved by NMFS following the issuance of Biological Opinions (BOs) and Incidental Take Permits (ITPs) covering hatchery and Wells Project operations. In November 2003, the Wells HCP was submitted to the FERC for approval and inclusion into the license for the Wells Project. On December 10, 2003, USFWS received a request from the FERC for formal consultation to determine whether the proposed incorporation of the Wells HCP into the FERC license for operation of the Wells Project was likely to jeopardize the continued existence of the Columbia River distinct population segment (DPS) of ESA-listed bull trout or destroy or adversely modify proposed bull trout critical habitat. In response to the FERC request, the USFWS submitted a BO and issued an ITP to Douglas PUD. The FERC approved the Wells HCP on June 21, 2004 along with similar HCPs submitted by Chelan PUD for the Rock Island and Rocky Reach hydroelectric projects.

As of April 2005, the Wells HCP has been signed by NMFS, USFWS, WDFW, Colville, Yakama, Douglas PUD and the Wells Project Power Purchasers (Puget Sound Energy, Inc. (PSE), Portland General Electric Company (PGE), PacifiCorp and Avista Corporation).

As part of the approval of the Wells HCP, the FERC amended the Wells Project license to include Article 61. Article 61 of the license required Douglas PUD to file with the FERC a Bull Trout Plan for monitoring take associated with the operations of the Wells Project. Article 61 further required that Douglas PUD prepare the Bull Trout Plan in consultation with the USFWS, NMFS, WDFW, and interested Indian Tribes (Colville and Yakama). On February 28, 2005, Following Consultation with the USFWS, NMFS,

WDFW, Colville and Yakama, Douglas PUD filed the BTMMP with the FERC. The FERC approved the BTMMP on April 19, 2005.

The parties to the Wells HCP have agreed to be supportive of Douglas PUD's long-term license application filed with the FERC during the term of the HCP. The Wells HCP is also intended to constitute the parties' terms, conditions and recommendations for Plan Species under Sections 10(a), 10(j) and 18 of the Federal Power Act, the Fish and Wildlife Conservation Act, the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act, the Pacific Northwest Electric Power Planning and Conservation Act, and Title 77 RCW of the State of Washington.

In accordance with the conservation and mitigation measures proposed in the Wells HCP and BTMMP, NMFS and USFWS have proposed to formally consult on the impact of the proposed actions on ESA-listed and candidate species pursuant to Section 7 of the ESA. This document is intended to serve as Douglas PUD's BA for these listed species under the jurisdiction of NMFS and USFWS.

2.0 PROPOSED ACTION

Douglas PUD is proposing to relicense the 774.3-MW Wells Project, and implement a suite of six settlement agreements and twelve management plans meant to ensure resource protection and limit the potential for adverse effects on ESA-listed and candidate species. Relicensing will allow Douglas PUD to continue to generate electricity for its more than 18,000 local customers in Douglas County, and to fulfill long-term power purchase agreements with its tribal (Colville) and utility power purchasers (PSE, PGE, PacifiCorp, Avista Corporation, and Public Utility District No. 1 of Okanogan County) throughout the Pacific Northwest. Douglas PUD is not proposing to add capacity or make any major structural modifications to the Wells Project or substantially modify Project operations under a new license.

Douglas PUD proposed to continue implementation of the following agreements associated with the management and operation of the Wells Project, and to implement several new agreements, each described below. Many of these agreements specifically address PMEs developed to avoid, minimize, and mitigate for any environmental effects associated with the operation of the Wells Project. Most of these agreements are detailed in Douglas PUD's PAD, filed with the FERC in December 2006. These consist of:

- Agreement between Douglas PUD and Ervin and Loretta Wolley and Colville Regarding Use of Freeboard Lands (1970).
- Memorandum of Understanding with USFWS and State of Washington Department of Fisheries (1990).
- Canadian Entitlement Allocation Extension Agreement (1997).
- Pacific Northwest Coordination Agreement (1997).
- Mid-Columbia Hourly Coordination Agreement (1997).
- Hatchery Sharing Agreement with Chelan PUD (2002).
- Hanford Reach Fall Chinook Protection Program Agreement (2004).
- Anadromous Fish Agreement and Habitat Conservation Plan (2004).
- Interlocal Cooperative Agreement with Grant PUD (2004).
- Settlement Agreement with Colville (2005).

2.1 ACTION AREA

For the purposes of this BA, the action area includes all areas affected directly or indirectly by the Wells Project. The Wells Project action area is specifically defined as the Columbia River from river miles (RM) 514.4 (approximately 1.2 miles downstream of the Wells Dam) to RM 544.9 (Chief Joseph tailrace). The Columbia River both upstream and downstream of Wells Dam is in compliance with state water quality standards and therefore the action area does not extend downstream of the Project. 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 230kV transmission line right-of-way (ROW).

Additional Project hatchery program features include the Methow River from RM 51.0 to 49.8 (Methow Hatchery and related outfall channel). The Twisp River, a tributary to the Methow River, has trapping operations and an acclimation pond (located at RM 11.0) operated by Douglas PUD and is included in the action area. The Chewuch River, another tributary of the Methow River, has acclimation operations (located at RM 7.0) operated by Douglas PUD and is also included in the action area.

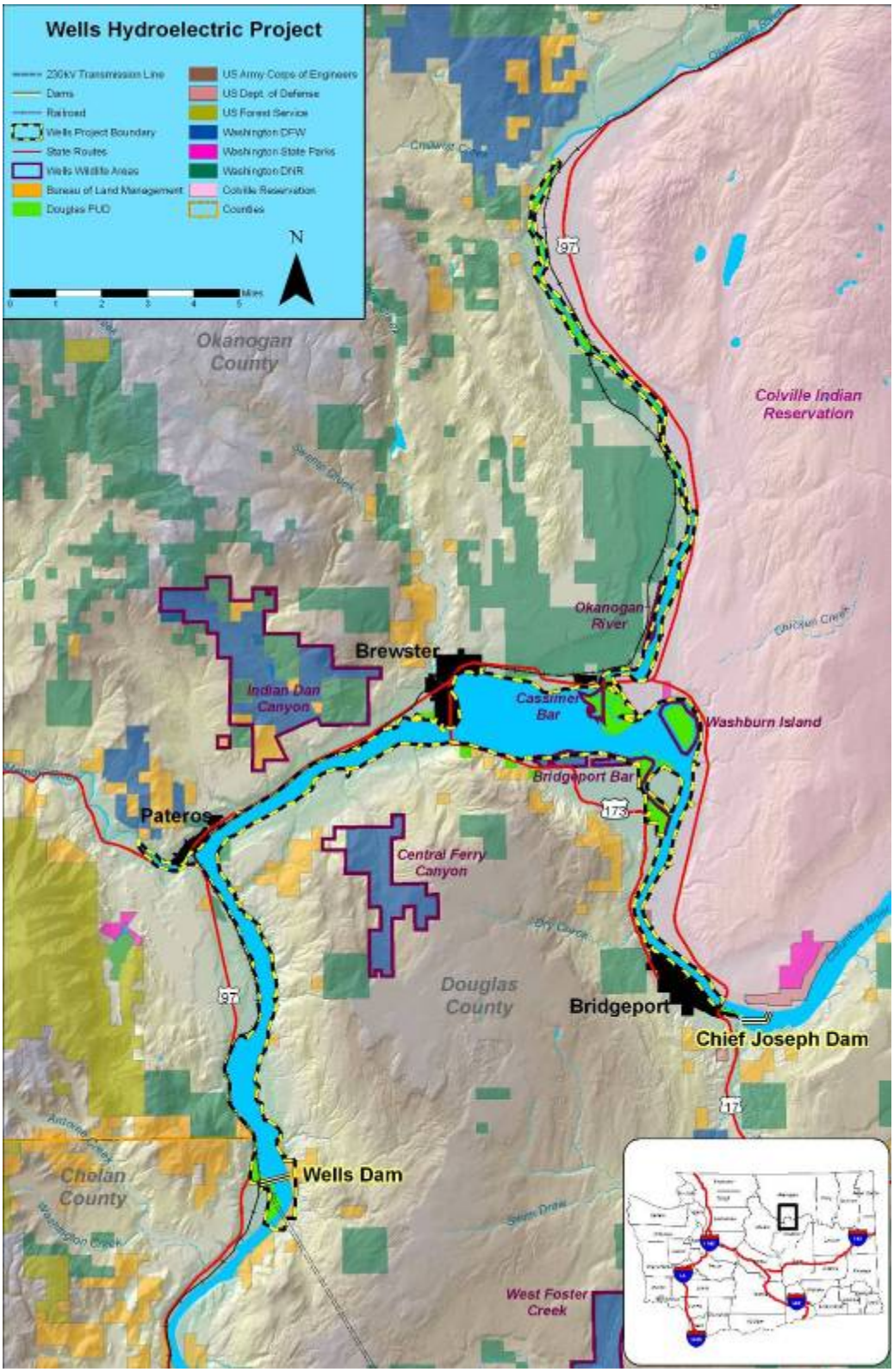

Figure 2.1-1 General Location of the Wells Project.

2.2 OPERATIONAL CHARACTERISTICS OF THE WELLS PROJECT

The Wells Project is a "run-of -river" hydroelectric project at which average daily inflow approximates the average daily outflow. The active storage capacity of the reservoir is only sufficient to regulate flow on a less-than-daily basis. The Wells Project has a water right for 220 thousand cubic ft per second (kcfs) for power production, with an impoundment right of 331,200 acre-feet (ac-ft) per year. The Wells Project is authorized by the FERC to maintain its reservoir level between elevation 781 and 771 ft above mean sea level (MSL) for power and non-power purposes. At elevation 781 ft MSL, total storage capacity is approximately 331,200 ac-ft, of which about 30 percent (97,985 ac-ft) is considered active storage (DTA 2006).

Reservoir fluctuations and power generation are largely driven by the discharge of water from regulated sources. Regulated sources of inflow include projects upstream of the Wells Reservoir in both the United States (US) and Canada. The closest project upstream from the Wells Project is the US Army Corps of Engineers' (USACE) Chief Joseph Project, also primarily a run-of-river project. Releases from Grand Coulee Dam largely dictate the flow regimes of the downstream projects including Wells. The primary sources of unregulated inflow include the two largest tributaries, the Methow and Okanogan rivers. Project operations reflect these inputs as well as the FERC license requirements, coordination of water releases on a continuous basis with other mid-Columbia River hydropower projects, fish and wildlife management requirements, and the power demands of the Wells Project power purchasers.

2.3 NORMAL DAILY OPERATIONS

Normal daily operations are coordinated according to the Mid-Columbia Hourly Coordination Agreement (HCA). The HCA provides for coordinated releases between the seven mid-Columbia River hydroelectric dams (Grand Coulee, Chief Joseph, Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids) to efficiently use the river, supply electricity during times of peak public demand, and maintain adequate flow to protect natural resources (HCA 1997). In effect, the HCA manages upstream releases and ensures downstream reservoirs make room to receive and release upstream flows. As a result of these coordinated operations, water fluctuations within Wells Reservoir are minimized, generally not exceeding one to two ft throughout the day. The Wells Project has operated under the terms of the HCA since 1972, and is currently operating within a 20-year agreement effective through 2017.

The daily operation of the Wells Project is influenced by the following factors: (a) the FERC license requirements; (b) natural stream flows; (c) regulation of upstream storage reservoirs in the U.S. and Canada; (d) regulation of water releases from upstream power projects on an hourly basis to meet changing power demands; (e) actions in response to fish, wildlife and other environmental regulations; and (f) variable power demands for

use within Douglas and Okanogan counties and under the long-term power sales contracts with PSE, PGE, PacifiCorp and Avista. The Wells Project has a 10 ft operating range, but typically operates within the upper one to two ft of the reservoir on any given day (see Figure 2.3-1). Over the period 1990 to 2005, the reservoir levels fell below 777 feet (four feet below normal maximum pool) only 1.1 percent of the time. Further discussion of reservoir levels is addressed in Section 2.4.

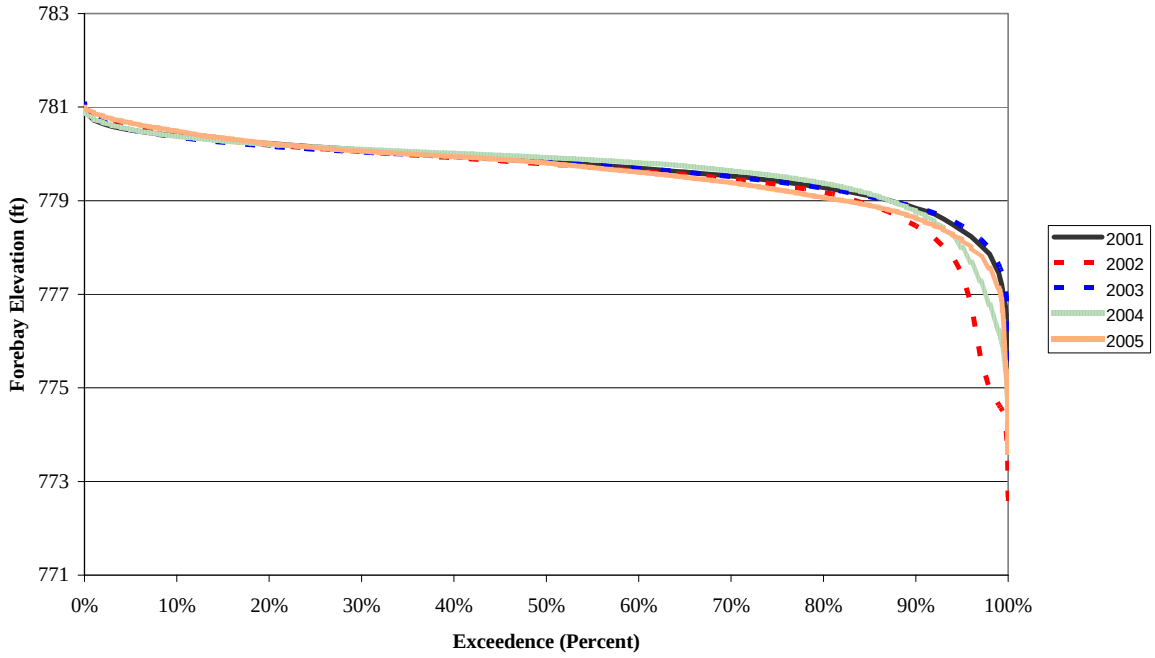

Figure 2.3-1 Headwater duration curves, Wells Forebay (hourly data) 2001-2005.

The Wells Project is operated in a coordinated manner with other regional hydroelectric projects to meet federal and state objectives for protecting and enhancing fish and wildlife and numerous other multi-purpose functions authorized by law such as power, flood control, navigation, recreation and water quality. The regulation of the upstream reservoirs in the US and Canada is primarily governed by the 1997 Pacific Northwest Coordination Agreement (PNCA) and the Columbia River Treaty between the US and Canada relating to the cooperative development of the Columbia River and its tributaries. The purpose of the PNCA is to optimize the firm load carrying capability of resources coordinated under the agreement, including the Wells Project, and to produce usable non-firm electricity from those resources as well. Importantly, the PNCA also sets forth a procedure approved by the FERC for apportioning costs to be borne by the Wells Project for purposes of headwater benefits compensation. This compensation addresses the benefit of improved stream flow regulation provided by the upstream storage reservoirs in the US, consistent with Article 47 of the Wells Project license.

Douglas PUD is required by Article 38 of the Wells Project license to use the improved stream flow resulting from Canadian storage for power production purposes and to make available to the federal system for delivery to Canada the Wells Project's share of coordinated system benefits resulting from such improved stream flow. Consistent with this requirement, Douglas PUD entered into agreements in 1964 (now expired) and 1997 with the Bonneville Power Administration (BPA) setting forth the share of Canadian benefits to be paid in the form of electricity deliveries by the Wells Project until September 15, 2024.

As previously noted, Douglas PUD is party to the HCA with the operators of six other federal and non-federal dams located both upstream and downstream of Wells Dam for a 20-year term through June 30, 2017. The HCA was originally conceived to find a means of protecting Wells and other downstream projects from adverse effects of "peaking" operations at the upstream federal projects. The primary objective of the agreement is to optimize the amount of electricity produced from available water consistent with power and non-power needs.

Douglas PUD also has an encroachment agreement (1968) with the USACE to compensate the federal system for power loss due to Wells Project encroachment on the tailwater of Chief Joseph Dam, consistent with Article 32 of the Wells Project license. The construction of the Wells Project increased the tailwater elevation at Chief Joseph Dam, which reduces the hydraulic head available for generation. The agreement was supplemented in 1982 when the FERC approved raising the upper elevation limit of Wells Reservoir from elevation 779 ft to 781 ft MSL.

Additional agreements affecting operation of the Wells Project include the Vernita Bar Settlement Agreement approved by the FERC on December 9, 1988. Its successor, the Hanford Reach Fall Chinook Protection Program Agreement, was submitted to the FERC by Grant PUD on April 19, 2004 and made part of the 2008 Priest Rapids license. Specifically, the Hanford Reach Fall Chinook Protection Program states that under certain circumstances Douglas PUD will release a limited amount of water from the Wells Project, in cooperation with prescribed federal upstream and non-federal downstream project water releases, to help adult spawning, incubation, and emergence of fall Chinook salmon downstream of the Priest Rapids Dam.

2.4 INFREQUENT RESERVOIR OPERATIONS

Typical operational fluctuations of the Wells Project are gradual, repetitive changes in reservoir stage that occur on a daily basis and generally result in reservoir elevation fluctuations of one to two ft (see Figure 2.3-1). Less frequent reservoir operations, defined as changes in water elevation which exceed twice the normal daily operation fluctuations (i.e., a change of more than four ft in a 24-hour period), also occur from time to time (DTA 2006). Under conditions that existed from 2001 through 2005, reservoir

elevations below 774 ft. MSL were observed four times. Past environmental management actions that required infrequent reservoir operations have included flushing flows to move sediment from the lower Methow River; increased discharge during low inflow periods to support downstream spawning, incubation and emergence for Hanford Reach fall Chinook; lowered water level elevations to facilitate construction of islands for waterfowl habitat and maintenance and repair of public boat launches and access facilities (DTA 2006).

From 2001through 2005, the daily fluctuation frequency of the reservoir was less than three ft 93.3 percent of the time and minimum elevations fell below 777 ft MSL only 3.8 percent of the time (DTA 2006). Infrequent reservoir operations resulting in fluctuations over four ft in a 24-hour period occurred only 1.1 percent of the time. From 1990 to 2005, the Project forebay maintained a minimum water surface elevation of at least 777 ft MSL 95.1 percent of the time (DTA 2006). From 2001 through 2005, reservoir operations resulting in fluctuations beyond six ft occurred only 0.1 percent of the time and never resulted in fluctuations past seven ft. Such infrequent reservoir operations are generally brief in duration as well (i.e., 1 to 5 hrs), and reservoir stage may rise and fall several times in the course of an event. Infrequent reservoir operations of four ft or more occurred a total of 21 times between 2000 and 2005, and ranged in frequency from one in 2003 to seven in 2005. The mean duration of occurrences was 7.1 hours, and the median value was 3.0 hours. This type of infrequent reservoir operation has occurred in each month except February, August, September, and December in the course of the last five years, and occurred most frequently in July (5 events) and April (4 events). However, the pattern of occurrence was highly variable, and infrequent reservoir operations rarely occurred in the same month in successive years.

2.5 PROPOSED PROJECT OPERATION

Douglas PUD is not proposing any changes to its operation of the Wells Project, other than the implementation of the proposed environmental measures described herein. Implementation of these measures is not anticipated to result in electric generation or reservoir operation changes.

2.5.1 Proposed Environmental Measures

Douglas PUD is proposing the following environmental measures in its application for a new FERC license:

2.5.1.1 HCP

The Wells HCP (Douglas PUD 2002) commits Douglas PUD to a 50-year program to ensure that the Wells Project has NNI on salmon and steelhead runs. The HCP requires that this be accomplished through a combination of juvenile and adult fish passage measures at the dam, off-site hatchery programs and evaluations, and habitat restoration work conducted in tributary streams upstream of Wells Dam. The Wells HCP outlines a schedule for meeting and maintaining NNI throughout the 50-year term of the agreement. NNI consists of two components including: (1) a 91 percent combined adult and juvenile Wells Project survival standard achieved by Wells Project improvement measures implemented within the geographic area of the Wells Project and (2) up to 9 percent compensation for unavoidable Wells Project related mortalities. Compensation to meet NNI is provided through hatchery and tributary programs under which 7 percent compensation is provided through hatchery production and 2 percent compensation is provided through the funding of enhancements to tributary habitats that support Plan Species.

The Wells HCP was designed to address Douglas PUD's obligations for relicensing and as such included all of the parties terms, conditions and recommended measures related to regulatory requirements to conserve, protect and mitigate plan species pursuant to ESA, the FPA, the Fish and Wildlife Coordination Act, the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act, the Pacific Northwest Electric Power Planning and Conservation Act and Title 77 RCW of the State of Washington. The HCP also obligates the parties to work together to address water quality issues.

The Wells HCP was signed in 2002 by NMFS, USFWS, Colville, WDFW, Douglas PUD and the Wells Project power purchasers (PSE, PGE, PacifiCorp and Avista Corporation). In 2005, the HCP was signed by Yakama. In late 2003, NMFS issued Douglas PUD a new ESA section 10 ITP (permit No. 1391) for the taking of UCR summer-run steelhead (steelhead), UCR spring-run Chinook salmon (spring Chinook), UCR summer/fall Chinook salmon and Okanogan River sockeye salmon in association with the operation and maintenance of the Wells Project. The Wells HCP was approved by the FERC on June 21, 2004 and made part of the Wells Project license. Following the FERC's approval of the HCP, Douglas PUD implemented the Wells HCP as part of the package of measures developed for the relicensing of the Wells Project.

Concurrent with the issuance of permit No. 1391, NMFS also issued Douglas PUD three separate ESA section 10 ITPs (permit No. 1395, 1347 and 1196) for the taking of salmon and steelhead associated with the operation of Douglas PUD's hatchery programs. These hatchery programs are central to Douglas PUD's fulfillment of the hatchery mitigation requirements of the HCP and Wells Project license. Permit No. 1196 and 1365 are for the taking of ESA-listed salmon and steelhead in association with the operation of

Douglas PUD's spring Chinook and steelhead hatchery programs, respectively. Permit No. 1347 is for the taking of ESA-listed salmon and steelhead in association with the operation of Douglas PUD's hatchery programs for non-ESA-listed salmon.

The Wells HCP also requires the formation of four committees that are used to implement, monitor and administer the agreement namely the Policy, Coordinating, Hatchery, and Tributary committees. The Wells HCP contains several plans and programs for implementing the components of the agreement.

Passage Survival Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of unavoidable juvenile and adult losses for each of the Plan Species passing through Wells Dam. Due to an agreed upon inability of the parties to differentiate between sources of adult mortality, initial compliance with the combined adult and juvenile survival standard is based upon measurement of juvenile survival (93 percent juvenile Project survival and 95 percent juvenile dam passage survival). The plan lays out the methodologies for measuring survival rates and the decision process that will be followed depending on whether the applicable survival standards are achieved or not. This section of the plan also details the 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).

Wells Dam Juvenile Dam Passage Survival Plan

In addition to the specific details describing how survival studies will be implemented and evaluated relative to achievement of NNI, the HCP also contains specific criteria for the operation of the Wells juvenile fish bypass system. 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 passing through Wells Dam are provided a safe, non-turbine passage route around the dam. The operational dates for the bypass are set annually by unanimous agreement of the parties to the HCP.

Tributary Conservation Plan

The Tributary Conservation Plan (TCP) within Section 7 of the Wells HCP guides the funding for and allocation of dollars from the Plan Species Account. The Plan Species Account provides funding for tributary habitat protection and restoration projects within the Wells Project Boundary and within the portions of the Methow and Okanogan rivers that are accessible to Plan Species, in order to compensate for up to two percent unavoidable adult and/or juvenile mortality for HCP species passing through Wells Dam. The Tributary Committee will select projects according to guidelines established in

Supporting Document D, with a high priority given to the acquisition of land or interests in land such as conservation easements or water rights.

Hatchery Compensation Plan

The Hatchery Compensation Plan, as described in Section 8 of the Wells HCP, was established to provide hatchery compensation for up to 7 percent unavoidable juvenile passage losses of Plan Species passing through Wells Dam (Douglas PUD 2002). The goal of the program is to utilize hatchery produced fish to replace unavoidable losses in such a manner that the hatchery fish produced contribute to the rebuilding and recovery of naturally reproducing populations of Plan Species, in their native habitats, while maintaining the genetic and ecological integrity of each stock of Plan Species. Supporting harvest, where appropriate, is also a goal of the Hatchery Compensation Plan.

Adult Passage Plan

The Adult Passage Plan, as contained within Section 4.4 and Appendix A of the Wells HCP, 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 passage success, timing and rates of fallback.

Predator Control Program

Section 4.3.3 of the Wells HCP requires Douglas PUD to implement a northern pikeminnow, piscivorous bird and piscivorous mammal harassment and control program to reduce the level of predation upon anadromous salmonids migrating through Wells Dam. The northern pikeminnow removal program may include a northern pikeminnow bounty program, fishing derbies and tournaments, and the use of longline fishing and trapping.

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. Access deterrents include steel wires across the hatchery ponds and tailrace, fencing and covers for hatchery ponds, and electric fencing.

Hatchery Genetic Management Plans

Hatchery and genetic management plans (HGMPs) are used to address the take of ESA-listed species that may occur as a result of artificial propagation activities. The primary goal of an HGMP is to devise biologically-based artificial propagation management strategies that ensure the conservation and recovery of listed evolutionarily significant units (ESUs). Information from HGMPs is used to evaluate impacts on anadromous salmon and steelhead listed under the ESA, and to inform issuance of ESA Section 10 incidental take permits for artificial propagation activities.

The Hatchery Compensation Plan, together with NMFS's authorized Incidental Take permits and HCP Hatchery Committee approved Hatchery Genetic Management plans, form the basis for the NNI hatchery programs. In 2010, new HGMPs were developed and approved by the HCP Hatchery Committee for UCR spring Chinook salmon and UCR steelhead. Once approved by NMFS and the FERC, These new HGMPs will require substantial modification to the facilities and operations previously authorized at the Methow and Wells fish hatcheries.

2.5.1.2 Aquatic Settlement Agreement

Douglas PUD has entered into an Aquatic Settlement Agreement (ASA) with the Washington State Department of Ecology (Ecology), USFWS, BLM, the Colville, Yakama and WDFW. The purpose of the ASA is to resolve all remaining aquatic resource issues related to compliance with all federal and state law applicable to the issuance of a new license for the Wells Project. The ASA was developed to clearly define Douglas PUD's obligations for the protection of aquatic resources during the term of a new FERC license. The ASA established an Aquatic Settlement Work Group (Aquatic SWG), which serves as the primary forum for consultation and coordination between the Parties, and sets out the rules by which the agreement operates.

The ASA includes six aquatic resource management plans. Collectively, these six aquatic resource management plans are critical to guide implementation of PMEs during the term of a new license. Together with the Wells HCP, these measures are intended to function as the Water Quality Attainment Plan (WQAP) in support of the Section 401 Water Quality Certification of the Clean Water Act for the Wells Project. NMFS was invited to participate in the development of aquatic resource management plans, but declined because its interests are satisfied by the measures identified within the Wells HCP. Implementation of the management plans, described individually in greater detail below, is not expected to result in any changes in future Project operations.

White Sturgeon Management Plan

The goal of the White Sturgeon Management Plan (WSMP) is to increase the white sturgeon (*Acipenser transmontanus*) population in Wells Reservoir to a level that can be supported by the available habitat and characterized by a diverse age structure consisting of multiple cohorts (juveniles and adults). In addition, the WSMP is intended to support spawning, rearing and migration as identified by the aquatic life designated use under Washington Administrative Code (WAC) 173-201A in the Washington State Water Quality Standards (WQS). Based upon the information available as of December 2006, the Aquatic SWG determined that an assessment of Wells Project effects on white sturgeon was not practical given sturgeon life history characteristics and the limited number of fish estimated to exist in the Wells Project. The Aquatic SWG concluded that resource measures related to white sturgeon should focus on population protection and enhancement by means of supplementation as an initial step to increase the number of fish within Wells Reservoir. In addition to the initial supplementation activities, the Aquatic SWG proposed implementation of a monitoring and evaluation program to assess natural recruitment, juvenile habitat use, carrying capacity, and the potential for natural reproduction in order to inform the scope of a future, long-term supplementation strategy.

To fulfill the goals and objectives of the WSMP, Douglas PUD, in consultation with the Aquatic SWG, developed a white sturgeon management program that will be implemented in two phases. Phase I will be implemented during the first ten years of a new license and includes juvenile stocking, and monitoring and evaluation activities. Phase II will include long-term juvenile stocking, adult passage evaluation and monitoring for the remainder of the new license. The scope of the Phase II activities will be determined in part by the results of the Phase I measures. Douglas PUD will provide an annual report that documents all white sturgeon activities conducted within the Wells Project and include any decisions, statements of agreement, evaluations, or changes made pursuant to the WSMP. The PMEs presented within the WSMP were designed to meet the following objectives and will be implemented during a 50-year license term:

Objective 1: Supplement the white sturgeon population in order to address Project effects, including impediments to migration and associated bottlenecks in spawning and recruitment.

Due to the low numbers of sturgeon indicated by the 2001-2003 white sturgeon study (Jerald 2007) and the need to increase genetic variation, there is a low probability that brood stock from only the Wells Reservoir can be utilized as the basis for supplementation activities. Consequently, other sources of fish must be considered in addition to capturing fish from Wells Reservoir to increase the white sturgeon population. Within one year of issuance of a new license, Douglas PUD shall prepare and implement a Brood Stock Collection and Breeding Plan, in consultation with the Aquatic SWG,

which considers such factors as genetics and questions of imprinting, and are consistent with the goal and objectives of the WSMP and includes the level of detail provided in other existing white sturgeon breeding plans.

Following is a prioritized list of juvenile fish source options that shall be incorporated into a Brood Stock Collection and Breeding Plan:

- Brood stock collected from the Wells Reservoir;
- Brood stock collected from nearby reservoirs (Priest Rapids, Wanapum, Rocky Reach, Rock Island);
- Brood stock collected from McNary Reservoir;
- Juvenile production from the Lake Roosevelt white sturgeon recovery effort;
- Brood stock collected from below Bonneville Dam in the lower Columbia River;
- Juveniles purchased from a commercial facility.

A white sturgeon supplementation program may include the following implementation options (Not listed in a priority order).

- Build new or retrofit existing Douglas PUD funded hatchery facilities to accommodate white sturgeon brood stock, egg incubation, and juvenile rearing;
- Development of a mid-Columbia hatchery facility funded by the mid-Columbia PUDs (Douglas, Chelan, and Grant) to accommodate various phases of white sturgeon supplementation: brood stock, egg incubation, and juvenile rearing;
- Direct release into the Wells Reservoir of juveniles produced via appropriate Breeding Plan criteria and reared at a commercial facility;
- Direct release into the Wells Reservoir of juveniles or adults trapped and hauled from the lower Columbia River.

The initial source of brood stock shall be determined within the first year of issuance of a new license. Collection of brood stock shall occur consistent with the brood stock collection plan in years 1-4 of the new license. Any additional years during the Phase I program (first ten years of the new license) in which brood stock collection shall occur in order to facilitate additional juvenile stocking into the Wells Reservoir will be determined by the Aquatic SWG. The intent of brood stock collection is to use their progeny, if feasible, for future white sturgeon stocking activities in the Wells Reservoir. The brood stock collection plan shall be updated annually, or as otherwise recommended by Douglas PUD in consultation with the Aquatic SWG, to incorporate new and appropriate information.

Juvenile White Sturgeon Stocking

Within two years following issuance of a new license, Douglas PUD shall release up to 5,000 yearling white sturgeon into the Wells Reservoir annually for four consecutive years (20,000 fish total). Additional years and numbers of juvenile sturgeon to be stocked during Phase I will be determined by the Aquatic SWG and will not exceed 15,000 juvenile sturgeon (total of 35,000 juvenile sturgeon during Phase I). Douglas PUD shall ensure that all hatchery-reared juvenile white sturgeon released into the Wells Reservoir are marked with Passive Integrated Transponder (PIT) tags and year-specific scute marks for monitoring purposes. In order to allow for tracking of juvenile white sturgeon emigration (Objective 2), Douglas PUD shall ensure that up to one percent (or a maximum of 50) of the juvenile white sturgeon released into the Wells Reservoir are large enough to allow implantation of an active tag prior to release. In addition, following the third year of supplementation (unless the Aquatic SWG determines more analysis is required), the Aquatic SWG may elect to release juveniles at an earlier or later life stage for the fourth year in order to compare success of fish released at varying life stages.

Objective 2: Determine the effectiveness of the supplementation activities through a monitoring and evaluation program.

Douglas PUD shall conduct a monitoring and evaluation program within the Wells Reservoir for the purpose of assessing the effectiveness of the supplementation activities described in the WSMP. Monitoring shall include both an Index Monitoring Program and a Marked Fish Tracking Program. Both programs will be used to collect life history and population dynamics information including rates of fish movements into and out of the Wells Reservoir and habitat use. Douglas PUD shall also obtain updated information, when available, on other white sturgeon recovery programs (e.g., Upper Columbia River, Kootenai River, mid-Columbia PUDs), in order to improve the monitoring and evaluation program and refine its implementation. The results of this information will also inform supplementation, monitoring and evaluation activities during implementation of Phase II of the WSMP.

Index Monitoring Program

Within three years following issuance of a new license, Douglas PUD shall initiate an index monitoring program (Years 3-5) for juvenile and adult sturgeon in the Wells Reservoir to determine age-class structure, survival rates, abundance, density, condition factor, growth rates, and to identify distribution and habitat selection of juvenile sturgeon. The indexing methods shall include using gillnets, set lines or other appropriate recapture methods for juveniles and adults.

As a component of the indexing monitoring program, Douglas PUD shall capture and implant active tags in a portion of the juvenile and sexually mature adult sturgeon population found in the Wells Reservoir. This tagging effort shall be used to augment broodstock collection, population level information and juvenile habitat use and natural reproduction potential.

The information collected during the index monitoring program will be used to assess age-class structure, survival rates, abundance, condition factor, and growth rates; identify distribution and habitat selection of juvenile sturgeon; and to inform the supplementation program strategy.

Marked Fish Tracking Program

Beginning in year three of the new license and continuing for three years (Years 3-5), Douglas PUD shall conduct tracking surveys of the juvenile white sturgeon that were released with active tags as part of supplementation activities. This will require one percent of each of the annual classes of juvenile sturgeon (up to a maximum of 50 fish each year) released in years 2, 3, 4, and 5 to be reared large enough to implant an active tag for tracking purposes. The purpose of tracking active-tagged fish is to determine juvenile white sturgeon emigration rates out of the Wells Reservoir and habitat use within the Wells Reservoir.

Douglas PUD shall repeat the tracking survey for two additional years during Phase I. The additional two years of surveys shall track: 1) active tags implanted in a percentage of juvenile fish from previous years of supplementation activities (dependent upon tag life) and 2) any juvenile and adult fish implanted with active tags during the last indexing period preceding the survey. Subsequent Phase I surveys are likely to coincide with the additional Phase I index monitoring and juvenile stocking activities.

Objective 3: Determine the potential for natural reproduction in the Wells Reservoir in order to appropriately inform the scope of future supplementation activities.

Objective 4: Adaptively manage the supplementation program as warranted by the monitoring results.

Pertaining to both Objectives 3 and 4, in years where environmental conditions are appropriate, Douglas PUD shall track sexually mature adult sturgeon that were captured and implanted with active tags for the purpose of identifying potential spawning locations and determining natural reproduction potential. Appropriate environmental conditions may be determined by examining the following factors: water quality and quantity (i.e., flow, temperature, and turbidity), the presence of reproductively viable adults during index monitoring activities, and the status of maturity for supplemented fish. In years in which sexually mature adult sturgeon are tagged under, Douglas PUD may also utilize

egg collection mats in combination with tracking in areas of the Wells Reservoir for the purpose of identifying potential spawning locations and activity. Five surveys of natural reproduction using adult tracking and/or egg mat placement shall occur over the term of a new license. Several of these surveys are intended to be implemented during the latter part of the license in order to examine the natural reproductive potential of supplemented fish recruiting to sexual maturity.

Objective 5: Evaluate whether there is biological merit to providing safe and efficient adult upstream passage.

In year eleven of the new license and every 10 years thereafter for the duration of the new license unless otherwise determined by the Aquatic SWG, the Aquatic SWG shall evaluate the biological merit of providing upstream passage for adult white sturgeon. The assessment of biological merit shall be determined by: (i) evaluating information gathered from monitoring and evaluation activities and determining whether there is significant biological benefit and need for upstream passage; (ii) the availability of reasonable and appropriate means to provide upstream passage; and (iii) consensus from all other operators of the mid-Columbia projects to implement adult upstream passage measures. If all three criteria above are met, Douglas PUD, in consultation with the Aquatic SWG shall develop adult passage measures that are consistent with measures being implemented by other mid-Columbia project operators.

Objective 6: Identify white sturgeon educational opportunities that coincide with WSMP activities.

Douglas PUD, in consultation with the Aquatic SWG, shall identify appropriate WSMP activities as opportunities for education to local public entities such as schools, cities, fishing and recreation groups, and other interested local groups. WSMP activities that may be appropriate for public participation are hatchery tours, release of hatchery juveniles, and tagging of juveniles prior to release.

Supplementation Program Review

During the implementation of WSMP, Douglas PUD shall compile information on other white sturgeon supplementation programs in the Columbia River Basin as needed in order to assess whether the white sturgeon supplementation program being implemented at the Wells Project is: (i) consistent and comparable with the technology and methods being implemented by other supplementation programs in the region; (ii) reasonable in cost and effective to implement at the Project; and (iii) consistent with the supplementation program goals and objectives. The supplementation program review will be conducted annually in coordination with the development of the annual report.

Bull Trout Management Plan

The goal of the Bull Trout Management Plan (BTMP) is to identify, monitor, and address impacts to bull trout, if any, resulting from the Wells Project, in a manner that is consistent with the USFWS Bull Trout Recovery Plan and the terms of the Section 7 Incidental Take Statement (ITS). The BTMP is intended to continue the implementation of management activities to protect bull trout during the new license term in a manner consistent with the original BTMMP (Douglas PUD 2004). Douglas PUD, in consultation with the Aquatic SWG, will implement the following PMEs in order to meet the goals and objectives of the BTMP:

Objective 1: Operate the upstream fishways and downstream bypass systems in a manner consistent with the HCP.

Provide Upstream and Downstream Passage for Adult and Sub-Adult Bull Trout

Douglas PUD will continue to provide upstream passage for adult bull trout through the existing upstream fishways and downstream passage of adult and sub-adult bull trout through the existing downstream bypass system. Both upstream fishway facilities (located on the west and east shores) 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, based on past data from year-round monitoring efforts, bull trout have not been observed passing Wells Dam. Operation of the downstream passage facilities for bull trout will be consistent with bypass operations for Plan Species identified in the HCP. Currently the bypass system is operated from April 12 through August 26 of each year. This operating period is consistent with the period of high bull trout and anadromous fish presence at the Project.

Upstream Fishway Counts

Douglas PUD shall continue to conduct video monitoring in the Wells Dam fishways from May 1st through November 15th to count and provide information on the population size of upstream moving bull trout.

Upstream Fishway Operations Criteria

Douglas PUD shall continue to operate the upstream fishway at Wells Dam in accordance with criteria outlined in the Wells HCP.

Bypass Operations Criteria

Douglas PUD operates a juvenile bypass system (JBS) annually to provide a non-turbine passage route through the dam for 95 percent of the spring and summer-run juvenile plan

species outmigration. The bypass is in operation annually from mid April until late August, which is consistent with the period of high bull trout and anadromous fish presence at the Wells Project.

The procedures set forth in the Wells HCP are intended to guide the operating criteria for the JBS. This plan also includes specific operating criteria for the turbines and spillways sufficient to maximize fish use and survival through the JBS (USFWS 2004c). A more detailed description of JBS, spillway and turbine operations can be found in Section 4.3 and Appendix A of the Wells HCP." Douglas PUD shall continue to operate the bypass system at Wells Dam in accordance with criteria outlined in the Wells HCP.

Objective 2: Identify any adverse Project-related impacts on adult and sub-adult bull trout passage.

Adult Bull Trout Upstream and Downstream Passage Evaluation

Douglas PUD shall continue to monitor upstream and downstream passage and incidental take of adult bull trout through Wells Dam and in the Wells Reservoir through the implementation of a radio-telemetry study. Specifically, in years 5 and 10 of the new license, and continuing every ten years thereafter during the new license term, Douglas PUD will conduct a one-year monitoring program to determine whether Douglas PUD remains in compliance with the ITS. This program was recommended and approved by the FERC and USFWS. The same study protocols used during past radio-telemetry assessments at Wells Dam (LGL and Douglas PUD 2007) will be employed for these monitoring studies.

If the adult bull trout counts at Wells Dam increases more than two times the existing 5-year average or if there is a significant change in the operation of the fish ladders or hydrocombine, then the Aquatic SWG will determine whether additional years of take monitoring are needed beyond those identified in this section of the BTMP. If the authorized incidental take level is exceeded during any one-year period, Douglas PUD will conduct another monitoring study in the succeeding year. If the authorized incidental take level is exceeded in this second year, Douglas PUD will develop a plan, in consultation with the Aquatic SWG, to address the identified factors contributing to exceedance of the allowable level of incidental take.

Douglas PUD does not develop take estimates based upon observed mortality rates for bull trout. In the eight years of monitoring, Douglas PUD has never observed any bull trout mortality. Therefore, to develop take estimates based upon observed bull trout mortality at the Wells Project, other than zero mortality, is not possible. Douglas PUD's bull trout program seeks to reduce any potential incident of harassment or delay as a result of Project activity (i.e., sub-lethal take).

Adult Bull Trout Passage Evaluation at Off-Project Collection Facilities

Douglas PUD shall assess upstream and downstream passage and incidental take of adult, migratory bull trout at off-Project (outside of the Project Boundary) adult salmon and steelhead brood stock collection facilities associated with the hatchery compensation component of the Wells HCP. Specifically, beginning in year one of a new license, Douglas PUD will conduct a one-year radio-telemetry study to assess passage and incidental take at off-Project adult collection facilities (i.e., Twisp weir). Douglas PUD will capture and tag up to 10 adult, migratory bull trout (>400mm) at adult collection facilities and use fixed receiver stations upstream and downstream of collection facilities to examine upstream and downstream passage characteristics and incidental take. Study protocols that have been used during past radio-telemetry assessments at Wells Dam will be employed for this assessment (LGL and Douglas 2008).

If negative impacts to passage associated with Off-Project collection facilities are observed or the authorized incidental take level is exceeded during any one-year period, Douglas PUD will conduct another monitoring study in the succeeding year. If negative impacts to passage continue to be observed or the authorized incidental take level is exceeded in this second year, Douglas PUD will develop a plan, in consultation with the Aquatic SWG, to address the identified factors contributing to passage impacts or the exceedance of the allowable level of incidental take.

After year one of a new license, the implementation of this sub-objective will be integrated into the one-year telemetry monitoring program that is to be conducted every ten years (beginning in year 10 of the new license) at Wells Dam. In year 10 of the new license and every 10 years thereafter, bull trout will be captured and tagged only at Wells Dam since data show that bull trout passing Wells Dam are migrating back into the Methow River watershed (LGL and Douglas 2008). Through the continued deployment of fixed station monitoring at off-Project adult salmon and steelhead brood stock collection facilities, these tagged bull trout will continue to provide passage and take information in support of this sub-objective throughout the term of a new license.

Sub-Adult Bull Trout Monitoring

While an objective of the BTMP is to identify potential Project impacts on upstream and downstream passage of sub-adult bull trout, Aquatic SWG members (including the USFWS) agree that it is not feasible to assess sub-adult passage because sub-adult bull trout have not been observed at Wells Dam. During the previous six years of bull trout data collection at Wells Dam (BioAnalyst Inc. 2004; LGL and Douglas 2008), sub-adult bull trout have not been documented passing Wells Dam. However, it is expected that through the increased monitoring associated with the implementation of the BTMP there may be encounters with sub-adult bull trout.

If at any time during the new license term, sub-adult bull trout are observed passing Wells Dam in significant numbers (>10 per calendar year), the Aquatic SWG will recommend reasonable and appropriate methods for monitoring sub-adult bull trout. Specifically, Douglas PUD may modify counting activities, continue to provide PIT tags and equipment, and facilitate training to enable fish sampling entities to PIT tag sub-adult bull trout when these fish are collected incidentally during certain fish sampling operations. This activity will occur the year following the first observation of >10 sub-adult bull trout (in a single calendar year), and subsequently as recommended by the Aquatic SWG.

Objective 3: Implement reasonable and appropriate options to modify upstream fishway, downstream bypass, or operations if adverse impacts on bull trout are identified and evaluate effectiveness of these measures.

Douglas PUD shall continue to operate the upstream fishway and downstream bypass at Wells Dam in accordance with the Wells HCP. However, if upstream or downstream passage problems for bull trout are identified (as agreed to by the USFWS and Douglas PUD), Douglas PUD will identify and implement, in consultation with the Aquatic SWG and HCP Coordinating Committee, reasonable and appropriate options to modify the upstream fishway, downstream bypass, or operations to reduce the identified impacts to bull trout passage.

Objective 4: Periodically monitor for bull trout entrapment or stranding during low Wells Reservoir elevations (similar to BTMMP).

During the implementation of the BTMMP from 2004-2008, Douglas PUD, through the use of high resolution bathymetric information, hydraulic and elevation data, and backwater curves, identified potential bull trout entrapment and stranding areas in the Wells Reservoir. Although no stranded bull trout were observed in these areas during the implementation of the BTMMP, Douglas PUD will continue to investigate potential entrapment or stranding areas for bull trout through periodic monitoring when periods of low reservoir elevation expose identified sites. During the first five years of the new license, Douglas PUD will implement up to five bull trout entrapment/stranding assessments during periods of low reservoir elevation (below 773' MSL). If no incidences of bull trout stranding are observed during the first five years of study, additional assessment will take place every fifth year during the remainder of the license term, unless waived by the Aquatic SWG. If bull trout entrapment and stranding result in take in exceedance of the authorized incidental take level, then reasonable and appropriate measures will be implemented by Douglas PUD, in consultation with the Aquatic SWG, to address the impact.

Objective 5: Participate in the development and implementation of the USFWS Bull Trout Recovery Plan, including information exchange and genetic analysis. Should bull trout be delisted, the Aquatic SWG will re-evaluate the needs and objectives of the BTMP.

Monitoring Other Aquatic Resource Management Plan Activities and Predator Control Program for Incidental Capture and Take of Bull Trout

Douglas PUD will monitor activities associated with the implementation of other Aquatic Resource Management Plans (white sturgeon, Pacific lamprey, resident fish, aquatic nuisance species, and water quality) and Predator Control Program that may result in the incidental capture and take of bull trout. If the incidental take of bull trout is exceeded due to the implementation of other Aquatic Resource Management Plan activities, then Douglas PUD will develop a plan, in consultation with the Aquatic SWG, to address the identified factors contributing to the exceedance of the allowable level of incidental take. If the incidental take of bull trout is exceeded due to the implementation of the Predator Control Program, then Douglas PUD will develop a plan, in consultation with the HCP Coordinating Committee and the Aquatic SWG, to address the identified factors contributing to the exceedance of the allowable level of incidental take.

Funding Collection of Tissue Samples and Genetic Analysis

Beginning in year 10 of the new license, and continuing every 10 years thereafter for the term of the new license, Douglas PUD will, if recommended by the Aquatic SWG, collect up to 10 adult bull trout tissue samples in the Wells Dam fishway facilities over a period of one year and fund their genetic analysis. Genetic tissue collection will take place concurrent with the implementation of the bull trout radio-telemetry monitoring study. Samples will be submitted to the USFWS Central Washington Field Office in Wenatchee, Washington. Any sub-adult bull trout collected during these activities will also be incorporated into the bull trout genetic analysis.

Beginning in year one of the new license, Douglas PUD will collect up to 10 adult bull trout tissue samples from the Twisp River brood stock collection facility over a period of one year and will fund their genetic analysis. Genetic tissue collection will take place concurrent with the implementation of the Off-Project bull trout radio-telemetry monitoring study.

Information Exchange and Regional Monitoring Efforts

Douglas PUD will continue to participate in information exchanges with other entities conducting bull trout research and regional efforts to explore availability of new monitoring methods and coordination of radio-tag frequencies for bull trout monitoring studies in the Project.

Douglas PUD will make available an informational and educational display at the Wells Dam Visitor Center to promote the conservation and recovery of bull trout in the Upper Columbia River and associated tributary streams.

Objective 6: Identify any adverse impacts of Project-related hatchery operations on adult and sub-adult bull trout.

Bull Trout Monitoring During Hatchery Activities

During the term of the new license, Douglas PUD shall monitor hatchery actions (e.g., salmon trapping, sturgeon brood stocking and capture activities) that may encounter adult and sub-adult bull trout for incidental capture and take. Actions to be monitored shall be associated with the Wells Hatchery, the Methow Hatchery, and any future facilities directly funded by Douglas PUD.

If the incidental take of bull trout is exceeded due to Douglas PUD's hatchery actions then Douglas PUD will develop a plan, in consultation with the Aquatic SWG, to address the identified factors contributing to the exceedance of the allowable level of incidental take.

Pacific Lamprey Management Plan

The goal of the Pacific Lamprey Management Plan (PLMP) is to implement measures to monitor and address impacts, if any, on Pacific lamprey (*Lampetra tridentata*) resulting from the Wells Project during the term of the new license. The PLMP is intended to be compatible with other Pacific lamprey management plans in the Columbia River. Furthermore, the PLMP is intended to be supportive of the Wells HCP (see below for description); the critical research needs identified by the Columbia River Basin Technical Working Group, the Resident Fish Management Plan, Bull Trout Management Plan, and White Sturgeon Management Plan.

Douglas PUD, in collaboration with the Aquatic SWG, will implement PMEs for Pacific lamprey in the Wells Project consistent with the goals and objectives identified in the PLMP. The PMEs are designed to meet the following objectives:

Objective 1: Identify and address any adverse Project-related impacts on passage of adult Pacific lamprey.

Upstream Fishway Operations Criteria

Douglas PUD is required to operate the upstream fishways at Wells Dam in accordance with criteria outlined in the Wells HCP. Based upon information collected from activities conducted during the implementation of the PLMP, Douglas PUD, in consultation with

the Aquatic SWG and the HCP Coordinating Committee, may evaluate various operational and structural modifications to the upstream fishways (e.g., reduction in fishway flows at night) for the benefit of Pacific lamprey passing upstream through Wells Dam during the new license term. If requested, the Aquatic SWG shall develop an Operations Study Plan (OS Plan) that specifically identifies all operational modifications to be evaluated, the proposed monitoring strategy, implementation timeline and criteria for success. The plan shall include a component to evaluate the effects of lamprey modifications on salmon. Upon completion of the evaluation, the Aquatic SWG, in consultation with the HCP Coordinating Committee, will determine whether the proposed modifications should be made permanent, removed, or modified.

Salvage Activities During Ladder Maintenance Dewatering

Douglas PUD shall continue to implement the Adult Fish Passage Plan and associated Adult Ladder Dewatering Plan as required by the Wells HCP. These plans include practices and procedures utilized during fishway dewatering operations to minimize fish presence in the fish ladders and then once dewatered directs Douglas PUD staff to remove stranded fish and safely place them back into the Columbia River. All fish species, including Pacific lamprey that are encountered during dewatering operations are salvaged consistent with the protocol identified in the Wells HCP. Any adult lamprey that are captured during salvage activities will be released upstream of Wells Dam, unless otherwise determined by the Aquatic SWG. Douglas PUD will provide a summary of salvage activities in the annual PLMP report.

Upstream Fishway Counts and Alternative Passage Routes

Douglas PUD shall continue to conduct annual adult fish passage monitoring in the Wells Dam fishways using the most current technology available, to count and provide information on upstream migrating adult Pacific lamprey 24-hours per day during the adult fishway monitoring season (May 1- November 15). Based upon information collected from passage evaluation activities conducted as part of the PLMP, Douglas PUD, in consultation with the Aquatic SWG, may choose to address the use of alternative upstream passage routes around Wells Dam fishway counting stations by adult Pacific lamprey. Potential measures to improve counting accuracy, following consultation and approval of the Aquatic SWG, may include, but may not be limited to, the development of a correction factor based upon data collected during passage evaluations or utilization of an alternative passage route as a counting facility for adult Pacific lamprey.

Upstream Passage Improvement Literature Review

If additional passage improvement measures are deemed necessary by the Aquatic SWG, then within six months after this determination, Douglas PUD, in consultation with the Aquatic SWG, shall complete a literature review on the effectiveness of upstream

passage measures (i.e., lamprey passage systems, plating over diffuser grating, modifications to orifices, rounding sharp edges, fishway operational changes, etc.) implemented at other Columbia and Snake river hydroelectric facilities. The literature review will be conducted in support of fishway modification activities identified in the PLMP to help in the selection of reasonable measures that may be implemented to improve adult lamprey passage at Wells Dam.

Fishway Modifications to Improve Upstream Passage

If additional passage improvement measures are deemed necessary by the Aquatic SWG, based upon the results of studies conducted at Wells Dam, then within one year or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall identify, design and implement any reasonable upstream passage modifications (structural and/or operational). Passage measures will be designed to improve passage performance by providing safe, effective, and volitional passage for Pacific lamprey through the Wells Dam fishways without negatively impacting the passage performance of adult anadromous salmonids. The following components shall be included in these passage measures:

- Fishway Inspection: Within one year of license issuance or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall conduct a fishway inspection with the Aquatic SWG and regional lamprey passage experts to identify and prioritize measures to improve adult lamprey passage and enumeration at Wells Dam. Additional ladder inspections will be conducted at the request of the Aquatic SWG, consistent with winter ladder dewatering operations.
- Entrance Efficiency: Within one year of license issuance or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall develop a Lamprey Entrance Efficiency Plan (LEE Plan) for evaluating operational and physical ladder entrance modifications intended to create an environment at the fishway entrances that are conducive to adult lamprey passage without significantly impacting the passage of adult salmonids. These improvements shall be evaluated until compliance, as described below, is attained.
- Diffuser Gratings: Within five years of license issuance or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall identify and address, if needed, diffuser gratings within fishways at Wells Dam that adversely affect passage of adult Pacific lamprey.
- Transition Zones: Within five years of license issuance or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall identify and address, if needed, transition zones within fishways at Wells Dam that adversely affect passage of adult Pacific lamprey.

- Ladder Traps and Exit Pools: Within five years of license issuance or as soon as practicable following consultation with the Aquatic SWG, Douglas PUD shall identify and address, if needed, lamprey ladder traps and exit pools within fishways at Wells Dam that adversely affect passage of adult Pacific lamprey.

Douglas PUD shall exhibit steady progress, as agreed to by the Aquatic SWG, towards improving adult lamprey passage until performance at Wells Dam is determined to be similar to other mid-Columbia River hydroelectric dams, or until scientifically rigorous standards and evaluation techniques are established by the Lamprey Technical Work Group, or its successor, and adopted regionally. The Aquatic SWG will then evaluate, and if applicable and appropriate, adopt these standards for use at Wells Dam. If compliance is achieved, Douglas PUD shall only be required to implement activities pursuant to Section 4.1.7 (Periodic Monitoring) for adult Pacific lamprey passage.

Adult Pacific Lamprey Upstream Passage Evaluation

Should upstream passage measures be implemented, then within one year following the implementation of such measures, Douglas PUD, in consultation with the Aquatic SWG, shall conduct a one-year study to monitor the effectiveness of such measures on upstream passage performance of adult Pacific lamprey through Wells Dam. If monitoring results indicate that passage rates at Wells Dam are not similar to passage rates at other mid-Columbia River dams or within standards as described above, Douglas PUD, in consultation with the Aquatic SWG, shall develop and implement additional measures to improve upstream Pacific lamprey passage. Fishway modification and passage evaluation measures (pursuant to Sections 4.1.5 and 4.1.6 of the PLMP) may be repeated, as necessary, until adult passage through Wells Dam is similar to passage rates at other mid-Columbia River hydroelectric dams or within standards as described above.

Periodic Monitoring

Once adult Pacific lamprey upstream passage rates at Wells Dam are similar to rates at other mid-Columbia River dams, Douglas PUD, in consultation with the Aquatic SWG, shall periodically monitor adult Pacific lamprey passage performance through Wells Dam fishways to verify the effectiveness of passage improvement measures. Specifically, every ten years after compliance has been achieved, or as determined by the Aquatic SWG, Douglas PUD shall implement a one-year study to verify the effectiveness of the adult fish ladders with respect to adult lamprey passage. If results of the monitoring program confirm the effectiveness of adult lamprey passage measures and the results indicate that passage rates are still in compliance, then no additional measures are needed. If the results indicate that adult upstream passage rates are out of compliance, then the upstream passage study will be replicated to confirm the results. If the results after two years of study both indicate that passage rates have not been maintained,

Douglas PUD, in consultation with the Aquatic SWG, shall develop and implement measures to improve upstream Pacific lamprey passage, if any.

Objective 2: Identify and address any Project-related impacts on downstream passage and survival and rearing of juvenile Pacific lamprey.

Downstream Bypass Operations Criteria

Douglas PUD is required to operate the downstream bypass system at Wells Dam in accordance with criteria outlined in the Wells HCP.

Salvage Activities During Ladder Maintenance Dewatering

Douglas PUD shall continue to conduct salvage activities as required by the Wells HCP's Adult Fish Passage Plan during fishway dewatering operations. All fish species, including Pacific lamprey that are encountered during dewatering operations shall be salvaged consistent with the protocol identified in the Wells HCP. Any juvenile Pacific lamprey that are captured during salvage activities will be released downstream of Wells Dam. Douglas PUD will coordinate salvage activities with the Aquatic SWG and allow for member participation. Douglas PUD will provide a summary of salvage activities in the annual report.

Juvenile Pacific Lamprey Passage and Survival Literature Review

Beginning in year five and every five years thereafter during the new license, Douglas PUD, in consultation with the Aquatic SWG, shall conduct a literature review to summarize available technical information related to juvenile lamprey passage and survival through Columbia and Snake river hydroelectric facilities. This information will be used to assess the feasibility of conducting activities identified in Section 4.2.4 of the PLMP.

Juvenile Pacific Lamprey Downstream Passage and Survival Evaluation

Based upon the current state of the science regarding tag technology and methodologies for Pacific lamprey macrophthalmia, coupled with the challenges of obtaining macrophthalmia in sufficient numbers within the Project to meet sample size requirements for a statistically rigorous study, a juvenile downstream passage and survival evaluation is not feasible at this time.

During the term of a new license, if tag technology and methodologies are developed and field tested and a sufficient source of macrophthalmia in or upstream of the Project are identified to ensure that a field study will yield statistically rigorous and unbiased results, Douglas PUD, in consultation with the Aquatic SWG, shall implement a one-year juvenile Pacific lamprey downstream passage and survival study.

If statistically valid study results indicate that Project operations have a significant negative impact on the Pacific lamprey population above the Wells Dam, Douglas PUD, in consultation with the Aquatic SWG, shall identify and implement scientifically rigorous and regionally accepted measures (e.g., translocation, artificial production or habitat enhancement), if any, or additional studies to address such impacts. If operational changes are needed to improve passage of juvenile lamprey migrants, Douglas PUD, in consultation with the Aquatic SWG, will coordinate with the HCP Coordinating Committee to implement such measures.

Juvenile Pacific Lamprey Habitat Evaluation

Within three years of the effective date of a new license, Douglas PUD shall implement a one-year study to examine presence and relative abundance of juvenile Pacific lamprey in habitat areas within the Project that may be affected by Project operations. As part of this measure, Douglas PUD shall identify areas of potential juvenile Pacific lamprey habitat for future evaluation. Sampling of these areas will assess presence/absence and relative abundance. Any sampling methodologies used in support of this activity will require coordination with the HCP Coordinating Committee and regulatory approval of the federal and state agencies.

Objective 3: Participate in the development of regional Pacific lamprey conservation activities.

Regional Lamprey Working Groups

Douglas PUD shall participate in Pacific lamprey work groups in order to support regional conservation efforts (e.g., the Pacific Lamprey Technical Work Group and the USFWS Lamprey Conservation Initiative). Activities may include but are not limited to information exchanges with other entities, meeting attendance, and coordination of Douglas PUD's Pacific lamprey activities with other entities conducting lamprey research in the mid-Columbia River. Activities may also include conducting PLMP research within the Project, and sharing that information with other entities.

Resident Fish Management Plan

The goal of the Resident Fish Management Plan (RFMP) is to protect and enhance native resident fish populations and habitat in the Wells Project during the term of a new license. The RFMP is intended to be compatible with other resident fish management plans in the Columbia River mainstem. Furthermore, the RFMP is intended to be supportive of the Wells HCP (see below), BTMP, PLMP and WSMP by continuing to monitor changes, if necessary, in the resident fish assemblage within the Wells Project. Douglas PUD, in collaboration with the Aquatic SWG, has agreed to implement several

resident fish PMEs in support of the goals and objectives of the RFMP. The objectives and PMEs are as follows:

Objective 1: Implementation of Programs that Benefit Resident Fish.

HCP Predator Control Programs

Douglas PUD shall continue to conduct annual predator control activities for northern pikeminnow and avian predators as outlined in the Wells HCP (Douglas PUD 2002). Although implementation of this program is targeted at reducing predation on anadromous species covered by the Wells HCP, it is also anticipated to have direct benefits for resident fish species.

Land Use Policy

Douglas PUD's Land Use Policy requires approval of all land use activities that take place within the Project Boundary. All permit activities such as construction of boat docks, piers, and landscaping within Project Boundary will be subject to review and approval by Douglas PUD only after the applicant has received all other required regulatory permits, in addition to consideration by the Wells HCP signatory parties and permit review by state and federal action agencies. The purpose of the Douglas PUD review and approval process captured in the Land Use Policy is to protect habitats and species that may be affected by proposed land use activities within the Project.

The Land Use Policy is Douglas PUD's mechanism to ensure land use activities are consistent with all of Douglas PUD's license obligations and other binding agreements. The Wells HCP's Reservoir as Habitat criteria require habitat protection towards meeting NNI standards for anadromous salmonids. For example, Douglas PUD's Land Use Policy prohibits construction of additional docks outside the city limits of Pateros, Bridgeport and Brewster. In addition, Douglas PUD conducts regular reservoir shoreline monitoring patrols for unpermitted uses; damage caused by adjacent property owners' unauthorized use of Project lands is required to be repaired, and other unauthorized damage to habitat is repaired by Douglas PUD.

Objective 2: Resident Fish Assemblage Monitoring.

Douglas PUD shall conduct a resident fish study to determine the relative abundance of the various resident fish species found within the Wells Reservoir. This assessment shall occur in year 2 and every 10 years thereafter during the term of the new license. The study objectives will focus on (1) identifying whether there have been major shifts in the resident fish populations resulting from the implementation of the White Sturgeon, Bull Trout, Pacific Lamprey, and Aquatic Nuisance Species (ANS) Management Plans, and

(2) collecting information on resident predator fish populations found within the Wells Reservoir.

In order to maintain comparative assemblage information over time to inform Project resident fish status and trends, methodology for monitoring activities shall remain consistent with the methods described in Beak (1999). Information collected from these monitoring activities may be used to inform the implementation activities of the other Wells aquatic resource management plans and the Wells HCP predator control activities.

Objective 3: Actions to Address Major Shifts in Native Resident Fish Assemblage.

Based upon information collected during the resident fish status and trends monitoring, if any statistically significant negative changes to native resident fish populations of social, economic, and cultural importance are identified, and are not caused by and cannot be addressed through the implementation of other aquatic resource management plans or activities (white sturgeon, Pacific lamprey, bull trout, ANS, HCP, predator control), reasonable and appropriate implementation measures to address negative changes, if any, will be undertaken by Douglas PUD.

Objective 4: Monitoring in Response to Proposed Changes in Project Operations.

If at any time during the new license term, future changes in Wells Dam operations are proposed that require the FERC's approval and the Aquatic SWG concludes that either reservoir or tailrace habitat within Project Boundary may be affected with regards to spawning, rearing, and migration (aquatic life designated uses) of native resident fish, an assessment will be implemented to identify potential effects, if any, in order to make informed license decisions. If the results of the assessment identify adverse effects to native resident fish species of social, economic and cultural importance, attributable to such changes in Project operations, then Douglas PUD will consult with the Aquatic SWG to select and implement reasonable and appropriate measures to address such effects.

In addition to these activities, Douglas PUD will provide an annual report to the Aquatic SWG summarizing the previous year's activities undertaken in accordance with the RFMP. The report will document all native resident fish activities conducted within the Wells Project. Furthermore, any decisions, statements of agreement, evaluations, or changes made pursuant to this RFMP will be included in the annual report. If no significant activity was conducted in a given year, Douglas PUD will prepare a memorandum providing an explanation of the circumstances in lieu of the annual report.

Aquatic Nuisance Species Management Plan

The goal of the Aquatic Nuisance Species Management Plan (ANSMP) is to prevent the introduction and/or spread of ANS in Wells Project waters. The ANSMP is intended to be compatible with other aquatic nuisance species management plans in the Columbia River mainstem. Furthermore, the management plan is intended to be supportive of the Wells HCP, BTMP, PLMP, RFMP, WSMP, and Water Quality Management Plan (WQMP) by continuing to prevent the introduction and/or spread of aquatic nuisance species in Wells Project waters. The PMEs presented within the ANSMP are designed to meet the following objectives:

Objective 1: Implement best management practices to prevent Eurasian watermilfoil (*Myriophyllum spicatum*) proliferation during in-water (i.e., construction, maintenance, and recreation improvements) improvement activities in the Project.

If at any time during the new license term, Douglas PUD is required to construct, improve or maintain recreation access at boat launches and swim areas and the removal or disturbance of aquatic macrophtye beds that contain Eurasian watermilfoil may potentially occur, Douglas PUD will implement containment efforts utilizing best management practices (BMPs), agreed to by the Aquatic SWG, during such activities.

Objective 2: Continue participation in regional and state ANS efforts.

Coordination with Regional and State Entities

Douglas PUD shall continue to coordinate with regional and state entities to implement activities in Project waters to monitor for the presence of ANS, specifically zebra and quagga mussels. Activities covered by this objective will consist of continued monitoring for the presence of zebra and quagga mussels. If ANS are detected during monitoring activities, Douglas PUD will immediately notify the appropriate regional and state agencies and assist in the implementation of reasonable and appropriate measures to address the ANS presence as is consistent with ANS Management protocols.

Douglas PUD shall participate in information exchanges and regional efforts to coordinate monitoring activities.

Monitor Bycatch from other Project Aquatic Resource Management Activities

Douglas PUD shall monitor bycatch data collected from ongoing Project aquatic resource management activities for aquatic nuisance species presence to support regional and state efforts and the ANSMP. Such ongoing activities may consist of broodstock collection activities at Wells Dam and in associated Project tributaries, the northern pikeminnow

removal program, water quality monitoring and any other aquatic resource activities related to implementation of Aquatic Resource Management Plans for bull trout, Pacific lamprey, white sturgeon, and resident fish.

ANS Information and Education

Douglas PUD shall develop and make available to the public, information regarding the effects of ANS introductions and the importance of prevention. Such outreach activities may consist of posting signage at Project recreation areas and boat launches.

Douglas PUD shall also provide literature produced by appropriate state entities (Ecology and WDFW) for distribution at the visitor centers of local communities of the Project (Pateros, Brewster, Bridgeport) including Wells Dam.

Objective 3: Monitoring in Response to Proposed Changes in Project Operations.

If at any time during the new license term, future changes in Project operations requiring the FERC's approval are proposed and the Aquatic SWG concludes that such proposed operations may encourage the introduction or proliferation of aquatic nuisance species within the Project, the Aquatic SWG will assess the potential effects, if any, in order to make informed management decisions.

If the assessment identifies adverse effects to aquatic resources due to ANS, which are attributable to changes in Project operations, Douglas PUD shall consult with the Aquatic SWG to select and implement reasonable and appropriate PMEs to address the identified adverse effect(s).

Water Quality Management Plan

The goal of the WQMP is to protect the quality of the surface waters affected by the Wells Project. Studies conducted during the relicensing process have found water quality within the Wells Project to be within compliance. Reasonable and feasible measures will be implemented in order to maintain compliance with the numeric criteria of the Washington State WQS, Chapter 173-201A WAC. In further support of the aquatic life designated uses in the Wells Project, five other aquatic resource management plans within the ASA and the measures in the Wells HCP are currently active or proposed for implementation through the new license term.

The measures presented within the WQMP are designed to meet the following objectives:

Objective 1: Maintain compliance with state WQS for TDG.

Project TDG Monitoring

Douglas PUD shall continue to maintain fixed monitoring stations in the forebay and tailrace area of Wells Dam to monitor TDG and barometric pressure. TDG will be monitored hourly during the fish spill season each year. Data from the Wells forebay and tailrace stations will be transmitted on a daily basis to the applicable web-accessible database used by Ecology and regional fish management agencies. Douglas PUD shall maintain this monitoring program consistent with activities described in the then-current Wells Gas Abatement Plan (GAP).

Douglas PUD shall provide an annual report of all spill (and predicted TDG levels in the tailrace) occurring outside the fish passage season (currently October 1 to March 15).

Project Spill Operations

Within one year of issuance of the new license, Douglas PUD shall coordinate the annual Wells HCP Project Fish Bypass/Spill Operations Plan with the Aquatic SWG and the GAP, using best available information to minimize the production of TDG during periods of spill. All operations identified within the plan shall require the approval of the Wells HCP Coordinating Committee and the Aquatic SWG in order to ensure that spill operations are aimed at protecting designated uses and complying with the WQS numeric criteria for TDG in the Columbia River at the Project. In consultation with the Wells HCP Coordinating Committee and Aquatic SWG, the spill operations plan will be reviewed and updated, as necessary.

Project Gas Abatement Plan and TDG Exemption

Pending Ecology's approval of each subsequent GAP (which provides for the TDG exemption), Douglas PUD shall continue to implement the activities identified within the previously-approved plan. Douglas PUD shall submit the GAP to Ecology by February 28th of each year, or on a less frequent basis, as documented by Ecology in writing. Douglas PUD shall submit the GAPs through the term of the new license or until no longer required by Ecology.

The GAP will include a Spill Operations Plan and will be accompanied by a fisheries management plan and physical and biological monitoring plans. The GAP shall include information on any new or improved technologies to aid in the reduction in TDG.

It is anticipated that: (1) the TDG monitoring activities described in Section 4.1.1 will be adequate for the physical monitoring plan requirement; and (2) the Wells HCP and Aquatic Resource Management Plans in the ASA with respect to fish passage will be adequate for fish management plans, for the purposes of the GAP. Additional biological monitoring studies for purposes of Gas Bubble Trauma Monitoring may be required.

Douglas PUD shall provide an annual TDG report as required by the Ecology-approved GAP.

Objective 2: Maintain compliance with state WQS for water temperature.

Project Temperature Monitoring

Douglas PUD shall continue to monitor temperature at the Wells Dam forebay and tailrace in conjunction with its TDG monitoring program (currently April 1-September 15). Temperature data from the TDG monitoring program will be recorded hourly and reported daily to regional databases. Water temperatures shall also be monitored at all boundary conditions of the Project (Methow River RM 1.5, Okanogan River RM 10.5, and Columbia River RM 544.5) and in the Well Dam forebay and tailrace as required by the Aquatic SWG.

Douglas PUD shall continue to collect hourly fish ladder temperatures 24 hours a day during the fish passage season (May 1 to November 15) at Pool No. 39 on the east ladder. Water temperatures shall also be monitored hourly in the auxiliary water supply system and near the east shore of the Wells Dam forebay (bottom, middle, and surface depths) during this same time period.

Temperature TMDL Development and Implementation

Douglas PUD shall participate in EPA Region 10's water temperature TMDL development for the U.S. portion of the Columbia River, in coordination with the Aquatic SWG. Temperature data from the monitoring program at Wells Dam and software and results of the CE-QUAL-W2 model will be made available to EPA and other entities to assist in the development of the Columbia River temperature TMDL.

Where the measures identified in the TMDL are more protective than other measures in this plan, provisions of the temperature TMDL and implementation plans relevant to the Project and its operations, including specified time frames for implementing improvement measures, shall be implemented at the Project.

If a TMDL is not timely approved by EPA, Ecology may establish an allocation. In this case, Ecology will work with the Aquatic SWG and other interested parties to identify reasonable and feasible measures.

This plan does not exclude the option of the Aquatic SWG to consider modifying the water quality standard through a use attainability analysis or other process.

Objective 3: Maintain compliance with state WQS for other numeric criteria.

Douglas PUD shall report information indicative of non-compliance with other numeric criteria immediately to Ecology for regulatory discretion and to the Aquatic SWG for consideration. This includes existing or developed criteria for toxic substances in water or sediments within Project Boundaries. The Aquatic SWG shall evaluate the information, and, if needed, require Douglas PUD to develop a plan to identify and address Project-related impacts, if any.

After the evaluation, if no reasonable and feasible improvements have been identified, Douglas PUD may propose an alternative to achieve compliance with the standards, such as site-specific criteria, a use attainability analysis, or a water quality offset.

Objective 4: Operate the Project in a manner that will avoid, or where not feasible to avoid, minimize, spill of hazardous materials and implement effective countermeasures in the event of a hazardous materials spill.

Spill Prevention and Control Requirements

Douglas PUD shall operate the Project in a manner that will minimize spill of hazardous materials and implement effective countermeasures in the event of a hazardous materials spill. The Project Spill Prevention Control and Countermeasures Plan (SPCC) will be updated pursuant to the FERC's requirements and recommendations as provided by Ecology. Douglas PUD shall comply with the updated version(s) of the SPCC.

Participation in the Columbia and Snake River Spill Response Initiative

Douglas PUD shall continue participation in the Columbia and Snake River Spill Response Initiative (CSR-SRI). The CSR-SRI is a collaborative effort made up of local, state, and federal oil spill response entities as well as members of industry and was developed to address the immediate need for oil spill preparedness and response in the area along the Columbia and Snake rivers. In addition to participation in the CSR-SRI, Douglas PUD shall continue to operate the Project in accordance with its SPCC (Jacobs 2007).

Inspections

For the term or the new license, Douglas PUD shall, upon reasonable notice, allow Ecology staff or representatives access to inspect the Project, including inside the dam, for the purpose of assessing Spill Prevention and Control measures and compliance with Section 4.4.1. Following inspection, Douglas PUD shall address oil and hazardous material prevention and control issues identified by Ecology.

Objective 5: Participate in regional forums tasked with improving water quality conditions and protecting designated uses in the Columbia River basin.

Participation in Regional Water Quality Forums

Douglas PUD shall continue its participation in both the Water Quality Team and Adaptive Management Team meetings to address regional water quality issues, including sharing the results from monitoring, measuring, and evaluating water quality in the Wells Project. However, Douglas PUD will not advocate for any water quality measures in regional forums without consulting with the Aquatic SWG.

Project Operations

Douglas PUD may, following notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with other mid-Columbia hydroelectric operations to the extent practicable. Coordinated operations are intended to reduce spill, increase generating efficiencies and thereby reduce the potential for exceedances of the TDG numeric criteria. These coordinated operations should be beneficial to TDG compliance and Aquatic Resources.

2.5.1.3 Terrestrial Resources Management Plans

In addition to the proposed implementation of the Wells HCP and ASA, Douglas PUD is also proposing to implement additional management plans and environmental measures for various terrestrial resources as part of the relicensing of the Wells Project. These plans and measures include the Wildlife and Botanical Management Plan (Douglas PUD 2009g), Wells 230 kV Transmission Line Corridor Avian Protection Plan (Douglas PUD 2009e), Douglas PUD's Land Use Policy (Douglas PUD 2009d), Recreation Management Plan (Douglas PUD 2009c), and Historic Properties Management Plan (Douglas PUD 2009b).

Wildlife and Botanical Management Plan

The goal of the Wildlife and Botanical Management Plan (WBMP) is to protect, maintain and enhance wildlife populations and habitat on Wells Project lands. The plan is also intended to guide wildlife management activities and to protect rare, threatened and endangered (RTE) wildlife species on Wells Project lands during the term of a new license for the Wells Project. Members of the Terrestrial Resource Work Group (TRWG) include USFWS, WDFW, BLM, Colville and Douglas PUD.

Douglas PUD, in collaboration with the TRWG, has agreed to implement several measures in support of the goals and objectives of the WBMP. The objectives and measures are as follows:

Objective 1: Protect and Enhance RTE Terrestrial Species Habitat on Project Lands.

The only State-listed terrestrial wildlife species known to use the Wells Project is the American white pelican (Douglas PUD 2006c, 2009h). Sharp-tailed grouse were found in the Bridgeport Bar unit of the Wells Wildlife Area, but have not been observed for over 20 years (M. Hallet, WDFW, email to B. Patterson, Douglas PUD, December 31, 2007). Currently no federal ESA listed, proposed or candidate terrestrial species utilize the Project.

Following receipt of a new license, Douglas PUD will do the following: A) starting in year 2 of the new license Douglas PUD will provide educational material (signs) at Douglas PUD boat launches and local visitor centers advising boaters to avoid pelicans while boating, fishing and hunting, and as an enhancement B) Douglas PUD will continue to water irrigation dependent riparian trees, shrubs and associated vegetation located below Wells Project Boundary within the confines of the Bridgeport Bar Unit of the Wells Wildlife Area (WWA). Continued watering of this habitat will benefit a wide range of wildlife species, including migratory waterfowl, and in harsh winters could benefit future wintering sharp-tailed grouse, if WDFW efforts to restore populations in the Dyer Hill area of Douglas County are successful.

Objective 2: Protect RTE Botanical Species from Land Disturbing Activities and Herbicide Sprays.

Based on botanical surveys that targeted RTE plants, the only federal or state listed plant species known to occur in the Wells Project are little bluestem and Thompson's clover (Douglas PUD 2006a, 2009h). In year five of the new license and every 10 years thereafter, Douglas PUD proposes to survey and revise site boundaries for populations of little bluestem and Thompson's clover found within the Project.

For lands owned by Douglas PUD within the Wells Project Boundary, no new ground disturbing activities will be allowed within a 500 ft buffer zone surrounding identified RTE plant locations and no new land use permits will be issued for these buffer areas. For private lands, located within the Wells transmission line corridor, Douglas PUD will control weeds within a 500 ft buffer around Thompson's clover occurrences within the transmission line right of way. Thompson's clover and little bluestem are State-listed threatened plant species.

Any weed control activities within the 500 ft buffer zones will utilize the following methods in descending order of preference: biological control, hand pulling and hand wiping of individual weeds with herbicide.

Objective 3: Conserve Habitat for Species on Project Lands Protected by the Federal Endangered Species Act, Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act.

Following receipt of a new license, Douglas PUD is proposing to A) inspect raptor perch poles annually and repair or replace perch poles as warranted and remove avian (cormorant) perch poles near Starr Boat Launch, B) conduct monthly boat surveys during the months of November through March to inventory wintering bald eagle numbers and to identify perch trees that may need protection from beavers, C) protect from beaver damage large living trees, regularly used by bald eagles as perches, and D) plant at least 50 acres of annual grain crops along Wells Reservoir to provide food for wintering Canada geese and dabbling ducks. Douglas PUD will implement the WBMP in a manner consistent with the National Bald Eagle Management Guidelines (USFWS 2007).

Objective 4: Protect Wildlife Habitat on Wells Project Lands.

Following receipt of a new license, Douglas PUD is proposing to monitor Wells Project lands by boat twice a month for unauthorized encroachment and damage caused by recreational activities and adjacent land owners. Wildlife habitat damage by unauthorized encroachments or recreational activities will be repaired or replaced with in-kind habitat within 12 months of identifying unauthorized activity.

Objective 5: Maintain Productive Wildlife Habitat on the Cassimer Bar Wildlife Management Area.

Following receipt of a new license, Douglas PUD is proposing to manage the Cassimer Bar Wildlife Area for the benefit of wildlife including implementation of the following specific measures: A) implement weed management annually to control new occurrences of noxious weeds and reduce existing weed occurrences, B) manage access and replace damaged habitat to reduce adverse effects of recreation on wildlife habitat, C) maintain perimeter fencing to protect habitat from livestock, and D) contingent upon receiving the necessary permits, repair the dikes on Cassimer Bar to enhance habitat for waterfowl and other aquatic species. In year four and every year thereafter, the dikes will be inspected and repaired as soon as the design work and permitting allow.

Objective 6: Control Noxious Weeds on Project Lands.

Douglas PUD annually checks the state and county weed lists for changes, and complies with legal requirements for noxious weed control. Douglas PUD annually controls Class A (if any detected) and B designate weed occurrences on Wells Project lands and, starting in year five of the new license, proposes to survey Wells Project lands for new terrestrial weed infestations every five years. Douglas PUD implements appropriate

weed control actions based on effectiveness of controlling weed growth with least impact to surrounding vegetation.

Douglas PUD does not conduct any broadcast herbicide spray treatment of Project lands. Where herbicide is used, application is with a backpack sprayer and application is to individual weed plants. Calculating acreage treated is therefore difficult. The majority of weed control spray efforts is in uplands along the transmission line ROW, far removed from water. Douglas PUD almost never uses glyphosate, of any formulation, in native habitats due to its nonselective nature and broad spectrum botanical lethality.

Douglas has used an IPM approach to noxious weed control since at least 2000, when Rodeo™ Herbicide spraying of purple loosestrife around the reservoir was discontinued in favor of biological control agents (beetles). Douglas PUD collects beetles annually on public lands in the Columbia Basin, and releases those in loosestrife areas around the reservoir. Biological agents are also collected and dispersed annually by Douglas PUD to control Dalmatian toadflax in the Wells Project.

Douglas PUD will, as required for consistency with the terms of the new operating license, include BMPs for the use of herbicides associated with recreation facilities operation and maintenance contracts.

Objective 7: Consultation.

As part of implementing the WBMP, Douglas PUD will meet with resource agencies and/or tribes when requested to discuss management of wildlife and botanical species on Project lands. All changes to the WBMP must be in writing and made by unanimous consent by all Parties. Any agreed-upon changes to the WBMP will be submitted to the FERC for review and approval.

Wells 230 kV Transmission Line Corridor Avian Protection Plan

The Wells 230 kV Transmission Line Corridor Avian Protection Plan (APP) was developed to reduce the potential for bird collisions with the Wells 230kV transmission lines and structures, and was prepared in consultation with the TRWG including detailed involvement from the WDFW and USFWS. The APP considers both avian migrants interacting with the transmission lines crossing the Columbia River and birds nesting on the transmission line structures.

As part of the APP, Douglas PUD is proposing to implement the following practices during the term of a new license:

1. Reporting Protocol: All avian mortalities found in the transmission line corridor will be reported to the appropriate parties.

2. Nest Management Protocol: Within two years of receiving a license, a nest management protocol will be developed in compliance with Federal and State bird protection laws.

3. Training Protocol: All appropriate utility personnel will be trained to evaluate avian issues when performing maintenance on the transmission lines and corridor.

Under the APP, Douglas PUD is proposing to annually train all appropriate utility personnel (Wildlife Biologist, Linemen and Right of Way workers) to evaluate avian issues when performing maintenance on the transmission lines and corridor. All nest management will be performed in compliance with applicable state and federal laws. All avian mortalities found in the transmission line corridor will be reported to Douglas PUD's Wildlife Biologist.

Recreation Management Plan

The Recreation Management Plan (RMP) establishes a process for developing, planning, and implementing recreation enhancements during the term of the new license. Douglas PUD developed this plan in consultation with the members of the Recreation Resources Work Group (RRWG). Members of the RRWG include representatives from the cities of Pateros, Brewster and Bridgeport, Okanogan and Douglas counties, Washington State Parks and Recreation Commission (State Parks), Washington Recreation and Conservation Office (RCO), WDFW, the National Park Service (NPS), Colville, BLM and Douglas PUD. The RMP replaces the Recreation Action Planning Process used during the initial license period.

The goal of the RMP is to define Douglas PUD's role and responsibilities related to the management of the recreation resources of the Wells Project during the term of a new license. The RMP includes the following measures designed to achieve the RMP goals:

Wells Dam Overlook Interpretive Displays

The Wells Dam Visitor Center, previously located inside the Wells Dam, has been closed to the public since 2001 due to security concerns. Douglas PUD is proposing to construct a new Visitor Interpretation Facility to be located on lands owned by Douglas PUD at the access point to the Wells Dam in the vicinity of the current Wells Dam Overlook. Exhibits to be provided at the new facility may include, but are not limited to, power generation, the history of Wells Dam, benefits of hydropower, fish and wildlife, and recreation. A live video feed of the Wells Project fish ladder will also be provided at the facility.

Marina Park Expansion

Relicensing studies determined that Marina Park in Bridgeport is often filled to capacity during peak recreation season. To accommodate increasing use, Douglas PUD will expand Marina Park to include an additional 10 recreation vehicle (RV) spaces. The park will be expanded to the north along the river within Project Boundary. The expansion will include all facilities needed to accommodate recreation use associated with 10 additional RV spaces, including restroom facilities, lift stations, landscaping and access roads.

All necessary environmental permits would be acquired following license issuance, and prior to implementing this project.

Boat-in Tent Camping and Signage

Relicensing studies identified a need to improve access to the Wells Project for non-motorized boats. As such, Douglas PUD will implement several measures to improve access for non-motorized boaters, including installing Greater Columbia Water Trail Coalition signs and informational material at appropriate Wells Project recreational access facilities; providing information on portaging around Wells Dam; constructing a formal boat-in tent camping facility in the vicinity of the Okanogan River, including restroom and picnic shelter; and designating and providing basic improvements for an informal/rustic boat-in tent camping location on the west side of the river within several miles of Wells Dam.

All necessary environmental permits would be acquired following license issuance, and prior to implementing this project.

Extend Chicken Creek Boat Launch

The Chicken Creek Boat Launch is located on Washburn Pond within the Wells Project Boundary. Lower pond levels are often observed in the fall season, and public access can be restricted due to the short length of the launch. Douglas PUD is proposing to place additional concrete planks at the end of the launch in order to extend the launch for improved access during the fall season.

All necessary environmental permits would be acquired following license issuance, and prior to implementing this project.

Reservoir Navigation Maps

In order to facilitate effective navigation of the reservoir, Douglas PUD will install maps of the reservoir showing areas of the reservoir where shallow waters may be encountered. Maps will be installed at high-use boat launches in Pateros, Brewster, and Bridgeport.

The O&M Program also includes a provision for aquatic plant control at designated swimming areas in Bridgeport, Brewster, and Pateros. Douglas PUD proposes to identify and implement the most feasible measures to manage aquatic plant growth at these three locations. Measures may include but not be limited to harvesting, herbicide application, installation of plastic liners, etc. All necessary environmental permits would be acquired following license issuance, and prior to conducting these activities.

Wildlife Viewing Trail Development Feasibility Study

Douglas PUD's proposed RMP includes a wildlife viewing feasibility study and a trail development feasibility study. The conduct of these studies will not have an impact on ESA-listed species.

Promotion of Recreation Facilities

Douglas PUD is proposing to make available printed and web-based material showing day-use sites, boat launches, wildlife viewing areas, campsites, trails, etc. The promotion of recreation facilities will not impact ESA-listed species.

Recreation Facility Operation, Maintenance and Monitoring Program.

Douglas PUD's proposed RMP includes a Recreation Facility Operation, Maintenance and Monitoring Program. Under this program Douglas PUD will be responsible for ensuring that operation and maintenance (O&M) standards are met at all Wells Project recreation facilities. Activities under the O&M Program include regular maintenance of buildings and restrooms, docks and boat launches, picnic facilities, trash receptacles, access roads and pavement, trails, landscaping and turf. Douglas PUD's recreation use monitoring program will inform future planning related to recreation management during the term of the new license and does not include actions that could affect ESA-listed species.

Historic Properties Management Plan

In November 2005, Douglas PUD formed a Cultural Resource Work Group (CRWG) to conduct consultation as required by Section 106 of the National Historic Preservation Act (NHPA), and to develop studies to identify Project effects. The CRWG was comprised of representatives from the Colville, the Washington Department of Archaeology and Historic Preservation (DAHP), the FERC, the BLM, the Bureau of Indian Affairs (BIA),

and Douglas PUD. The CRWG developed a Historic Properties Management Plan (HPMP) to address potential Project-related effects to cultural resources within the area of potential effect (APE).

The purpose of the HPMP is to provide guidelines to Douglas PUD for managing historic properties affected by the operation and maintenance of the Wells Project and complying with the NHPA during the term of the new FERC license. The HPMP includes programs for achieving NHPA compliance through monitoring and protection of historic properties, and through consultation with the DAHP State Historic Preservation Officer (SHPO), CCT Tribal Historic Preservation Officer (THPO) and other interested parties. Table 2.5.1-1 summarizes implementation measures within the HPMP.

Table 2.5.1-1 Historic Properties Management Plan Implementation Measures

Implementation Measure	Description
Designate a HPMP Coordinator	Douglas PUD will appoint a staff HPMP Coordinator responsible for implementation of the HPMP.
Consultation	Douglas PUD will manage historic properties within the Wells Project APE in consultation with the SHPO, THPO, FERC and other agencies as applicable.
Education and Interpretation Program	Douglas PUD will develop an Employee Education Program to inform appropriate staff and contractors on the relevant HPMP programs. Douglas PUD will develop a Public Education and Interpretation Program designed to provide information about historical uses of the Wells Project area.
Management Standards for Historic Properties	For projects that cause ground disturbance or that have other potential effects to cultural resources, Douglas PUD will consult with the THPO, SHPO and other interested parties prior to beginning the project.
Curation and Document Management	Archaeological collections will be curated at the Colville curation facility in Nespelem, WA. Douglas PUD will inventory and index relevant documents, data, drawings, photographs, etc., that are considered historic or of value to historic properties management.
Historic Structures Evaluation	Wells Dam and the associated facilities will be evaluated for historic architectural and engineering significance after the facility turns 50 years old (2017).
Inadvertent Discoveries and Emergencies	For inadvertent discoveries, all activities at the project site will cease and Douglas PUD will consult with the appropriate parties to identify the appropriate measures.
Site Specific Management Measures	Douglas PUD will implement the Archaeological Sites Monitoring Plan as described in Appendix G of the HPMP. This program is summarized below.
Traditional Cultural Properties	Douglas PUD will consult with the THPO and the SHPO for those activities that may have effects on TCPs, and will prepare Determinations of Eligibility for the National Register of Historic Places.

Monitoring and Treatment Program

The HPMP archaeological monitoring program includes five basic components: 1) an archaeological site monitoring program; 2) a site testing program; 3) a monitoring program for inundated sites; 4) an erosion monitoring program; and 5) a site protection program. Sites to be managed under each of these programs include 44 sites to be monitored annually, 211 sites to be monitored every 10 years, 65 inundated sites to be monitored during low reservoir events, 8 sites requiring additional information or site testing, and 6 sites requiring protection measures. Erosion monitoring will be conducted by a professional geomorphologist at a subset of archaeological sites which will be selected based on landform, river environment, and archaeological content.
Each of the sites identified for management were selected and prioritized by the CRWG based on study results and past research. Management measures will be modified as new information becomes available after each monitoring cycle. Each year the CRWG will meet to discuss study results and to modify the monitoring program as appropriate.

Consultation

Consultation with the THPO, SHPO, and other parties as applicable, is a key component of each program within the HPMP. For projects that cause ground disturbance or that have other potential effects to cultural resources, Douglas PUD will consult with the THPO, SHPO and other interested parties prior to beginning the project. Consultation is also required for inadvertent discoveries, traditional cultural properties, education and interpretation, emergency situations, annual monitoring program, and for periodic revisions to the HPMP. The CRWG will review the HPMP every five years to identify whether any potential changes are needed.

Douglas PUD Land Use Policy

The waters and shoreline features of the Wells Project have been designated as critical habitat for several ESA listed species. As it applies to the Wells Project, the goal of the Douglas PUD Land Use Policy is to ensure that Project operations are in compliance with the FERC license and other federal and state regulations, including the protection of fish and wildlife habitat, protection of critical habitat for ESA-listed species, protection of significant historical, cultural and natural features and compliance with existing settlement agreements including the Wells HCP. The Douglas PUD Land Use Policy is Douglas PUD's decision making process for issuing any land use permit for commercial and private use of Wells Project land and waters. The plan, together with the Wells HCP, ASA, other Terrestrial Resource Management Plans, and Off-License Settlement, form the core of the Douglas PUD resource measures.

The use of Wells Project lands will be governed by the Wells Project license and the Douglas PUD Land Use Policy, and must comply with applicable federal and state laws, the Wells HCP and various fish and wildlife settlement agreements. All required

environmental permits must be obtained and the proposed use must comply with the FERC license and the Douglas PUD Land Use Policy before Douglas PUD will issue a land use permit. Permits from city, county, state and federal agencies may be required before a permit will be issued.

Terrestrial Resources

Within the Wells Project Boundary, no new ground disturbing activities will be allowed within buffer areas surrounding RTE plant locations, and no new land use permits will be issued for these buffer areas. Ground disturbing activities are not allowed on Douglas PUD owned or controlled lands, within 500 ft in any direction, of any know RTE plants locations mapped by EDAW, Inc. (Douglas PUD 2006a).

Douglas PUD will comply with the guidelines established in the WBMP for the protection of RTE terrestrial species. The guidelines include protection of bald eagle (*Haliaeetus leucocephalus*) perch trees on land owned by Douglas PUD.

Aquatic Resources

The Wells HCP provides for the protection of the reservoir habitat for the HCP Plan Species while making land use permit decisions. Douglas PUD is required to consider the cumulative impact effects of land use decisions, in order to meet the HCP objective of "no net impact". Douglas PUD is also required to notify and consider comments from the various agencies and tribes (Wells HCP signatory parties only) regarding land use permit applications.

Docks provide habitat for piscivorous fish to hide and wait to ambush prey moving past the dock. Docks disrupt the shoreline forcing small fish to leave the shoreline cover and either swim under the dock where the predators wait or out into deeper water and away from cover. Douglas PUD's Land Use Policy limits new boat docks to the city limits of Bridgeport, Brewster and Pateros to ensure high survival of juvenile HCP Plan Species. These restrictions are intended to protect juvenile salmon from predation and meet smolt survival standards required by the Wells HCP.

Large portions of the mainstem Columbia River and Methow River Basin are designated as critical habitat under the ESA for bull trout, spring Chinook or steelhead. Critical habitat designations further restrict Douglas PUD's ability to grant land use permits along the shoreline of the Columbia and Methow rivers. Section 7 of the ESA prohibits the destruction or adverse modification of critical habitat in connection with actions carried out, funded, or authorized by a federal agency or an entity that has a federal nexus such as funding, permits or FERC license.

Compliance with critical habitat designations requires Douglas PUD to ensure that each permit application has received an exception from critical habitat designation, from either NMFS or USFWS, prior to Douglas PUD issuing a conditional land use permit. Changes in critical habitat designations and regulations are frequent. Douglas PUD will require that applicants for land use permits consult both the NMFS and USFWS prior to submitting a land use permit application.

Cultural Resources

Compliance with the Douglas PUD Land Use Policy ensures the compatibility of public and commercial occupancy of Project land (public land) with project operations, compliance with FERC license articles, and federal and state laws. Significant cultural resource sites on Project lands are subject to protection under Articles 41 and 44 of the Wells FERC License and section 106 of the NHPA.

Under the NHPA, Douglas PUD is required to address potential impacts to cultural resources that may be affected by Project-related activities conducted in compliance with the FERC license. Procedures for addressing cultural resource issues are defined in Douglas PUD's proposed HPMP. Douglas PUD will follow the guidelines of the HPMP prior to issuing any land use permits. If a permit is issued, the proponent will be required to pay for any additional archaeological work related to the proposed land use activity.

Federal law prevents Douglas PUD from disclosing the location of archaeological and cultural sites. Permits for these locations will either not be issued, or will include special conditions to ensure protection of the cultural resource site.

2.5.1.4 Off-License Settlement Agreement

In 2006, the FERC issued a Policy Statement on Hydropower Relicensing Settlements that limits the ability of licensees to include measures lacking sufficient nexus to the project as conditions of a new license. However, the FERC recognized that settling parties are free to enter into "off-license" or "side" agreements with respect to such matters that will not be included in a license. The measures related to the Wells Wildlife Area and rainbow trout program are similar to measures in other relicensing proceedings which the FERC found to lack a sufficient nexus to the project. Therefore, in an effort to continue these programs during the term of the new license consistent with the Policy Statement, WDFW and Douglas PUD entered into an Off-License Agreement.

The Off-License Agreement is an agreement between Douglas PUD and WDFW that is not intended to be included in the new license and therefore is not subject to the FERC's approval. Through this agreement, Douglas PUD agreed to the following responsibilities:

1. Trout Program: Douglas PUD will provide the funds necessary to produce and transport up to 20,000 pounds of rainbow trout equivalents, based on rearing goals set annually with the WDFW. The trout will be either raised at the Wells Fish Hatchery or at another location agreed to by both parties.

2. Wildlife Area Operations and Maintenance Funding: Douglas PUD will provide annual Operations and Maintenance funding for the Wells Wildlife Area in an amount not to exceed $200,000 (2007 dollars).

3. Habitat Restoration Funding: Douglas PUD will provide WDFW with funding to restore Wells Wildlife Area habitat destroyed by fire in an amount not to exceed $50,000 (2012 dollars) over the term of the agreement.

4. Capital Equipment Replacement Funding: Douglas PUD will provide WDFW with funds to replace certain capital equipment used in the maintenance of the Wells Wildlife Area once it has reached the end of its useful life.

Through this agreement, WDFW agreed to the following responsibilities:

1. License Application: WDFW agrees to support the Aquatic and Terrestrial measures proposed in the Wells License Application for the New Operating License.

2. License Term: WDFW agrees to support Douglas PUD's request for a New Operating License for a term of 50 years.

3. Water Quality Certification: WDFW agrees to reference only the goals and objectives contained within the management plans attached to the ASA and the measure(s) contained within the Off-License Agreement when working with Ecology to develop the original conditions of the Clean Water Act § 401 water quality certification for the New Operating License for the Wells Project.

4. FPA Section 10(a) and 10(j): WDFW agrees to refrain from requesting or advocating for additional FPA section 10(a) and 10(j) conditions or measures for Wildlife Resources, Resident Fish, Resident Fish habitat and lost Resident Fish harvest opportunities during the relicensing proceedings related to the issuance of a New Operating License for the Wells Project.

5. Trout Agreement: WDFW will meet with Douglas PUD in April of each year to establish the annual rearing goals and transportation protocols for each year's Trout Program and to determine how to best meet the trout obligation.

6. Wells Wildlife Program: WDFW will provide Douglas PUD with a proposed budget, not exceeding $200,000 (2007 dollars), and will provide a general description of how the proposed budget addresses the goals of the program for the Wells Wildlife Area by March 1st of each year. WDFW will provide complete documentation of all expenditures with each monthly bill. WDFW will not release or propagate any RTE species below the Project Boundary, not currently found within Project Boundary, without written permission from Douglas PUD. To ensure consistency with the Off-License Agreement, WDFW will provide Douglas PUD with an opportunity to review and modify any action that is expected to take place within the Wells Project Boundary.

The Off-License Agreement was effective December 11, 2007, with Douglas PUD's responsibilities commencing on June 1, 2012. The agreement expires upon the expiration of the Wells Project's New Operating License, assuming that an acceptable license is issued to Douglas PUD.

3.0 ENVIRONMENTAL BASELINE

For the purposes of this BA, the action area includes all areas potentially affected directly or indirectly by the Wells Project. This includes both project components that are located within the FERC-approved Project Boundary as well as features and areas located outside of the Project Boundary.

Project components within the FERC Project Boundary include the hydrocombine and associated structures, the reservoir, transmission line, tailrace, recreation facilities and adjacent lands. Project features within the Project Boundary are discussed in greater detail in Section 3.2.

ESA-listed species' use of some areas and features located upstream of the Project Boundary could also be potentially affected directly or indirectly by the Wells Project. These features include upper portions of the Methow River located more than 1.5 miles upstream from its confluence with the Columbia River, the Methow River fish hatchery and acclimation pond, an acclimation pond and trapping site on the Twisp River (a tributary to the Methow River), and an acclimation pond on the Chewuch River, another tributary of the Methow River. Additional features located outside of the Project Boundary, include upper portions of the Okanogan River located more than 15.5 miles upstream from its confluence with the Columbia River. Features located outside of the FERC Project Boundary, and potentially affected by Project operations are discussed in Sections 3.3 (upper portions of the Methow and Okanogan river basins) and 3.4 (Methow Hatchery and acclimation ponds).

3.1 OVERVIEW

The Columbia River within the Wells Project lies in a relatively narrow valley comprised of numerous large, dry side canyons and is also 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 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 environmental conditions of the components within the Project Boundary and those outside of the boundary that could be directly or indirectly affected by the Project (i.e., tributaries outside of the Project Boundary, Methow Fish Hatchery, and acclimation ponds). This section addresses the general site condition of these features and focuses on the use of the areas by the following 19 species:

- Bull trout (threatened, 1998 listing)
- Upper Columbia River spring-run Chinook salmon (endangered, 1999 listing)
- Upper Columbia River Steelhead (endangered, 1997 listing; threatened per 2009 court decision and order)
- Marbled Murrelet (threatened, 1992 listing)
- Greater sage-grouse (candidate, 2008)
- Fisher (candidate, 2004)
- Pygmy rabbit (endangered, 2001 listing)
- North American wolverine (candidate, 2010)
- Gray wolf (endangered, 1973 listing)
- Grizzly bear (threatened, 1975 listing)
- Canada lynx (threatened, 2000 listing)
- Northern spotted owl (threatened, 1990 listing)
- Washington ground squirrel (candidate, 1999)
- Yellow-billed cuckoo (candidate species, 1982)
- Whitebark pine (candidate, 2011)
- Northern wormwood (candidate, 2004)
- Wenatchee Mountains checkermallow (endangered, 1999 listing)
- Showy stickseed (endangered, 2002 listing)
- Ute ladies'-tresses (threatened, 1992 listing)

These species are described by USFWS or NMFS as those ESA-listed or candidate species that have historically occurred, are known to occur, or have the potential to occur within the counties in which the Wells Project is located (Douglas, Chelan, and Okanogan). In Section 4.0 an evaluation of the habitat preferences, ranges, and likelihood of occurring in the Wells Project is presented for each of these species. Based on this evaluation, only three of these species are expected to occur within the action area with any regularity: bull trout, spring Chinook and steelhead. Grizzly bear and gray wolf are known to inhabit a wide range of habitats, have large territories, and can travel considerable distances to establish their territories (especially young males). Thus, it is possible that individuals may move through the Wells Project area on occasion, but it is highly unlikely they would reside in the Project Area, or be affected by the Project.

3.2 WELLS PROJECT

3.2.1 Project Components

3.2.1.1 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 ft long and 168 ft wide with a top elevation at 795 ft above 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 ft long and 40 ft high, with a top elevation of 797 ft MSL. The east embankment is 1,030 ft long with a maximum height of 160 ft above the riverbed. The east embankment also has a top elevation of 797 ft.

3.2.1.2 Reservoir

The body of water formed and directly influenced by Wells Dam is known as Wells Reservoir (Figure 2.1-1). 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 ft 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 ft MSL for power and non-power purposes. The maximum depth of the reservoir under average conditions is >100 ft and the mean depth is 34 ft. The flushing rate varies seasonally with average flushing rates of 0.48 days in June and 2.98 days in January (Douglas PUD 2006b).

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 2006b). The FCRPS manages for these objectives using releases from storage at Chief Joseph Dam (USACE) and Grand Coulee Dam (United States Bureau of Reclamation [USBR]), 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. Dominant substrate in this upper section is characterized by larger sized cobble substrate. 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 the 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 rip-rap; 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 (Beak Consultants, Inc and Rensel Associates 1999), which consists of higher levels of fine substrate that has been deposited within Wells Reservoir by the Methow River.

A botanical survey of the Wells Project was conducted in 2005 (Douglas PUD 2006a). The 12,217-acre study area for the Wells Project included the approximately 9,678 acre open water areas of Wells Reservoir and approximately 2,539 acres of land within the Wells Project Boundary. Although the focal area of the survey included the reservoir components and adjacent upland, the major habitat groups identified in the survey are representative of the general habitats found throughout the Wells Project area, including upper portions of the Methow and Okanogan rivers, as well as the area surrounding the hatchery components of the Wells Project. Cover types of the Wells Project area are identified in Table 3.2.1-1.

Table 3.2.1-1 Acreage of Cover Types in Wells Project Study Area.

Community Type	Acres in the Reservoir Component	Percent of Area Surveyed[1]
Conifer	5	0.2
Shrub-steppe	502	19.8
Open - grass	136	5.4
Open - weed	163	6.4
Rocky - upland	12	0.5
Riparian - tree	142	5.6
Riparian - shrub	314	12.5
Emergent wetland	287	11.4
Emergent wetland - pond	46	0.5
Littoral zone	61	2.4
Bare-disturbed-eroded	49	1.9
Agriculture	648	25.5
Developed	175	6.9

1 Excludes open water portion of the reservoir (9,678 acres).

The entire shoreline length is 105 miles long, most of which has a relatively steep topography with banks rising sharply to 20 to 40 ft above the reservoir elevation. Exceptions to this include: shoreline areas near Pateros and Brewster; near the mouth of Okanogan River; at Washburn Island; and at Bridgeport Bar. The reservoir shoreline is diverse and includes stable areas with dense riparian vegetation; unstable and eroding areas; areas of minimal vegetation and exposed bedrock; and areas that are relatively unvegetated and have been stabilized by riprap. There are 142 acres of riparian vegetation with deciduous tree overstory on lands within the Wells Project Boundary (Douglas PUD 2006a). Shrub-steppe, irrigated agriculture, wildlife habitat (e.g., wildlife management areas), recreation lands, and the towns of Pateros, Brewster and Bridgeport, surround the reservoir.

Within the reservoir, native aquatic plant communities (i.e., macrophytes) are dominated by various native species of pondweed (*Potomegeton* spp.) and are most common between depths of 4 to 18 ft (Douglas PUD 2006a and Le and Kreiter 2006). Macrophytes generally were not found at water depths less than 4 ft, which encompasses the area most susceptible to fluctuating reservoir water levels (Le and Kreiter 2006). Invasive species such as Eurasian watermilfoil and curly leaf pondweed (*Potomegeton crispus*) also occur in Wells Reservoir, but at this time are in low proportion relative to the dominant native macrophyte species (Le and Kreiter 2006).

The revised 2006 Washington State WQS identify the aquatic life uses in the WRIA of the Columbia River section (RM 309.3 to 596.6) that includes Wells Reservoir, as salmonid spawning, rearing and migration (Ecology 2006). Other identified uses for Wells Reservoir include 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. In the state WQS, only one category, Category 5, represents the 303(d) listed waters subject to EPA approval and requiring TMDL (Ecology 2008). Water temperature and TDG levels in Wells Reservoir

have been known to exceed WQS and were assigned a Category 5 designation, based on measurements reported by the USACE (NMFS 2002a, Ecology 2008). The reach of the Columbia River within the Wells Project was on the State's 303(d) list for temperature impairment in 1996, 1998, 2004 and 2008 (Ecology 2008). The reservoir was also on the 303(d) list for TDG impairment in 1996 and 1998. However, in 2004, this reach of the Columbia River was removed from the 303(d) list for TDG, and assigned a Category 4a designation as a result of implementation of EPA approved TMDLs. The Category 4a designation remains in effect as of 2008 (Ecology 2008). Numerous water quality studies have also been conducted in the reservoir by multiple entities (i.e., Douglas PUD, Ecology, United States Geological Survey (USGS), and USACE), some since the late 1950s. Results indicate that the water found within the Wells Project is of high quality and is in compliance with the WQS for all of the parameters measured, except for seasonal exceedances in water temperature.

Lower Methow River

The Wells Project Boundary includes the Methow River from its confluence with the Columbia River to RM 1.5(Figure 2.1-1). 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 rip-rap and the City of Pateros. Water quality in the section of the Methow River within the Project is considered excellent and the substrate is in good condition (Ecology 1992, 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 (Ecology 2006). 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 populations of anadromous summer/fall Chinook, and ESA-listed stocks of spring Chinook, steelhead and bull trout. Aquatic habitat in the lower section of the Methow River is utilized 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 2.1-1). 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 ft wide throughout most of the river length (Douglas PUD 2006b, 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). Designated uses for the Okanogan River include 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, including the 15.5 miles within the Wells Project Boundary was put on the 303(d) list for DDE, DDD, and 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 Wells Project Boundary from the 303(d) list in 2004. However, water temperatures in this portion of the river are known to exceed the WQS during summer months and some sections of the lower Okanogan remain on the 2008 303(d) list (Ecology 2008). Water temperature modeling analysis demonstrated that with Wells Project in place, water temperatures in the Columbia, Okanogan and Methow rivers do not increase by more than 0.3°C compared to ambient without Wells Project conditions anywhere in the reservoir, and that the Wells Project complies with state WQS for temperature. The analysis also showed that the backwater from the Wells Project can significantly reduce the very high summer temperatures observed in the lower Okanogan and Methow rivers. 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 extent and length of freezing (Douglas PUD 2008j). Based upon the model, water temperature exceedance 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 2006b). Despite temperatures in exceedance of the WQS in some portions of the river, the Okanogan River watershed currently 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. Anecdotal reports from the Colville Tribe also suggest bull trout are present seasonally in the Okanogan River and have been detected in the upper reaches at Zosel Dam in Oroville. However, eight years of telemetry monitoring by Douglas PUD only documented straying behavior by bull trout that move briefly into the lower Okanogan River and then leave for the Methow River. The lower section of the Okanogan River within the Wells Project Boundary is utilized by anadromous salmonids primarily as a migratory corridor (NMFS et al. 1998).

3.2.1.3 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 ft downstream of the dam. The Wells Project Boundary extends beyond the Wells HCP defined Wells tailrace 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 ft. The tailrace width is approximately 1,900 ft at its widest point.

The tailrace begins at the exit of the draft tubes and consists of natural riverbed. 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 ft deep and 30 ft 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 kcfs from Wells Dam and a Rocky Reach Reservoir elevation at its normal elevation of 707 ft would result in an approximate tailwater elevation of 718 ft. A lesser discharge of 100 kcfs from Wells Dam and a Rocky Reach Reservoir elevation of 707 ft would result in an approximate tailwater elevation of 711 ft.

3.2.1.4 Wells Hatchery

The Douglas PUD Hatchery Program is designed to mitigate for the construction and continuing impacts to anadromous fish attributed to the operation of the Wells Project. 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. Both the Wells and Methow hatchery programs are funded by Douglas PUD and operated by WDFW.

The Wells Hatchery is located within Project Boundary; the other components of the Hatchery Program are located outside of the Project Boundary, and are discussed in greater detail later in this document. The hatchery programs annually produce approximately 3 million juvenile salmon and steelhead that are released into the Methow, Okanogan and Columbia rivers. The Wells Hatchery is operated to provide compensation for both inundation and passage losses as described in the Wells HCP. The inundation compensation is related to Wells Project construction and includes the production of 300,000 yearling steelhead, 320,000 yearling summer Chinook and 484,000 subyearling summer Chinook. The passage loss compensation provided by the Wells Hatchery is currently set at 48,858 yearling steelhead (3.8 percent).

The Wells Fish Hatchery is located immediately adjacent to the Wells Dam on the west tailrace embankment and produces summer Chinook, steelhead, coho and rainbow trout. Built in 1967, it was originally developed to compensate for the loss of fish production resulting from the inundation of the Columbia River above the dam. The Wells Hatchery, including associated facilities, covers 33 acres and consists of: a 6,100 ft long channel with portions of the channel modified to hold adults and juveniles; numerous above ground and in ground raceways; four large earthen rearing ponds; a centralized incubation, early rearing, cold storage and administration building; vehicle storage building; steelhead spawning building; and a separate set of residences for hatchery personnel.

The four earthen rearing ponds vary in size and purpose. Pond 1 is used for rearing yearling summer Chinook and is connected to the main hatchery outfall channel via a gate and outlet structure. When acclimated and ready for release, the juvenile summer Chinook are allowed access to the main hatchery outfall channel and are volitionally released into the Columbia River below Wells Dam. Pond 2 is the largest pond and has historically been used to raise yearling steelhead or subyearling Chinook. Ponds 3 and 4 are used each year for the rearing of yearling steelhead. Ponds 2, 3 and 4 have volitional collection and transportation facilities located downstream of their outlet structures. The steelhead raised at the Wells Hatchery are volitionally collected at the hatchery and are transported and released by truck or acclimated in the Methow and Okanogan rivers. Currently no juvenile steelhead are released through the hatchery outfall channel.

3.2.1.5 Transmission Line

The Wells Project includes two 230 kV single-circuit transmission lines. Each of the 230 kV transmission lines is capable of transmitting the entire output of the Wells Project. The lines run 41 miles in length from the switchyard atop the hydrocombine to the Douglas Switchyard operated by Douglas PUD. The lines run parallel to each other on 45-85 foot steel towers along a common 235-ft wide right-of-way. The Douglas Switchyard is located in close proximity to the Rocky Reach Switchyard, operated by Chelan PUD and the Sickler Substation, operated by the Bonneville Power

Administration (BPA). The 230 kV lines connect to the regional transmission grid at BPA's Sickler Substation.

The habitat in the vicinity of the corridor includes shrub-steppe, small stands of conifer tree dryland wheat fields and fields planted to grass and shrubs under the Conservation Reserve Program. The area supports huntable populations of mule deer and upland game birds including California quail, grey partridge and chukar. Raptors are found hunting the fields in the vicinity of the corridor and nest in the conifer tree stands. Songbirds, owls, ravens and crows are all present in the area (Douglas PUD 2009h).

3.2.2 Species Documented Within the Wells Project

Results from the numerous studies conducted in the Wells Project indicate that the water quality, turbidity, flow, and nutrient levels of the reservoir are all within sufficient limits to support healthy populations of aquatic species and provide ample water uses that include 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 (Douglas PUD 2006b, Ecology 2006, 2008). Limnological, macrophyte, and aquatic macroinvertebrate studies of the reservoir by Douglas PUD support these findings (BioAnalysts, Inc. 2006; DTA 2006; Douglas PUD 2006c and 2009h; EES 2006; Le and Kreiter 2006). Water quality studies conducted by Douglas PUD have demonstrated compliance with Washington State numeric criteria for water quality standards associated with TDG, DO, pH, turbidity, water temperature and toxins (Politano et al. 2008, 2009a, 2009b; West Consultants, Inc. 2008; Parametrix, Inc. 2009; CBE 2009; Douglas 2008g). These studies indicate that Wells Reservoir is a healthy run-of-river waterbody with no thermal or chemical stratification; that the reservoir ecosystem is dominated by native fish, macrophyte, and benthic invertebrate communities; and that the reservoir supports healthy populations of numerous other native wildlife species.

The impounded deepwater, shallow shoreline water, and shoreline riparian areas of the reservoir (including the Columbia River and lower potions of the Methow and Okanogan rivers) provide habitat for numerous species that include aquatic invertebrates and fish, wading birds, shore birds and waterfowl, several aquatic furbearers, and terrestrial species that may frequent the reservoir edge for water and foraging opportunities. As presented in the PAD, numerous surveys have been conducted in the Wells Project area for botanical resources, amphibians, fish, mammals, birds, and macroinvertebrates (BioAnalysts, Inc. 2006; Lê, B. and S. Kreiter 2006; Douglas PUD 2006a, c; 2008c, f; Douglas PUD 2009h). Field surveys of Wells Reservoir, the Project transmission line, and the surrounding area have documented 161 bird species, 5 amphibians, 9 reptiles, 29 mammals (Table 3.2.2-1), 27 resident fish species (Table 3.2.2-2), 6 anadromous fish species, and aquatic macroinvertebrates including 17 mollusk species (Table 3.2.2-3).

Open water habitat is of particular importance to waterfowl, macroinvertebrates, and aquatic furbearers during much, if not all, of their life cycle. The WDFW considers Wells Reservoir one of the most important waterfowl wintering areas in eastern Washington (Patterson B, WDFW, pers. comm.). Although Canada geese are the only bird known to nest along the reservoir in any great numbers (Hallet 2005; WDOG 1978; WDOG 1979), many species use the area for foraging and resting activities. Data from aerial surveys show a maximum of 33,912 ducks and geese using Wells Reservoir during the fall migration, and a maximum of 38,909 ducks and geese wintering on the reservoir (Douglas PUD 2006c). In addition to the waterfowl, as shown in Table 3.2.2-1, many birds of prey, shorebirds, rails, and game birds are known to use the reservoir and surrounding upland areas, some in great numbers. Up to 23,150 American coots have been documented at Wells Reservoir during the fall migration and approximately 25,700 coots wintered there between 2001 and 2005 (Douglas PUD 2006c).

Furbearers such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), and river otter (*Lutra canadensis*) also rely on open water habitats and associated riparian areas along the reservoir for food and lodging material. The trees and shrubs found along the reservoir edge also provide foraging, and in some cases nesting opportunities, for terrestrial mammals and birds, and also provides food and thermal cover for wildlife species during the winter. Riparian areas typically host higher numbers of both plant and animal species when compared to other habitats in a given area. Twenty-seven percent (43 species) of the bird species detected during the breeding season in the Wells Project area were in riparian habitats along the shoreline of waterbodies and wetlands, more than any other habitat type (Douglas PUD 2006c).

Large mammals such as gray wolf and grizzly bear were not detected on wildlife surveys of the Wells Project (Douglas PUD 2006c, 2009h). These species are unlikely to use the Project with any regularity given the extent of their ranges, lack of suitable habitat, and due to the significant presence of agriculture and developed lands and the proximity of human presence to the Wells Project Boundary. However, these species utilize a wide diversity of habitat types, have large territories, and may cover great distances during their life cycle. Transient wolves and grizzly bear could on rare occasion utilize the Wells Project for brief periods of time.

Table 3.2.2-1 Wildlife Species Detected in the Wells Project Area.

Common Name	Scientific Name
Pelagic Birds and Herons	
Common Loon	*Gavia immer*
Eared Grebe	*Podiceps nigricollis*
Horned Grebe	*Podiceps auritus*
Red-necked Grebe	*Podiceps grisegena*
Western Grebe	*Aechmophorus occidentalis*
Pied-billed Grebe	*Podilymbus podiceps*
American White Pelican	*Pelecanus erythrorhynchos*
Double-crested Cormorant	*Phalacrocorax auritus*
Great Egret	*Ardea alba*
Great Blue Heron	*Ardea herodias*
Waterfowl	
Canada Goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Northern Pintail	*Anas acuta*
Blue-winged Teal	*Anas discors*
Green-winged Teal	*Anas crecca*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Anas clypeata*
Ruddy Duck	*Oxyura jamaicensis*
Wood Duck	*Aix sponsa*
Redhead	*Aythya americana*
Canvasback	*Aythya valisineria*
Ring-necked Duck	*Aythya collaris*
Scaup spp.	*Aythya spp.*
Barrow's Goldeneye	*Bucephala islandica*
Common Goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Common Merganser	*Mergus merganser*
Hooded Merganser	*Lophodytes cucullatus*
Raptors	
Turkey Vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Golden Eagle	*Aquila chrysaetos*
Bald Eagle	*Haliaeetus leucocephalus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Peregrine Falcon	*Falco peregrinus*
Prairie Falcon	*Falco mexicanus*
Rough-legged Hawk	*Buteo lagopus*
Swainson's Hawk	*Buteo swainsoni*

Table 3.2.2-1 (continued) Wildlife Species Detected in the Wells Project Area.

Gamebirds	
Chukar	*Alectoris chukar*
Ring-necked Pheasant	*Phasianus colchicus*
California Quail	*Callipepla californica*
Dusky Grouse	*Dendragapus obscurus*
Gray Partridge	*Perdix perdix*
Rails, Cranes, & Shorebirds	
Virginia Rail	*Rallus limicola*
American Coot	*Fulica americana*
American Golden Plover	*Pluvialis dominica*
Killdeer	*Charadrius vociferus*
Greater Yellowlegs	*Tringa melanoleuca*
Spotted Sandpiper	*Actitis macularia*
Dowitcher spp.	*Limnodromus spp.*
Common Snipe	*Gallinago gallinago*
Wilson's Phalarope	*Phalaropus tricolor*
Gulls & Terns	
Bonaparte's Gull	*Larus philadelphia*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Caspian Tern	*Sterna caspia*
Black Tern	*Chlidonias niger*
Common Tern	*Sterna hirundo*
Doves	
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Owls & Goatsuckers	
Great Horned Owl	*Bubo virginianus*
Short-eared Owl	*Asio flammeus*
Northern Pygmy-Owl	*Glaucidium gnoma*
Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*
Hummingbirds & Kingfishers	
Rufous Hummingbird	*Selasphorus rufus*
Black-chinned Hummingbird	*Archilochus alexandri*
Calliope Hummingbird	*Stellula calliope*
Belted Kingfisher	*Ceryl alcyon*
Woodpeckers, Nuthatches, Creepers & Flycatchers	
Northern Flicker	*Colaptes auratus*
Hairy Woodpecker	*Picoides villosus*
Downy Woodpecker	*Picoides pubescens*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Pygmy Nuthatch	*Sitta pygmaea*
Red-breasted Nuthatch	*Sitta canadensis*
Brown Creeper	*Certhia americana*
Western Wood-Pewee	*Contopus sordidulus*
Olive-sided Flycatcher	*Contopus cooperi*

Table 3.2.2-1 (continued) Wildlife Species Detected in the Wells Project Area.

Willow Flycatcher	*Empidonax traillii*
Dusky Flycatcher	*Empidonax oberholseri*
Least Flycatcher	*Empidonax minimus*
Say's Phoebe	*Sayornis saya*
Eastern Kingbird	*Tyrannus tyrannus*
Western Kingbird	*Tyrannus verticalis*
Corvids, Shrikes & Swallows	
Steller's Jay	*Cyanocitta stelleri*
Clark's Nutcracker	*Nucifraga columbiana*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Northern Shrike	*Lanius excubitor*
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Cliff Swallow	*Petrochelidon pyrrhonota*
Bank Swallow	*Riparia riparia*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Barn Swallow	*Hirundo rustica*
Chickadees, Wrens, Vireos & Kinglets	
Black-capped Chickadee	*Poecile atricapillus*
Mountain Chickadee	*Poecile gambeli*
House Wren	*Troglodytes aedon*
Canyon Wren	*Catherpes mexicanus*
Marsh Wren	*Cistothorus palustris*
Winter Wren	*Troglodytes troglodytes*
Cassin's Vireo	*Vireo cassinii*
Warbling Vireo	*Vireo gilvus*
Ruby-crowned Kinglet	*Regulus calendula*
Golden-crowned Kinglet	*Regulus satrapa*
Thrashers, Thrushes & Starlings	
Sage Thrasher	*Oreoscoptes montanus*
Gray Catbird	*Dumetella carolinensis*
European Starling	*Sturnus vulgaris*
American Robin	*Turdus migratorius*
Hermit Thrush	*Myadestestownsendi*
American Pipit	*Anthus rubescens*
Mountain Bluebird	*Sialia currucoides*
Western Bluebird	*Sialia mexicana*
Townsend's Solitaire	*Myadestes townsendi*
Waxwings	
Cedar Waxwing	*Bombycilla cedrorum*
Warblers & Tanagers	
Magnolia Warbler	*Dendroica magnolia*
Townsend's Warbler	*Dendroica townsendi*
Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Yellow-rumped Warbler	*Dendroica coronata*
Yellow Warbler	*Dendroica petechia*

Table 3.2.2-1 (continued) Wildlife Species Detected in the Wells Project Area.

MacGillivray's Warbler	*Oporornis tolmiei*
Wilson's Warbler	*Wilsonia pusilla*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
Western Tanager	*Piranga ludoviciana*
Sparrows & Icterids	
Spotted Towhee	*Pipilo maculatus*
Chipping Sparrow	*Spizella passerina*
Lark Sparrow	*Chondestes grammacus*
Grasshopper Sparrow	*Ammodramus savannarum*
Savannah Sparrow	*Passerculus sandwichensis*
Lincoln's Sparrow	*Melospiza lincolnii*
Song Sparrow	*Melospiza melodia*
White-crowned Sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atrichipilla*
Vesper sparrow	*Pooecetes gramineus*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Red-winged Blackbird	*Agelaius phoeniceus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
Western Meadowlark	*Sturnella neglecta*
Larks, Finches & Allies	
Horned Lark	*Eremophila alpestris*
Dark-eyed Junco	*Junco hyemalis*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
House Finch	*Carpodacus mexicanus*
Cassin's Finch	*Carpodacus cassinii*
Purple Finch	*Carpodacus purpureus*
Pine Siskin	*Carduelis pinus*
Red Crossbill	*Loxia curvirostra*
American Goldfinch	*Carduelis tristis*
Evening Grosbeak	*Coccothraustes vespertinus*
House Sparrow	*Passer domesticus*
Amphibians	
Pacific Treefrog	*Pseudacris regilla*
Great Basin Spadefoot Toad	*Spea intermontana*
Long-toed Salamander	*Ambystoma macrodactylum*
Tiger Salamander	*Ambystoma tigrinum*
Bullfrog	*Rana catesbeiana*

Table 3.2.2-1 (continued) Wildlife Species Detected in the Wells Project Area.

Reptiles	
Painted Turtle	*Chrysemys picta*
Gopher Snake	*Pituophis catenifer*
Racer	*Coluber constrictor*
Western Terrestrial Garter Snake	*Thamnophis elegans*
Common Garter Snake	*Thamnophis sirtalis*
Western Rattlesnake	*Crotalus viridis*
Sagebrush lizard	*Sceloporus graciosus*
Pygmy Short-horned Lizard	*Phrynosoma douglasii*
Western Skink	*Eumeces skiltonianus*
Mammals	
Deer Mouse	*Peromyscus maniculatus*
Great Basin Pocket Mouse	*Parognathus parvus*
Western Harvest Mouse	*Reithrodontomys megalotis*
Sagebrush Vole	*Lemmiscus curtatus*
Montane Vole	*Microtus montanus*
Meadow Vole	*Microtus pennsylvanicus*
Vagrant/Masked Shrew	*Sorex spp.*
Bushy-tailed Woodrat	*Neotoma cinerea*
House Mouse	*Mus musculus*
Mountain Cottontail	*Sylvilagus nuttallii*
Long-tailed Weasel	*Mustela frenata*
Porcupine	*Erethizon dorsatum*
Northern Pocket Gopher	*Thomomys talpoides*
Yellow-bellied Marmot	*Marmota flaviventris*
Chipmunk spp.	*Tamias spp.*
Douglas squirrel	*Tamiasciurus douglasii*
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicus*
Coyote	*Canis latrans*
Raccoon	*Procyon lotor*
Mink	*Mustela vison*
River Otter	*Lutra canadensis*
Striped Skunk	*Mephitis mephitis*
American Badger	*Taxidea taxus*
Black Bear	*Ursus americanus*
Cougar	*Puma concolor*
Bobcat	*Felis rufus*
White-tailed deer	*Odocoileus virginianus*
Mule deer	*Odocoileus hemionus*

Sources: BioAnalysts, Inc. 2006, Douglas PUD 2006c, Douglas PUD 2009h.

The reservoir is made up of several different aquatic habitat types including deepwater, littoral, backwater, and transitional habitats. These unique habitat types are defined by parameters such as velocity, depth, bathymetry, substrate, nutrient availability and overall complexity. The distribution, abundance, and composition of fish species in the reservoir are heavily influenced by the availability and quality of these habitats and include a wide diversity of anadromous and resident, native and non-native, warm and cold water species. Table 3.2.2-2 provides a list of the 27 resident fish species that have been documented in the reservoir (Dell et al. 1975; McGee 1979; Zook 1983; Burley and Poe 1994; Beak Consultants, Inc and Rensel Associates 1999; NMFS 2002a; Wydoski and Whitney 2003; BioAnalyst, Inc. 2004).

Table 3.2.2-2 Native and Non-native Resident Fish Species Documented in Wells Reservoir.

Common Name	Scientific Name
Native Resident Species	
White sturgeon	*Acipenser transmontanus*
Chiselmouth	*Acrocheilus alutaceus*
Longnose sucker	*Catostomus catostomus*
Bridgelip sucker	*Catostomus columbianus*
Largescale sucker	*Catostomus macrocheilus*
Lake whitefish	*Coregonus clupeaformis*
Prickly sculpin	*Cottus asper*
Threespine stickleback	*Gasterosteus aculeatus*
Burbot	*Lota lota*
Peamouth	*Mylocheilus caurinus*
Rainbow trout	*Oncorhynchus mykiss*
Mountain whitefish	*Prosopium williamsoni*
Northern pikeminnow	*Ptychocheilus oregonensis*
Redsided shiner	*Richardsonius balteatus*
Dace	*Rhinichthys spp.*
Bull Trout	*Salvelinus confluentus*
Non-Native Resident Species	
Lake Whitefish	*Coregonus cluepeaformis*
Carp	*Cyprinus carpio*
Black bullhead	*Ictalurus melas*
Brown bullhead	*Ictalurus nebulosus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis macrochirus*
Smallmouth bass	*Micropterus dolomieu*
Largemouth bass	*Micropterus salmoides*
Yellow Perch	*Perca flavescens*
Black crappie	*Pomoxis nigromaculatus*
Walleye	*Stizostedion vitreum*
Tench	*Tinca tinca*

Sources: Dell et al. 1975, McGee 1979, Zook 1983, Burley and Poe 1994, Beak Consultants, Inc and Rensel Associates 1999, NMFS 2002a, Wydoski and Whitney 2003, BioAnalyst, Inc. 2004.

Six species of anadromous fish are also found in Wells Reservoir and include: spring and summer/fall-run Chinook salmon, sockeye salmon, steelhead, coho salmon, and Pacific lamprey. With the exception of the summer/fall-run ocean-type Chinook salmon, anadromous species utilize Wells Reservoir primarily as a migratory corridor; this differs considerably from some resident species that may depend upon the habitats in the Wells Project for all their life history needs. Summer/fall ocean-type Chinook salmon are known to extensively utilize the mainstem for rearing and migration (Chapman et al. 1994a). All of these species are native to the Columbia River basin and all but Pacific lamprey are considered game fish species. Based on results from previous studies, as further discussed in section 3.3.2 of the EA (Exhibit E of the Final License Application), the reservoir does not provide suitable spawning habitat for any of the anadromous fish species (Beak Consultants, Inc and Rensel Associates 1999, Douglas PUD 2008i, Douglas PUD 2010).

The reservoir also hosts a diversity of gastropods and bivalves (i.e., mollusks) which are important as forage for many fish and wildlife (Table 3.2.2-3). In September and October 2005, Douglas PUD conducted an aquatic invertebrate inventory and assessment of RTE aquatic invertebrates within Wells Reservoir (BioAnalysts, Inc. 2006). Documented species from this study include 13 species in the Methow portions of Wells Reservoir, 11 in the Okanogan portion, and nine in the Columbia River portion. The gastropods included eight native species and non-native species and the bivalves included seven native species and one non-native species (BioAnalysts, Inc. 2006). Benthic macroinvertebrate communities appeared to be healthy and abundant, but were scarcer within shallow water areas where daily fluctuations occur (DTA 2006). These water fluctuations may also affect the composition of benthic macroinvertebrate communities along the shoreline.

Table 3.2.2-3 Mollusk Species in the Wells Project Area.

Common Name	Scientific Name
Native Species	
Western pearlshell	*Margaritinopsis falcata*
Striate fingernail clam	*Sphaerium striatinum*
Ridgebeak peaclam	*Pisidium compressum*
Western lake fingernail clam	*Musculium raymondi*
Shortface lanx	*Fisherola nuttalli*
Ashy pebblesnail	*Fluminicola fuscus*
Western floater	*Anodonta kennerlyi*
Ubiquitous peaclam	*Pisidium casertanum*
Golden fossaria	*Fossaria obrussa*
Prairie fossaria	*Fossaria (Bakerilymnaea) bulimoides*
Ash gyro	*Gyraulus parvus*
Three ridge valvata	*Valvata tricarinata*
Rocky Mountain physa	*Physella propinqua propinqua*
Western ridgemussel	*Gonidea angulata*
Fragile ancylid	*Ferrissia californica*
	Physella sp.
	Anodonta sp.
	Corbicula sp.
Non-native Species	
Big-ear radix*	*Radix auricularia*
Asian clam*	*Corbicula fluminea*

* Non-native taxon.
Source: BioAnalysts, Inc. 2006

3.2.3 T & E Species Use of the Wells Project

All three of the ESA-listed species found in the Wells Project (bull trout, spring Chinook salmon, and steelhead) are discussed in greater detail in Section 4 – Species Analysis. Within the Wells Project, telemetry studies have shown that bull trout utilize the mainstem Columbia River and pass through Wells Dam (BioAnalysts, Inc. 2004; LGL and Douglas 2008). Bull trout use of the mainstem of the Columbia River is variable and seasonal. Bull trout use the Columbia and larger tributaries as foraging, migrating and overwintering habitat, but approximately five percent are believed to be year-round residents (BioAnalysts 2004). Most (92%) migratory bull trout leave the Columbia when water temperatures exceed 15 degrees C. It also appears use of the Columbia varies between local populations. For example, radio-telemetry suggests large proportions of the Entiat and Mad River populations utilize the mainstem Columbia River. Bull trout found in the reservoir originate in the Methow River and 90 percent of dam passage occurs between May and June. Only adfluvial bull trout have been documented within

Wells Project and no bull trout have been counted in the Wells fishways during winter count periods (BioAnalysts, Inc. 2004; LGL and Douglas PUD 2008).

From 1998 to 2008 an average of 3,735 spring Chinook salmon migrated through Wells Dam annually (CBFAT 2009, Columbia River DART 2009). As with bull trout, spring Chinook salmon utilize Wells Reservoir primarily as a migration corridor to and from their spawning areas in the upper Methow, Chewuch and Twisp rivers and spend little time rearing in Wells Reservoir (NMFS 2002a). Spawning spring Chinook have been observed in the outfall at the Methow Fish Hatchery although most of these fish are of hatchery origin (NMFS 2002a). Steelhead utilize the mainstem of the Columbia River as they migrate to spawning areas in the Methow River and Okanogan River watersheds. From 1998 to 2008, on average 7,446 steelhead migrated through Wells Dam annually (CBFAT 2009).

None of the other ESA-listed or candidate plants, birds, or mammals examined in this BA have been documented in the study area (McGee 1979; Zook 1983; Chapman et al. 1994a; Beak Consultants, Inc and Rensel Associates 1999; BioAnalysts, Inc. 2006; Hallet 2005; DTA 2006; Douglas PUD 2006a, c, 2008c, 2009h; Le and Kreiter 2006). The habitat found in the Wells Project area includes mostly open water, irrigated agriculture, shrub-steppe, emergent wetland/pond, and riparian shrub vegetation without a tree overstory (Douglas PUD 2006a). Based on the general habitat requirements of the species identified in this BA as potentially occurring within the Wells Project, except for the three salmonid species suitable habitat is very limited to nonexistent. Further, documented distributions for most of the terrestrial species fall outside of the Wells Project.

3.2.4 Critical Habitat Designations in the Wells Project

The mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Methow rivers, along with the accessible portions of the Methow River Basin, are included in the critical habitat listed for spring Chinook in the Wells Project area (70 FR 52731) (USFWS 2008).

Critical habitat was designated for the UCR summer-run steelhead ESU by NMFS on September 2, 2005 (70 FR 52630). Critical habitat does occur in the Wells Project area and includes; (1) the mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Okanogan rivers, (2) the accessible portions of the Methow River Basin, (3) the accessible portions of the Okanogan River Basin, excluding the Colville Reservation and Salmon Creek (NOAA 2006; USFWS 2008).

Critical habitat was designated by the USFWS for bull trout throughout their U.S. range on September 30, 2010 (75 FR 63898). Designated bull trout critical habitat occurs in the Wells Project area and includes: (1) the mainstem Columbia River from the Wells Tailrace to the Chief Joseph Tailrace, and (2) the accessible portions of the Methow River Basin (USFWS 2010).

No upland critical habitats are known to occur within the vicinity of Wells Reservoir components of the Wells Project area (USFWS 2008). The closest known critical habitat is Wenatchee Mountains checker-mallow habitat, located in Chelan County, approximately 40 miles to the southwest of the Wells Project area.

3.3 TRIBUTARIES LOCATED OUTSIDE OF THE PROJECT BOUNDARY THAT MAY BE AFFECTED BY THE PROJECT

3.3.1 Tributary Components

Two tributaries flow into the Wells Reservoir (impounded portion of the Columbia, Okanogan and Methow rivers) and include the Methow and Okanogan rivers above Project Boundary, (Figure 2.1-1). Portions of the lower regions of the Methow and Okanogan rivers are generally impounded and directly influenced by the backwater effects of Wells Dam, and are therefore discussed in the Project Section of this BA (Section 3.2). The section below addresses conditions of these tributaries outside of the Project Boundary.

Based on results from the 2005 botanical survey and a comparison to aerial photography, the habitats documented in the Wells Project area are applicable to the general vicinity of the upper portions of the Methow and Okanogan rivers (Douglas PUD 2006a). However, moving upstream, undisturbed forest, shrub, and riparian habitats tend to increase in coverage, while developed areas and agriculture tend to decrease. (Cover types of the Wells Project area are identified in Table 3.2.1-1.).

3.3.1.1 Upper Methow River

The Methow River originates in the Cascade Mountains and flows southeast to its confluence at Columbia RM 524 near the City of Pateros, approximately 8 miles upstream of Wells Dam. The Methow River has a 1,805 square-mile watershed (Methow Basin Planning Unit 2005). The northern portions of the Methow Basin are located in the Pasayten Wilderness and the Okanogan National Forest. The western portion of the basin is formed by the North Cascade Mountains with the middle and lower portions of the river basin defined by a U-shaped, moderately confined, alluvial valley. The average width of the river is 150 ft with variable depths. The river includes high quality habitat for salmonids, however, significant sections of the Methow above Project Boundary are

known to dry up during periods of low water flow and drought. Many of these low water events have resulted in significant fish kills (Ecology 1992).

Elevations range from 781 ft MSL at the river mouth to just under 9,000 ft at the highest upper watershed peaks. Principal tributary watersheds are the 245 square-mile Twisp River and the 525 square-mile Chewuch River. Annual precipitation in the Methow River Basin ranges from 10 inches in the semi-arid region of the valley floor near Pateros to 80 inches per year at higher elevations near the crest of the Cascade Range (Ely 2003). Average annual discharge rates are: 497 cfs near Mazama (USGS station #12447383, RM 63.8); 1,163 cfs near Winthrop (USGS station #12448500, RM 49.8); and 1,533 cfs near Pateros and the river mouth (RM 6.7). Water right certificates allow for numerous withdrawals along the Methow River. During peak usage in 1990, withdrawals accounted for one-third of the August flow along some sections of the river (Williams and Kendra 1990). The total allocated withdrawals and diversions in the basin are about 380,729 ac-ft/yr (340 million gallons per day) (Methow Basin Planning Unit 2005). Irrigation accounts for about 97% of the total annual water use (Methow Basin Planning Unit 2005).

Within the watershed, only approximately 14% of land is privately owned (Methow Basin Planning Unit 2005). Land within one mile of the river includes lands owned/managed primarily by BLM, USFS, or WDFW. Towns along the river include Pateros, located near the mouth of the river, and heading upstream is followed by Methow, Carlton, Twisp, Winthrop, and finally Mazama. Much of the area immediately surrounding the river is dominated by homesteads and ranches, agricultural areas, orchards, and pasture, particularly in the river floodplain (Ecology 2009). Mature forest and dense riparian vegetation is relatively uncommon adjacent to the river south of the Town of Winthrop, but becomes more prevalent heading north, particularly in areas not immediately adjacent to the river edge. The river shoreline is dominated by exposed bedrock, some eroding shoreline in unstable areas, and narrow patches of riparian tree or shrub vegetation (Ecology 2009). Exposed cobble is evident throughout the river channel, particularly during low flow. Within the river, gravel, cobble and some large cobble dominate due to the relatively fast flow of the stream which quickly moves smaller substrate material downstream (Ecology 2009). Pools, runs and riffles are common and provide high quality habitat for numerous fish species and aquatic macroinvertebrates. Aquatic plants are uncommon except in protected areas, due to the relatively high velocity flow and coarse substrate.

Several water quality monitoring stations are located on the Methow River (WRIA 48) upstream of the Wells Project. An Ecology station (#48A070), which has been in operation since 1978, is located at approximately RM 5 and provides the most reliable information for the quality of water entering Wells Reservoir from the Methow watershed upstream. Based on 2006 WQS, this segment of the Methow River was placed on the 303(d) list as an impaired water body for temperature exceedances in 1996 and remains

on the list in 2008 (Ecology 2008). All other water quality parameters at this station meet state WQS. Moving upstream from RM 5, three sections of the Methow are currently assigned a Category 4C designation, meaning the section is impaired for non-pollution related reasons. In this case, the listing is due to instream flow levels that are inadequate to support ESA-listed fish species (Ecology 2008). Identified water uses on the river include recreation (primary contact), water supply uses (domestic, industrial, agricultural and stock watering), and other miscellaneous uses (wildlife habitat, harvesting, commerce/navigation, boating and aesthetics). Riparian and stream channel condition along the river appear to have some damage from livestock grazing, agricultural development, and scouring, however the quality of the riverine substrate is in relatively good condition and provides high quality fish habitat (Ecology 1992, NMFS et al. 1998).

3.3.1.2 Upper Okanogan River

The Okanogan River is approximately 115 miles long, including the lower 15.5 miles that are considered part of Wells Reservoir and are discussed in the reservoir section of this BA. The river originates near Armstrong, British Columbia and flows south through a series of lakes, finally entering the Columbia River at RM 534 approximately 18 miles upstream of Wells Dam. The Okanogan watershed covers an area of approximately 8,200 square miles, 2,342 square miles (29 percent) of which occurs in the US. The northern portion of the watershed is in the Okanogan Highlands of the US and Canada. The southern part of the basin, near the river mouth, is in the northwest corner of the Columbia Plateau. Unlike the Methow River, the Okanogan River is wide (> 100 ft throughout most of the river) and relatively slow moving (Ecology 2009). Elevations range from 781 ft MSL at the river mouth to over 8,400 ft at the highest upper watershed peaks. The principal tributary of the Okanogan River is the Similkameen River which accounts for approximately one-half of the drainage area of the entire Okanogan watershed. Annual precipitation in the Canadian portion of the Okanogan Basin ranges from 30 to 40 inches and from 10-15 inches in the US portion the basin (Douglas PUD 2006b). The average annual discharge rate taken from a USGS station (#12439500) located close to where the river enters the US at the outflow of Lake Osoyoos near Oroville (RM 77.3), is 681 cfs, 493,200 ac-ft/year. Data from the USGS station (#12445000) located near Tonasket (RM 50.8) are 2,928 cfs, 2,121,000 ac-ft/year. The average discharge downstream from USGS station #12447200 near Malott (RM 17.0) is 3,038 cfs, 2,201,000 ac-ft/year. The area surrounding the river has steep to rolling hills along the valley walls, with flat to moderate slopes on ancient terraces and along the valley bottoms (NMFS 2002a).

Within the US portion of the river and within 1 mile of the west bank of the river, lands are owned/managed primarily by BLM, DNR, or WDFW (Douglas 2006b). The Colville Indian Reservation is bounded by the east bank of the river from the mouth upstream to the north boundary of Township 34 North, north of the town of Omak. Population centers along the Okanogan are Monse located near the mouth of the river, and heading

upstream Malott, Okanogan, Omak, Tonasket, and Oroville, located near Lake Osoyoos. In Canada, the Okanagan River passes through several lakes and the Canadian towns of Oliver and Penticton from its origin at the southern end of Okanagan Lake. Similar to the Methow River, much of the floodplain along the Okanogan River is dominated by towns, homesteads and ranches, and is used for crops and ranching. Mature forest and dense riparian vegetation is relatively uncommon adjacent to the river south of the Town of Oroville, but becomes more prevalent heading north. The river shoreline is dominated by exposed bedrock, some eroding shoreline in unstable areas, and narrow patches of riparian tree or shrub vegetation. Within the upper portions of the river outside of the Project area, cobble substrates dominate and riffles and runs are uncommon (Ecology 2009). Mud and silt substrates are reported at water monitoring station #49A190 located near the outflow of Lake Osoyoos (Ecology 2009).

Portions of the Okanogan River (WRIA 49) were placed on the 303(d) list for exceeding limits for DDD, DDE, and PCBs in 1994 (Ecology 2008). In 2004, the impaired reaches of the Okanogan River were removed from the 303(d) list for these parameters and assigned a Category 4a designation as a result of implementation of EPA approved TMDLs (Ecology 2008). The Category 4a designation remains in effect as of 2008 (Ecology 2008). The portion of the river at USGS station #12447200 near Malott was placed on the 303(d) list for temperature exceedances and remains on the 303(b) list through 2008 (Ecology 2008). Data from long-term water quality monitoring stations located along the length of the Okanogan River, provide a water quality index (WQI) that expresses results relative to levels required to maintain beneficial uses (based on criteria in Washington's WQS, WAC 173-201A). WQI for station #49A070 located near Malott has been consistently rated as moderate since 2003 (Ecology 2009). The WQI for station #49A190 located near Oroville has been ranked consistently as "moderate" since 2006 (Ecology 2009).

3.3.2 T & E Species Use of Tributaries Outside of the Wells Project

All three of the ESA-listed fish species (bull trout, spring Chinook salmon, and steelhead) are known to occur in upper portions of tributaries that connect to the Wells Reservoir (Douglas PUD 2006b, Colville 2008). The USFWS has identified the Methow, Wenatchee and Entiat rivers as core areas for bull trout, with 10 of 19 local populations occurring in the Methow core area (USFWS 2002a). Based on radio-tagging studies conducted between 2001 and 2003, adult bull trout were detected moving upstream through the ladders of Wells Dam, destined for the Twisp River (Douglas PUD 2004). During the 2001-2003 study, and subsequent studies conducted between 2005 and 2008 by Colville Fish and Wildlife (2008) and LGL and Douglas PUD (2008), a majority of bull trout selected the Methow River System (including the Twisp River), and no fish ascended the Okanogan River. However, based on studies in the Lower Okanogan (BioAnalysts 2004), and according to the Colville Tribe, bull trout are known to occasionally use the Okanogan River and have been documented in the upper reaches at

Zosel Dam in Oroville. This behavior may be attributed to opportunistic foraging or possibly straying from the Methow where bull trout are more commonly found year-round.

The primary spawning areas for ESA listed spring Chinook salmon are the mainstem of the Methow River upstream of the Chewuch River confluence, the Twisp, Chewuch, and the Lost rivers, as well as Thirtymile and Lake creeks. Documented spawning sites for spring Chinook in the Methow drainage are located over 50 miles upstream of the Wells Project Boundary (NMFS 2002a). The Okanogan River population segment of the UCR spring-run Chinook population is extinct (WDFW 2005).

The majority of naturally produced steelhead that migrate through the Wells Project spawn in the Methow River watershed with a small population spawning in the Okanogan River watershed (Douglas PUD 2006b). Smolt stages of steelhead, of hatchery and wild origin, have been documented in the Okanogan (Colville 2008). Steelhead use spawning habitat in the mainstem Methow River and eleven of its tributaries located in the mid and upper reaches of the drainage outside of the Wells Project area (NMFS 2002a). A small number of primarily hatchery origin steelhead return to spawn on the lower Similkameen River, a tributary to the Okanogan River near the US-Canada Border also outside of the Wells Project area (NMFS 2002a). The habitat requirements and distribution of these species are discussed in greater detail in Section 4 – Species Analysis.

None of the other plants, birds, or mammals covered in this BA have been documented in the vicinity of the tributaries that could be effected by the Project during previous survey efforts of the Wells Project area (McGee 1979; Zook 1983; Chapman et al. 1994a; Beak Consultants, Inc and Rensel Associates 1999; BioAnalysts, Inc. 2006; Hallet 2005; DTA 2006; Douglas PUD 2006a, b; Le and Kreiter 2006). However, these surveys focused efforts on the Wells Project, including the lower 1.5 miles of the Methow drainage and the lower 15.5 miles of the Okanogan drainages. During the preparation of this BA, few field surveys specific to upper portions of the Methow and Okanogan rivers or Foster Creek, were identified for listed species other than bull trout, spring Chinook, and steelhead.

Based on of the general habitats likely to occur in the wetter and cooler upper portions of the tributaries located outside of the Project Boundary, it is possible that suitable habitat exists to support some of the other RTE species covered by this BA (e.g., in addition to bull trout, spring Chinook salmon, and steelhead). However, as further discussed in Section 4 – Species Analysis, there are no known species records or core habitat areas identified for any of the non-aquatic species covered in this BA in the upper reaches of the Methow and Okanogan rivers that have the potential to be affected by the Wells Project.

3.3.3 Critical Habitat Designations in Tributaries Outside of the Wells Project

Critical habitat was designated for the UCR summer-run steelhead ESU by NMFS on September 2, 2005 (70 FR 52630). Critical habitat outside the Wells Project Boundary includes the accessible portions of the Methow River Basin, and the accessible portions of the Okanogan River basin, excluding the Colville Reservation and Salmon Creek (NOAA 2006).

The accessible portions of the Methow River are also included in the critical habitat designations for spring Chinook and bull trout (70 FR 52731; 75 FR 63898). No other critical habitats are known to occur within the vicinity of the upper portions of the Methow and Okanogan rivers outside of the Wells Project Boundary (USFWS 2008).

3.3.4 Tributary Features that May be Affected by the Proposed Action

Relicensing of the Wells Project would result in a continuation of current conditions and is not expected to introduce new adverse environmental effects, particularly on areas outside of the Project Boundary such as the upper portions of Methow and Okanogan rivers and Foster Creek. Continuation of Wells HCP implementation, in particular tributary habitat improvements funded through the Tributary Fund, is likely to positively affect tributary habitat conditions for bull trout, steelhead, and spring Chinook salmon. Hatchery operations are conducted to assist in the recovery of naturally spawning anadromous fish populations.

3.4 HATCHERY PROGRAM FEATURES OUTSIDE OF THE PROJECT BOUNDARY THAT MAY AFFECT LISTED SPECIES

The Douglas PUD Hatchery Program is designed to mitigate for the construction and continuing impacts to anadromous fish, including UCR spring Chinook and steelhead. To meet production goals, Douglas PUD owns and provides funding for the operation and maintenance, and monitoring and evaluation, of two hatchery facilities: the Wells Hatchery and the Methow Hatchery. Douglas PUD also provides funding and support toward the production of yearling summer/fall Chinook at the Carlton Acclimation Pond. All of these hatchery programs are funded by Douglas PUD and operated by WDFW.

The Wells Hatchery is located within the Project Boundary and has been previously discussed in this document; the other components of the District's hatchery programs are located outside of the Wells Project Boundary. The Douglas PUD Hatchery Program produces approximately 3 million juvenile salmon and steelhead annually that are released into the Methow, Okanogan and Columbia rivers.

3.4.1 Hatchery and Acclimation Pond Components

3.4.1.1 Wells Hatchery

The Wells Fish Hatchery is located within the Wells Project immediately adjacent to the Wells Dam on the west tailrace embankment; however, the Wells Hatchery does plant fish into the Methow and Okanogan rivers located upstream of the Project Boundary. Currently the Wells Hatchery produces compensation fish for both inundation and passage losses as described in the Wells HCP. The inundation compensation is related to Wells Project construction and includes the production of 300,000 yearling steelhead, 320,000 yearling summer Chinook and 484,000 subyearling summer Chinook. The passage loss compensation provided by the Wells Hatchery is currently set at 48,858 yearling steelhead. The steelhead raised at the Wells Hatchery are either transported and released by truck or acclimated in the Methow and Okanogan rivers outside the Project Boundary. The current steelhead program at Wells Dam also raises up to 80,000 smolts for Grant PUD to support compliance with their passage loss obligations. Currently no juvenile steelhead are released through the hatchery outfall channel.

Beyond planting steelhead into the tributaries outside of the Project, the Wells Hatchery does not affect ESA-listed species residing outside the Project Boundary. The surface water intake at the Wells Hatchery is screened.

3.4.1.2 Methow Hatchery

The Methow Fish Hatchery is located approximately 51 miles upstream of the mouth of the Methow River near the town of Winthrop, Washington. Construction of the hatchery was completed in 1992 and is the result of a long-term Fish Settlement Agreement dated October 1, 1990 to mitigate for passage losses at the Wells Project. In 2004, the Wells HCP was approved by the FERC and superseded the 1990 Settlement Agreement. As a result, the terms of the Wells HCP now guide activities at the Methow and Wells hatcheries. The Methow Hatchery produces yearling spring Chinook and is dedicated to enhancing spring Chinook salmon in the Methow, Twisp and Chewuch river basins. The Methow Hatchery consists of 12 covered production raceways, three covered adult raceways, a centralized incubation, early rearing, administrative and hatchery maintenance building, one on-site acclimation pond, a satellite acclimation pond on the Chewuch River, a satellite acclimation pond on the Twisp River, a brood stock collection weir on the Twisp, a brood stock collection trap on the hatchery outfall and three separate houses for hatchery personnel.

All 12 of the production raceways and the on-site Methow acclimation pond are equipped with an outlet channel to the Methow River for releasing juvenile spring Chinook. The Twisp Acclimation Pond is located at RM 11 on the Twisp River, and the Chewuch Acclimation Pond is located at RM 7 on the Chewuch River. All of the surface water

intakes for the Methow hatchery facilities are screened. The Methow Hatchery is owned by Douglas PUD and operated by WDFW. The current program raises up to 550,000 yearling spring Chinook each year with fish of equal numbers released at each of the three acclimation ponds. Douglas PUD's current passage loss obligation for spring Chinook is 61,071 smolts. The remaining 489,000 fish (89 percent of the program) are provided to Chelan PUD (288,000 smolts) and Grant PUD (201,000 smolts) to support compliance with their passage loss obligations. The Methow Hatchery is entirely dedicated to raising ESA-listed spring Chinook, and all programs implemented at the Methow Hatchery are covered by the Wells HCP and its associated regulatory instruments.

3.4.1.3 Carlton Acclimation Pond

The Carlton Satellite Facility is located on the Methow River downstream of its confluence with the Twisp River. The facility was constructed in 1990 and consists of one hypalon-lined rearing pond. The water supply is pumped from the Methow River using two 3,345 gpm pumps (Chelan PUD 2005). All water intake pipes are screened. The facility provides an acclimation and release location for Methow summer Chinook.

Douglas PUD's current passage loss obligation for summer/fall Chinook is 108,570 yearling smolts. Chelan PUD's Carlton hatchery program produces and releases all of these fish into the Methow River near Carlton. The remaining 291,000 smolts (73 percent of the program) are produced to meet Chelan PUD's passage loss obligations associated with the Rocky Reach and Rock Island HCPs. WDFW operates the program for Chelan PUD.

3.4.2 T & E Species Use of Hatcheries

The Wells Hatchery is dedicated to rearing and releasing summer Chinook, steelhead, and rainbow trout and the Methow Hatchery is dedicated to rearing and releasing yearling spring Chinook. In general, anadromous salmonids do not spawn within the Wells Project with the notable exception of summer/fall Chinook salmon that spawn in the Wells Tailrace and Wells Hatchery outfall (Douglas PUD 2006b). There are no bull trout hatchery facilities associated with the Wells Project; however, bull trout are known to opportunistically forage on outmigrating smolts in the Wells Hatchery outflow. All hatchery facilities are screened to prevent any potential entrainment.

3.4.3 Critical Habitat Designations in Hatcheries

There are no critical habitat designations assigned to hatcheries or rearing pools (USFWS 2008).

3.4.4 Impacts of Previous Actions on Species and Habitat in the Hatcheries

The effects of Douglas PUD's Hatchery Program are mostly beneficial in that the hatcheries serve to conserve and supplement imperiled populations of spring Chinook and steelhead. Hatchery programs are implemented specifically to mitigate for anadromous fish losses that are attributed to the operation of Wells Dam.

The Wells Hatchery is operated to provide compensation for both inundation and passage losses as described in the Wells HCP. The inundation compensation is related to Wells Project construction and includes the production of 300,000 yearling steelhead for inundation and 48,858 yearling steelhead for compensation for passage losses at the Wells Project (Douglas PUD 2006b). The Methow Hatchery program currently produces up to 61,071 yearling spring Chinook each year to compensate for passage losses at the Wells Project (Douglas PUD 2006b). Douglas PUD's Hatchery Program does not produce bull trout.

Juvenile project survival studies at Wells Dam have shown an average survival rate of 96.2 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). Thus, while hatchery operations may serve to supplement, and in some cases sustain anadromous salmonid populations, the current role of Project operation in determining whether the benefits of hatcheries are compensatory or additive, is uncertain (Douglas PUID 2006b). The HCP Hatchery Committee currently guides the operation and monitoring and evaluation of Douglas PUD's hatchery programs with the goal of determining whether or not the currently configured hatchery programs are adequately mitigating for Project impacts while supporting natural reproduction of spring Chinook and steelhead. According to Chapman et al. (1994b) the majority of the steelhead and spring Chinook are of hatchery origin, suggesting these groups of fish may not exist if not for hatchery operations. Results from the Okanogan also found that 99 percent of the smolt stage Chinook and 92 percent of the smolt stage steelhead were of hatchery origin (Colville 2008).

3.4.5 Hatchery Habitat Features that May be Affected by the Proposed Action

Relicensing of the Wells Project would result in a continuation of current conditions and is not expected to introduce new adverse effects on listed or candidate species or designated critical habitat.

4.0 SPECIES ANALYSIS

The following life history and Wells Project activity descriptions provide the foundation for assessing the potential effects of the proposed action. Based upon this information, a determination of potential effects of the proposed action on each species is made. For all fish species, the analysis includes both the effect (life history stage and/or habitat parameter), and the measure that may cause the effect, whether potentially negative or positive. The areas of effect that are addressed include:

- Spawning, incubation and larval development,
- Rearing and migration within the Project,
- Tributary rearing and migration (outside the Project Boundary),
- Passage through Project reservoir and facilities,
- Water Quality,
- Water Quantity, and
- Riparian Cover.

These effect areas provide both a full assessment of life history traits and needed resources for species persistence. In some cases, the effect area does not occur within the Project Boundary, but is still addressed to show completeness of research topics.

Within each of the effect areas, the proposed measures are discussed. The order of the proposed measures is consistent and represented by the Wells HCP (described in Section 2.5.1.1), ASA (described in Section 2.5.1.2), Terrestrial Resources Management Plans (described in Section 2.5.1.3), and the Off-License Settlement Agreement (described in Section 2.5.1.4). Not all measures are pertinent to each area of potential effect and in those cases are stated as not posing a potential effect. An effects matrix at the end of each species analysis summarizes both findings and conclusions.

Research identified little potential for terrestrial ESA species to occur in the area of potential effects; as a result a more brief assessment was undertaken, followed with a dichotomous decision-making assessment to clearly depict how conclusions were made regarding potential effects.

4.1 SPECIES LIST AND CONSULTATION

Lists maintained by the USFWS and NMFS identify a total of three fish species, five plants, and eleven wildlife species that are listed or candidates for listing under the ESA and may occur within the counties surrounding the action area (Douglas, Okanogan, and Chelan) (Table 4.1-1). This list is based upon comments provided by the USFWS on January 5, 2009 and comments provided by NMFS on January 16, 2009 (Exhibit E, Appendix E-11); and updated from USFWS county lists August 24, 2011 (http://www.fws.gov/wafwo/species_EW.html). All species potentially occurring in the

surrounding counties are addressed below. For each species, a description of regulatory status, life history, and presence in the Wells Project is provided, and an analysis of potential Wells Project effects is made. Effects analyses take into account Wells Project operations, management plans included as part of the proposed action, and the potential for the species to be present. If a species is not believed to have the potential to occur in the action area, a concise determination is made using the USFWS (1998b) designed effects determination dichotomous key. Species known to occur or potentially occurring are provided a more comprehensive assessment, including an effects matrix, to summarize potential effects and findings.

Table 4.1-1 ESA-listed species potentially occurring in Douglas, Okanogan, and Chelan Counties.

Listed Species	Scientific name	Listing Status	Listing Authority
Bull Trout	*Salvelinus confluentus*	Threatened	USFWS
Chinook Salmon (Upper Columbia River Spring-run ESU)	*Oncorhynchus tshawytscha*	Endangered	NMFS
Steelhead (Upper Columbia River DPS)	*Oncorhynchus mykiss*	Threatened	NMFS
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	USFWS
Greater Sage-Grouse (Columbia Basin DPS)	*Centrocercus urophasianus*	Candidate	USFWS
Fisher (West Coast DPS)	*Martes pennanti*	Candidate	USFWS
Pygmy Rabbit (Columbia Basin DPS)	*Brachylagus idahoensis*	Endangered	USFWS
Gray Wolf	*Canis lupus*	Endangered	USFWS
Grizzly Bear	*Ursus arctos horribilis*	Threatened	USFWS
Canada Lynx	*Lynx canadensis*	Threatened	USFWS
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	USFWS
Washington Ground Squirrel	*Spermophilus washingtoni*	Candidate	USFWS
Yellow-billed Cuckoo	*Coccyzus americanus*	Candidate	USFWS
Wenatchee Mountains Checkermallow	*Sidalcea oregana var. calva*	Endangered	USFWS
Showy Stickseed	*Hackelia venusta*	Endangered	USFWS
Ute Ladies'-tresses	*Spiranthes diluvialis*	Threatened	USFWS

Listed Species	Scientific name	Listing Status	Listing Authority
North American wolverine	*Gulo gulo luscus*	Candidate	USFWS
Whitebark pine	*Pinus albicaulis*	Candidate	USFWS
Northern wormwood	*Artemisia campestris ssp. borealis var. wormskioldii*	Candidate	USFWS

4.2 BULL TROUT

4.2.1 Life History

(The information in this section was provided by the USFWS and incorporated per request; Douglas PUD has not corroborated the references cited in this section.)

The coterminous United States population of bull trout was listed as threatened on November 1, 1999 (64 FR 58910). Bull trout occur from the Klamath River Basin of south-central Oregon and in the Jarbridge River in Nevada, north to various coastal rivers of Washington to the Puget Sound and east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (Cavender 1978, Bond 1992, Brewin and Brewin 1997, Leary and Allendorf 1997).

Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation and alterations associated with: dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (64 FR 58910).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (63 FR 31647, 64 FR 17110). The preamble to the final listing rule for the United States coterminous population of the bull trout discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the ESA relative to this species (64 FR 58910):

> Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their

> uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process.

Please note that consideration of the above recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with USFWS policy (USFWS 2006b).

The USFWS completed its initial five-year status review of bull trout with two recommendations: (1) Retain threatened status for the species as currently listed throughout its range in the coterminous United States for the time being and (2) evaluate whether distinct population segments (DPSs) exist and merit the Endangered Species Act's protection (USFWS 2005b, 2005c, 2008). The status review considered information that had become available since the time of listing. The analysis to determine whether distinct population segments exist is currently ongoing.

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as interim recovery units: 1) Jarbridge River; 2) Klamath River; 3) Columbia River; 4) Coastal-Puget Sound; and 5) St. Mary-Belly River. Each of these segments is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

The conservation needs of the bull trout are often expressed as the need to provide the four "C's": cold, clean, complex, and connected habitat. Cold stream temperatures, clean water that is relatively free of sediment and contaminants, complex channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well connected by unobstructed migratory pathways are all needed to promote conservation of bull trout at multiple scales ranging from the coterminous to local populations. The recovery planning process for the bull trout (USFWS 2002a; 2004a, 2004b, 2006a) has also identified the following conservation needs for the species: 1) maintain and restore multiple, interconnected populations in diverse habitats across the range of each interim recovery unit; 2) preserve the diversity of life-history strategies; 3) maintain genetic and phenotypic diversity across the range of each interim recovery unit; and 4) establish a positive population trend. Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each interim recovery unit (Dunham et al, 2003a; Rieman et al 2007).

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (USFWS 2002a, 2004a, 2004b, 2005a, 2006a). A core area is defined as a geographic area occupied by one or more local bull trout populations that overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat. Each of the interim recovery units listed above consists of one or more core areas. About 118 core areas are recognized across the United States range of the bull trout (USFWS 2002a, 2004a, 2004b, 2005a, 2006a).

The Columbia River recovery unit currently contains about 90 core areas and 500 local populations. The condition of the bull trout within all 90 core areas varies from poor to good but generally all have been subject to the combined effects of habitat degradation, fragmentation and alterations associated with one or more of the following activities: dewatering; road construction and maintenance; mining and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species. The draft Bull Trout Recovery Plan (USFWS 2002a) identifies the following conservation needs for this unit: maintain or expand the current distribution of the bull trout within core areas; maintain stable or increasing trends in bull trout abundance; maintain/restore suitable habitat conditions for all bull trout life history stages and strategies; and conserve genetic diversity and provide opportunities for genetic exchange. Nineteen local populations, proximal to the Wells Project, were identified in the Methow (10), Wenatchee (7), and Entiat (2) core areas (USFWS 2002a).

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993). Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs (Fraley and Shepard 1989, Goetz 1989). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989, Goetz 1989), or saltwater (anadromous) to rear as subadults or to live as adults (Cavender 1978, McPhail and Baxter 1996, WDFW 1997). Bull trout normally reach sexual maturity in 4 to 7 years, may live longer than 12 years and can be found up to 20 years old in Canada (Goetz 1989). They are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 1982, Fraley and Shepard 1989, Pratt 1992, Rieman and McIntyre 1996). Some bull trout may spawn less frequently (e.g., 17 of 27 radio tagged bull trout spawned in 1 year, 5 of 27 in two years, and 1 of 27 in 3 years), based on telemetry data (B. Kelly-Ringel, USFWS pers. comm. 2001, Kelly-Ringel and De La Vergne 2008). Downs et al. (2006) describes that in Tresle Creek, in Lake Pend Oreille, Idaho a larger number of bull

trout spawn annually and that repeat spawners only comprise a portion of that number, documenting a 2:1 ratio of annual repeat spawners to alternate year spawners.

Growth varies depending upon life-history strategy. Resident adults range in total length from 6 to 12 inches (14-30cm), and migratory adults commonly reach 24 inches (60 cm) or more (Goetz 1989). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982).

Mortality rates of bull trout life history stages can be high; however, these rates decrease as the size of the fish increases. Egg survival can decrease with stream temperatures and alterations in habitat conditions (USFWS 1998, Pratt and Huston 1993). Egg to fry survival may vary between 3% to 50% depending on speed of growth, age at maturity, and fecundity (Rieman and McIntyre 1993). Fecundity may vary from less than 100 eggs in resident forms to greater than 5,000 eggs in migratory forms (Reiman and McIntyre 1993, Goetz 1989).

Sizes of bull trout vary widely depending on geography, and are likely due to a variety of factors, although water temperatures and diet are thought to play a large role (Pratt 1992, Goetz 1989, Rieman and McIntyre 1993, USFWS 1998). Age and size classification of the migratory bull trout life history form are generally defined as: juveniles: 0-3 years old and ranging in size from less than 1 to about 5 inches (2-13cm) in total length; subadults: 3-4 years old and ranging in size from 5 to13 inches (13 to 33cm) in total length; and migratory adults: 4+ years old and greater than 13 inches (33cm) in total length (pers. comm., S. Spalding, Service, 2006; Goetz 1989; Pratt 1992; Reiman and McIntyre 1993; Kramer 2003; McPhail and Baxter 1996).

Bull trout require year-round, two-way passage, both up and downstream, not only for repeat spawning but also for foraging, rearing, and overwintering. Most fish ladders, however, were designed specifically for anadromous semelparous (fishes that spawn once and then die, and therefore require only one-way passage upstream) salmonids. Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Baxter and Hauer 2000; Fraley and Shepard 1989; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Howell and Buchanan 1992; Pratt 1992; Rieman and McIntyre 1993, 1995; Rich 1996; Watson and Hillman 1997). Watson and Hillman (1997) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy

distribution, even in pristine habitats (Rieman and McIntyre 1993), fish should not be expected to simultaneously occupy all available habitats (Rieman et al.1997a).

Migratory corridors are necessary to link seasonal habitats for all bull trout life history forms (USFWS 1998). The ability to migrate is important to the persistence of the bull trout (Rieman and McIntyre 1993; Rieman et al. 1997). Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray, to non-natal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants. However, it is important to note that the genetic structuring of bull trout indicates that there is limited gene flow among bull trout populations, which may encourage local adaptation within individual populations, and that reestablishment of extirpated populations may take a very long time (Spruell et al. 1999, Rieman and McIntyre 1993).

Cold-water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams (below 59°F), and spawning habitats are generally characterized by temperatures that drop below 48°F in the fall (Fraley and Shepard 1989, Pratt 1992, Rieman and McIntyre 1993).

Thermal requirements for the bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, Rieman and McIntyre 1993, Baxter and McPhail 1997, Rieman et al. 1997a). Optimum incubation temperatures for bull trout eggs range from 35° to 39°F whereas optimum water temperatures for rearing range from about 46° to 50°F (McPhail and Murray 1979, Goetz 1989, Buchanan and Gregory 1997). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46° to 48°F, within a temperature gradient of 46° to 60°F. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003b) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 0.75) until maximum temperatures decline to 52° to 54°F.

All life history stages of the bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Fraley and Shepard 1989, Goetz 1989, Hoelscher and Bjornn 1989, Sedell and Everest 1991, Pratt 1992, Thomas 1992, Rich 1996, Sexauer and James 1993, Watson and Hillman 1997). Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1993). These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may

decrease survival of eggs and young juveniles in the gravel from winter through spring (Fraley and Shepard 1989, Pratt 1992, Pratt and Huston 1993).

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel (Fraley and Shepard 1989). Redds are often constructed in stream reaches fed by springs or are near other sources of cold groundwater (Goetz 1989, Pratt 1992, Rieman and McIntyre 1996). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992), and after hatching, juveniles remain in the substrate. Time from egg deposition to emergence of fry may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows (Pratt 1992, Ratliff and Howell 1992).

Less is known about how TDG affects bull trout. The USFWS consultation with EPA (USFWS 2008b) requires the following standards be met to protect salmonids in the mainstems of the Snake and Columbia Rivers: (1) TDG must not exceed an average of one hundred fifteen percent (115%) as measured in the forebays of the next downstream dams and must not exceed an average of one hundred twenty percent (120%) as measured in the tailraces of each dam (these averages are measured as an average of the 12 highest consecutive hourly readings in any one day, relative to atmospheric pressure); and (2) A maximum TDG 1-hour average of one hundred twenty-five percent (125%) must not be exceeded during spillage for fish passage.

Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, and small fish (Boag 1987, Goetz 1989, Donald and Alger 1993). Adult migratory bull trout feed on various fish species (Leathe and Graham 1982, Fraley and Shepard 1989, Donald and Alger 1993). In coastal areas of western Washington, bull trout feed on Pacific herring (*Clupea pallasi*), Pacific sand lance (*Ammodytes hexapterus*), and surf smelt (*Hypomesus pretiosus*) in the ocean (WDFW 1997).

Migration allows bull trout in Washington to access optimal foraging areas and exploit a wider variety of prey resources. Bull trout likely move to or with a food source. For example, some bull trout in the Wenatchee basin, in Washington, were found to consume large numbers of earthworms during spring runoff in May at the mouth of the Little Wenatchee River where it enters Lake Wenatchee (Kelly-Ringle and De La Vergne 2008). In the Wenatchee River, radio-tagged bull trout moved downstream after spawning to the locations of spawning Chinook and sockeye salmon and held for a few days to a few weeks, possibly to prey on dislodged eggs, before establishing an overwintering area downstream or in Lake Wenatchee (Kelly-Ringle and De La Vergne 2008).

4.2.2 Presence in Action Area

Two sets of studies have provided the majority of the information on bull trout migratory behavior in the mid-Columbia River. The first study was the 2001-2004 mid-Columbia radio telemetry study undertaken by the three mid-Columbia PUDs (Chelan, Grant, and Douglas PUD) to evaluate the movement and status of bull trout in their respective project areas at the request of the USFWS. The goal of the study was to monitor the movements and migration patterns of adult bull trout in the mid-Columbia River using radio telemetry. From 2001 to 2003, bull trout were collected from the Wells, Rocky Reach, and Rock Island dams, radio-tagged, and monitored through 2004. The second series of studies took place during 2005-2008 and were associated with the implementation of the BTMMP. The goals of the 2005-2008 studies included the measurement of incidental take for migratory and sub-adult bull trout passing through the Wells Project and the collection of stock identification information from the Methow River.

Following the FERC's approval of the Wells HCP in 2004, the Wells Project BTMMP was developed in 2005. The BTMMP was prepared and implemented to meet monitoring requirements stipulated in a USFWS BO (USFWS 2004c) regarding implementation of the Wells HCP. The goal of the Wells Project BTMMP was to identify, develop, and implement measures to monitor and address potential Wells Project-related impacts on bull trout associated with the operations of the Wells Project and associated facilities (Douglas PUD 2004). One component of the plan was to conduct additional telemetry assessments from 2005 through 2008 which provided additional telemetry information on bull trout movements in the Wells Project and documents rates of incidental take associated with the operation of Wells Dam (LGL and Douglas PUD 2008). Through the implementation of the strategies outlined in the BTMMP, six years of tagging, and eight years of monitoring, Douglas PUD has not identified any project-related impacts to adult or sub-adult bull trout from passage through the Wells Project, nor by stranding/entrapment due to lowering of the reservoir elevation. Douglas PUD has also determined there are no apparent correlations between Project operations and downstream passage events, and that there is no upstream movement of adult bull trout through the Wells Dam fishways during the off-season period of November 16 through April 30. Bull trout captured and tagged at Wells Dam were radio-tracked to the Methow and Entiat Core Areas during spawning periods, and have also demonstrated movement between these systems by successfully passing upstream or downstream through Wells Dam (LGL and Douglas PUD 2008).

Results of the telemetry studies identified several notable bull trout life history characteristics. Within the mid-Columbia Basin, bull trout utilized the mainstem Columbia River as a migratory corridor as data indicated that tagged fish passed through the mid-Columbia projects (BioAnalysts, Inc. 2004). This establishes that bull trout may be in the mainstem Columbia River (i.e., Wells Reservoir) throughout the year.

Within the Wells Project area, the majority of radio-tagged bull trout were destined for the Twisp and Methow rivers located upstream of Wells Dam, however some fish also migrated into the Entiat River, which is located downstream of Wells Dam. Most of the radio-tagged bull trout passed Wells Dam during the months of May and June (BioAnalysts, Inc. 2004). Adults generally concluded spawning in the Methow by late October; some bull trout were observed returning to Wells Reservoir by mid-December. Bull trout did not select the Okanogan River system in both telemetry studies (one bull trout entered the Okanogan for a short period before leaving to enter the Methow system).

In addition to telemetric assessments, bull trout have been observed and counted during passage at Wells Dam since 1998. Bull trout upstream passage in Wells Project fish ladders is monitored from May 1 through November 15. In recent years, Douglas PUD has initiated an experimental winter count for bull trout (November 16 through April 30). To date no bull trout have been observed in the fish ladders during the experimental winter monitoring period. Counts of bull trout from 2000 through 2008 are presented below for the Wells Project and two additional downstream projects (Table 4.2.1-1). The table shows the relatively small number of bull trout passing over Wells Dam as compared to the counts at Rocky Reach Dam.

Table 4.2.1-1 Tabulated Summary of Bull Trout Passage Up Adult Fish Ladders at Three mid-Columbia Projects (CBFAT 2009).

Project	Year											Total	Avg.
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		
Rocky Reach	83[1]	128[1]	216[1]	204	194	246	161	155	142	77	100	1279	155
Rock Island	67	61	87	82	84	102	114	69	35	46	36	783	71
Wells	17	49	93	108	76	53	47	49	100	65	43	700	64

[1] Unpublished data (Chelan PUD 2003)

4.2.3 Critical Habitat Designations

On September 26, 2005, the USFWS designated critical habitat for bull trout populations within the Columbia River and other locations. At that time, no critical habitat for bull trout was designated in the Columbia River drainage in or near the Wells Project. On September 30, 2010, the USFWS revised the designated critical habitat for bull trout. Newly designated critical habitat includes all of the Wells Project waters except the Okanogan River (75 FR 63898). Outside of the Wells Project Boundary, the accessible portions of the Methow River Basin are included in the critical habitat listed for bull trout (75 FR 63898).

4.2.4 Environmental Measures and Analysis of Effects

On July 30, 1998, Douglas PUD submitted an unexecuted form of an Application for Approval of the Wells HCP to the FERC and to NMFS. To expedite the FERC's formal consultation, biological evaluations of the effects of implementing the Wells HCP on listed species under the jurisdiction of the USFWS were prepared by Douglas PUD.

In a letter to the FERC, the USFWS requested consultation under Section 7 of the ESA regarding the effects of hydroelectric project operations on bull trout in the Columbia River (letter from M. Miller, USFWS, to M. Robinson, FERC, dated January 10, 2000). The request for consultation was based on observations of bull trout in the study area. In its reply to the USFWS, the FERC noted that there was virtually no information on bull trout in the mainstem Columbia River.

On November 24, 2003, Douglas PUD filed an application for approval of the executed Wells HCP. The 2004 application for approval replaced the 1998 application with the executed form of the Wells HCP.

On December 10, 2003, the USFWS received a request from the FERC for formal consultation to determine whether the proposed incorporation of the Wells HCP into the FERC license for operation of the Wells Project was likely to jeopardize the continued existence of the Columbia River DPS of ESA-listed bull trout, or destroy or adversely modify proposed bull trout critical habitat. In response to the FERC request, the USFWS submitted a BO and issued an ITP to Douglas PUD. The FERC incorporated the USFWS bull trout reasonable and prudent measures (RPM) and terms and conditions into the existing Wells Project license, which are represented as license articles 61, 62, and 63.

Article 61 of the license required Douglas PUD to file with the FERC a Bull Trout Plan for implementing the USFWS bull trout RPMs and terms and conditions, which were designed to monitor and limit bull trout take associated with Wells Project operations. Article 61 further required that Douglas PUD prepare the Bull Trout Plan in consultation with the USFWS, NMFS, WDFW, and interested Indian Tribes (Colville and Yakama). Following consultation with these stakeholders, on February 28, 2005, Douglas PUD filed with the FERC the Wells Project BTMMP, 2004-2008 (Douglas PUD 2004). The BTMMP was approved by the FERC on April 19, 2005.

Article 62 of the license requires Douglas PUD to prepare and file with the FERC an annual report describing the activities required by the BTMP. On March 26, 2008 Douglas PUD, with approval from USFWS, filed a request for an extension of time to submit the 2007 annual bull trout monitoring report and to consolidate the 2007 annual report with the final bull trout monitoring report, required to be filed with the FERC by December 31, 2008. On April 16, 2008, the FERC issued an order granting this request. This document summarizes all data collected to meet the BTMMP objectives over the

required monitoring period from 2005 to 2008 and is the final monitoring report. This final monitoring report completes radio-telemetry tagging and monitoring objectives outlined in the USFWS bull trout RPMs and terms and conditions, and the Wells Project license articles 61 and 62.

Article 63 was a reservation of authority by the FERC to require the licensee to carry out specified measures for the purpose of participating in the development and implementation of a bull trout recovery plan.

As required by the new license article, Douglas PUD, in concert with the USFWS, developed and implemented the BTMMP for the Wells Project (Douglas PUD 2004). The BTMMP addressed the RPM's defined by the USFWS above.

The BTMMP was intended to monitor and evaluate bull trout presence in Wells Project, quantify incidental take and address, to the extent feasible, potential Project-related impacts on bull trout from Wells Project operations and facilities. Implementation of the BTMMP began in May 2005 and will continue through the existing license term. The specific objectives of the BTMMP are:

Objective 1: Monitor adult upstream and downstream passage at Wells Dam and implement appropriate management plans to monitor any incidental take of bull trout through the use of telemetry studies, analysis of passage timing with operational data, and monitoring of off-season bull trout passage through the adult fishway;

Objective 2: Assess Wells Project-related impacts on upstream and downstream passage of sub-adult bull trout through Passive Integrated Transponder (PIT) tagging and off-season passage monitoring;

Objective 3: Investigate the potential for sub-adult entrapment or stranding in off-channel or backwater areas of Wells Reservoir through the evaluation of reservoir elevation and bathymetric data;

Objective 4: Identify the Core Areas and Local Populations, as defined in the Service's Draft Bull Trout Recovery Plan, of those bull trout that utilize the Wells Project area.

In early 2009, Douglas PUD completed the development of a new BTMP which details monitoring and management activities for bull trout during a new license. The BTMP is part of the Aquatic Settlement Agreement for the relicensing of the Wells Project. The goal of the BTMP is to identify, monitor, and address impacts, if any, to bull trout resulting from the Wells Project in a manner consistent with the USFWS Bull Trout Recovery Plan and the terms of the Section 7 ITS. The BTMP is intended to continue the implementation of management activities to protect bull trout during the new license term in a manner consistent with the original BTMMP implemented from 2005 to 2008 (Douglas PUD 2004). The PMEs presented within the 2009 BTMP are founded upon information collected from 2001 to 2008 and designed to meet the following objectives:

Objective 1: Operate the upstream fishways and downstream bypass systems in a manner consistent with the Wells HCP;

Objective 2: Identify any adverse Wells Project-related impacts on adult and sub-adult bull trout passage;

Objective 3: Implement reasonable and appropriate options to modify upstream fishway, downstream bypass, or operations if adverse impacts on bull trout are identified and evaluate the effectiveness of these measures;

Objective 4: Periodically monitor for bull trout entrapment or stranding during low Wells Reservoir elevations;

Objective 5: Participate in the development and implementation of the USFWS Bull Trout Recovery Plan including information exchange and genetic analysis. Should bull trout be delisted, the Aquatic SWG will re-evaluate the needs and objectives of the BTMP;

Objective 6: Identify any adverse impacts of Wells Project-related hatchery operations on adult and sub-adult bull trout.

This BTMP is intended to be compatible with other bull trout management plans and the Upper Columbia Salmon Recovery Plan (UCSRP) in the mainstem Columbia River. Furthermore, this management plan is intended to not conflict with other management strategies of federal, state and tribal natural resource management agencies and supportive of designated uses for aquatic life under WAC 173-201A, of the Washington State WQS. The plan addresses the critical life history needs of bull trout and is consistent with the USFWS critical habitat determination for the Project.

4.2.4.1 Spawning, Incubation, and Larval Development

Telemetry studies indicate that bull trout utilizing Wells Reservoir spawn in the mainstem Twisp River and upper mainstem Methow River more than 50 miles and 1,500 ft MSL in elevation above the Wells Project Boundary (BioAnalysts, Inc., 2004; BioAnalysts, Inc. 2006). Literature and investigative research did not locate any report documenting spawning habitat within the Wells Project Boundary. Migratory bull trout have been observed passing upstream through Wells Dam in the spring and summer with peak counts in late May and early June. The majority of tagged fish move into the Methow River by the end of June (BioAnalysts, Inc., 2004). For migratory life history types, juveniles rear in tributary streams for 1 to 4 years before migrating downstream into a larger river or lake to mature (Rieman and McIntyre 1993).

Since spawning activity occurs outside of the Project Boundary, no effect on spawning, incubation or larval development was identified for any of the proposed measures.

4.2.4.2 Rearing and Migration Within the Project

Bull trout have the potential to occur in Wells Reservoir year round. The Wells Reservoir provides a migration corridor, foraging opportunities, rearing habitat, and a relatively stable overwintering area compared to potentially dynamic tributary habitat. During residency within the reservoir the potential for Wells Project operations to have an impact on bull trout may occur by stranding/entrapment due to lowering of the reservoir elevation.

To address the potential for stranding or entrapment, the third objective of the BTMMP required an investigation of off-channel or backwater areas of Wells Reservoir during low reservoir elevations from 2005 through 2008. Field surveys were conducted at potential bull trout stranding sites during reservoir elevations below 774 ft MSL in 2006 and 2008. The stranding sites were identified by assessing high resolution bathymetric information, aerial photography, reservoir elevations, backwater curves, and inflow patterns. The result of the investigations did not identify any bull trout stranding. Surveys were planned in 2005 and 2007, but river operations were not low enough to warrant a survey.

Habitat Conservation Plan

Section 4.3.3 of the Wells HCP requires Douglas PUD to implement a targeted northern pikeminnow, piscivorous bird and piscivorous mammal harassment and control program with the goal of reducing the level of predation upon salmonids migrating through the Wells Project. However, the pikeminnow removal program may also result in the harassment, incidental capture and potential mortality of bull trout.

Northern pikeminnow are native predators of juvenile bull trout. The Northern Pikeminnow Removal Program (NPRP) included a northern pikeminnow bounty program, participation in fishing derbies and tournaments, hook and line fishing by experienced anglers and the use of longline fishing equipment. Currently only longline fishing is being utilized in the Project.

There is a potential for individual bull trout to be caught during northern pikeminnow longline angling. From inception in 1995 through 2007 Douglas PUD's NPRP has captured over 154,000 northern pikeminnow. During that time no bull trout have been incidentally captured during longline fishing.

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 species specifically. Captured bull trout from hook and line sampling were immediately released. Douglas PUD no longer uses angling removal for predator control in the Wells Project.

More recently (2000-present), the NPRP has shifted to a longline fishing system. This new system has proven to be more cost efficient and effective at targeting northern pikeminnow. Longline fishing gear has a low probability of catching bull trout 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 the incidental catch rate of bull trout by longline fishing has been zero.

The NPRP is implemented to benefit listed Columbia River salmonids. The operation of the program is likely to benefit bull trout by increasing juvenile salmonids in the mainstem Columbia, a forage base for bull trout. Increased survival of salmonids will increase the distribution of ocean nutrients into the upper reaches and tributaries of the Columbia River when these fish return from the ocean to spawn and die. The removal of northern pikeminnow is also likely to reduce predation on juvenile adfluvial bull trout entering the mainstem Columbia as they migrate out of their natal tributaries. Pikeminnow removal is also expected to benefit bull trout rearing in the reservoir by reducing competition for prey.

Other lesser threats to bull trout include predation by piscivorous birds and mammals. The focus of managing these species is not removal but hazing and access deterrents. Hazing includes propane cannons, pyrotechnics and the physical presence of hazing staff. Access deterrents include steel wires across the hatchery ponds and tailrace, fencing and covers for hatchery ponds, and electric fencing. When hazing and access deterrents fail, options for removal are also implemented by the US Department of Agriculture (USDA) Animal Control staff hired to conduct the hazing programs. The minor increase in human activity as a result of the avian and mammal predator control measures is unlikely to

adversely affect bull trout. Similar to pikeminnow removal, the reduction in predation on salmonids will likely increase the prey base for foraging bull trout.

In Section 4.5.1 of the ASA, Douglas PUD states that if incidental take from the Predator Control Program exceeds allowable levels, Douglas PUD will develop a new plan with the HCP Coordinating Committee and the Aquatic SWG. This plan will address factors contributing to the exceedance and seek a resolution.

Aquatic Settlement Agreement

The ASA includes implementation of the WSMP.

Indirect causes of increased predation may result from the enhancement of white sturgeon which may consume sub-adult bull trout. However, sub-adult bull trout have not been detected in the Wells reservoir, and white sturgeon are not known to use reaches of the Project tributaries above Project Boundary, therefore, spatial separation may preclude significant predation. Douglas PUD is required in its WSMP to enhance white sturgeon populations through artificial propagation. The increased number of sturgeon may result in an elevated potential for predation. The WSMP has provisions for adaptive management of supplementation activities should conflicts develop between stocked sturgeon and ESA-listed species. The WSMP 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 Section 4.5.1 of the ASA, Douglas PUD states that if incidental take exceeds allowable levels as a result of the implementation of other Aquatic Resource Management Plans, Douglas PUD will develop a new plan with the Aquatic SWG. This plan will address factors contributing to the exceedance and seek a resolution.

Terrestrial Resources Management Plans

No potential effects were identified.

Off License Agreement

No potential effects were identified.

4.2.4.3 Tributary Rearing and Migration

Activities associated with the operation of the Wells Project also take place in upper portions of the tributaries above the Project Boundary.

Habitat Conservation Plan

The two primary activities influencing the tributaries outside of the Project Boundary relate to requirements in the TCP and the Hatchery Compensation Plan. These two guiding documents establish necessary activities for Douglas PUD to maintain habitat and artificially enhance existing salmonid populations per obligations identified in the Wells HCP. Activities within these programs are intended to benefit the overall aquatic ecosystem, but may result in some short-term effects to bull trout.

Tributary Conservation Plan

The TCP found in Section 7 of the Wells HCP 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 Account 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 on bull trout may occur resulting from implementation of actions funded by the TCP. Because of the diverse nature of habitat improvement actions funded by the TCP, separate Section 7 consultations are initiated for actions associated with the TCP.

The Tributary Committee, comprised of various fisheries agencies and the Tribes, will be 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 USFWS representative on the Tributary Committee ensures that any take resulting from these activities is minimized to the extent practical.

The TCP funded by Douglas PUD provides money to fund third party conservation efforts in the Methow and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or lands in fee are submitted to the Tributary 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 on a long-term basis) conservation easements to protect or restore important aquatic habitat and shoreline areas. To date, most of the funding allocated through this plan has been focused on purchasing conservation easements, removing dikes and levees in order to restore natural river channel process, reconnecting side channels and oxbow habitats and fixing culverts to restore connectivity to properly functioning habitat.

The Tributary Committee will decide if the projects meet criteria for funding. Restoration and improvement projects have to be reviewed by state and federal agencies to receive permits for construction. Habitat preservation and conservation projects will likely benefit bull trout through the protection of critical habitat found within the Methow River bull trout core areas (75 FR 63898). Projects that may increase instream flow volume in the Methow Basin will benefit all life stages of bull trout 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 long-term positive benefits for bull trout through the protection and enhancement of aquatic habitat and removal of migration barriers.

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, temporary increases in sediment loads and turbidity, etc.) as a result of funding projects in the Methow River. In-stream projects having the potential to disturb bull trout or bull trout habitat will be required to go through a separate ESA Section 7(a)(2) consultation and authorization of incidental take of ESA-listed Permit Species.

In the long-term, any actions designed to remove migration barriers, stabilize stream channels and restore hydraulic equilibrium, increase riparian canopy cover, or increase base flows are expected to far outweigh small short-term impacts and result in beneficial effects for bull trout.

Hatchery Compensation Plan

The operation of hatchery enhancement activities has the potential to create both positive and negative results for bull trout.

The Hatchery Compensation Plan, as described in Section 8 of the Wells HCP, was established to provide hatchery compensation for up to 7 percent unavoidable juvenile passage losses of Plan Species passing through Wells Dam. The goal of the program is to utilize hatchery produced fish to replace unavoidable losses in such a manner that the hatchery fish produced contribute to the rebuilding and recovery of naturally reproducing populations of Plan Species, in their native habitats, while maintaining the genetic and ecological integrity of each stock of Plan Species. Supporting harvest, where appropriate, was also identified as a goal of the Hatchery Compensation Plan.

Actions associated with the Hatchery Compensation Plan are expected overall to be a benefit to bull trout. These activities provide an enhancement of listed and unlisted anadromous salmonids in the Methow and Columbia rivers. Bolstering salmonid populations will indirectly benefit bull trout populations by increasing densities of important prey items (smolts) in both tributary and mainstem habitats.

A direct example of bull trout exploiting Wells Project operations is the notable usage of the Wells Hatchery outfall. The 2001 to 2004 telemetry study suggested that bull trout frequented the outfall in search of prey (BioAnalysts, Inc. 2006). Typical operation at the hatchery is to volitionally release yearling Chinook smolts between 15 and 30 April, and subyearling Chinook smolts in early June. These smolts migrate downstream through the hatchery outfall channel system and then enter the Columbia River. During the 2001 study period, bull trout were observed at the hatchery outfall between 17 May and 27 June. In 2002, detections occurred between 3 June and 20 June. Large numbers of smolts were routinely observed during the period when the bull trout frequented the outflow (Shane Bickford, Douglas PUD, personal communication). Given that bull trout feed opportunistically (Goetz 1989), it is likely that the tagged bull trout were taking advantage of the large concentration of juvenile salmonids within the hatchery outfall system.

Another additional indirect benefit of the Hatchery Compensation Plan for bull trout may occur in both mainstem and tributary habitats as a result of enhanced nutrient availability due to an increased number decaying anadromous fish. Anadromous salmonids are highly important to the nutrient and trophic status of spawning tributaries (Kline et al. 1994; Bilby et al. 1996). By providing a conduit for nutrient transfer from ocean environments, salmon make significant nutrient contributions to the aquatic and terrestrial ecosystems of streams where they spawn (Bilby et al. 2003). The increase in primary and secondary productivity resulting from higher adult salmon returns in bull trout rearing streams may result in greater survival for juvenile bull trout.

One potential negative effect from the hatchery operations could include reduced water quality at the hatchery outfall. Water quality at each facility operates under a National Pollutant Discharge Elimination System (NPDES) permit which specifies discharge requirements, in accordance with finfish culture specifications. The USEPA has delegated responsibility to administer the NPDES permit program to the state of Washington on the basis of RCW 90.48, which defines Ecology's authority and obligations in administering the discharge permit program. Washington has issued a general state NPDES permit, renewed in April, 2000, that sets wastewater limits and sampling requirements for use of fish treatment drugs and chemicals. The permit is subject to revision and renewal every five years, with the next renewal due in 2010. No effects on bull trout are anticipated from water withdrawal or aquaculture practices associated with the Wells and Methow hatcheries and associated rearing facilities.

Another possible effect to bull trout may occur at the Twisp Weir where brood stock trapping occurs. As identified in the BTMP of the ASA, Douglas PUD will address this issue through the assessment of upstream and downstream passage and incidental take of adult, migratory bull trout at off-Project (outside of the Wells Project Boundary) adult salmon and steelhead brood stock collection facilities associated with the Wells HCP. Specifically, beginning in year one of a new license, Douglas PUD will conduct a one-year radio-telemetry study to assess passage and incidental take at off-Project adult collection facilities (i.e., Twisp weir). Douglas PUD will capture and tag up to 10 adult, migratory bull trout (>400 mm) at adult collection facilities and use fixed receiver stations upstream and downstream of collection facilities to examine upstream and downstream passage characteristics and incidental take. Study protocols that have been used during past radio-telemetry assessments at Wells Dam (LGL and Douglas PUD 2008) will be employed for this assessment.

If negative impacts to passage associated with off-Project collection facilities are observed or the authorized incidental take level is exceeded during any one-year period, Douglas PUD will conduct another monitoring study in the succeeding year. If negative impacts to passage continue to be observed or the authorized incidental take level is exceeded in this second year, Douglas PUD will develop a plan, in consultation with the Aquatic SWG, to address the identified factors contributing to passage impacts or the exceedance of the allowable level of incidental take.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.2.4.4 Adult Upstream Passage Through the Project Reservoir and Facilities

Habitat Conservation Plan

Wells Dam has two adult fish ladders, located on the east and west ends of the hydrocombine. These ladders are operated based upon measures identified within the Wells HCP. Bull trout utilize these ladders to pass upstream of the Wells Project. Each of the two fishways contains a single main entrance, a collection gallery, a fish ladder with PIT-tag monitoring stations, 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 (located on the west and east shores) 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 bull trout have not been observed passing Wells Dam (Douglas PUD 2008b).

Migratory bull trout have been observed passing upstream through Wells Dam in the spring and summer with peak counts in late May and early June. There have never been any observations from past year-round monitoring of bull trout passing upstream during out of season months (i.e. winter). The majority of tagged fish move back into the Methow River by the end of June (BioAnalysts, Inc., 2004; LGL and Douglas PUD 2008). During the six years of study and eight years of telemetry monitoring from 2001 through 2008, a total of 93 upstream passage events were detected at Wells Dam (79 of which occurred within one year of release and used in take calculations). Out of all 93 upstream passage events recorded, zero bull trout injury or mortality due to passage was observed at the Wells Project.

During the 2005 through 2008 study, 214 adult bull trout were counted passing upstream through Wells Dam. The proportion of the bull trout population at Wells Dam that was radio-tagged was 24 percent (52/214 = 0.24). The study found that Wells Project operations did not appear to influence the movements of adult bull trout. Instead, adult bull trout passage events appeared to be more closely associated with water temperature, photoperiod and time of year with rather predictable patterns of upstream and downstream movement.

Actively migrating bull trout may take additional time to pass through the Wells Dam, although no upstream or downstream passage problems were identified during the 2005 through 2008 study. Passage times upstream through the fishway appeared reasonable relative to the species migration and spawn timing.

Off-season or "winter" (November 16 to April 30) video monitoring of the Wells Dam fishways for adult and sub-adult bull trout was conducted during each of the years of this study including the winter of 2004 and 2005 as required by the BTMMP. Additional off-season counting took place during the winters of 2006, 2007, 2008 and 2009. To date, no adult or sub-adult bull trout have been observed utilizing the fishways at Wells Dam during the winter count season (LGL and Douglas PUD 2008).

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.2.4.5 Adult Downstream Passage Through the Project Reservoir and Facilities

The potential for adult bull trout to fallback is not a clear distinction when compared to other anadromous fishes. Fallback is defined as involuntary movement of a fish downstream past a dam once upstream passage has been achieved. Anadromous salmonids migrating upstream generally do not move downstream unless forced. In contrast, bull trout tend to meander both upstream and downstream to foraging opportunities creating a hazy dichotomy between volitional downstream passage and fallback. Telemetry studies have shown that bull trout have safely passed through spillways and turbines and to date no tagged fish have been injured or killed. Therefore,

movement downstream is not referred to as fallback, but rather downstream passage events.

During the six years of study and eight years of telemetry monitoring, a total of 27 downstream passage events took place at Wells Dam, 19 of which occurred within one year of release and used in take calculations. Radio-tagged bull trout passed downstream through the turbines or spillways as no downstream passage events were recorded via the fishways. Out of all the downstream passage events recorded, zero bull trout injury or mortality was observed at the Wells Project.

Habitat Conservation Plan

Operation of the downstream passage facilities for bull trout will be consistent with bypass operations for Plan Species identified in the Wells HCP. Currently the bypass system is operated from April 12 through August 26 of each year. This operating period is consistent with the period of high bull trout and anadromous fish presence at the Wells Project (Douglas PUD 2008b).

Douglas PUD will continue to operate the upstream fishway and downstream bypass at Wells Dam in accordance with the Wells HCP. However, if upstream or downstream passage problems for bull trout are identified (as agreed to by the USFWS and Douglas PUD), Douglas PUD, through the implementation of the BTMP, will identify and implement, in consultation with the Aquatic SWG and HCP Coordinating Committee, reasonable and appropriate options to modify the upstream fishway, downstream bypass, or operations to reduce the identified impacts to bull trout passage (Douglas PUD 2008b).

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.2.4.6 Sub-adult Passage

The second objective outlined in the BTMMP includes an assessment of Project-related impacts on upstream and downstream passage of sub-adult bull trout (fish <400 mm in length) through PIT tagging and off-season passage monitoring. During the development of the BTMMP, stakeholders agreed that because of the inability to collect a sufficient

sample size of sub-adult bull trout at Wells Dam, it was not feasible to assess sub-adult passage. However, when encountered at Wells Dam, or in tributary traps, sub-adult bull trout would be PIT tagged. Douglas PUD provided funding, equipment, training, and coordination for the sub-adult bull trout PIT tag program. From 2004 to 2008, 67 sub-adult bull trout were PIT tagged in the Methow River sub-basin during standard tributary smolt trapping operations. Douglas PUD operated PIT tag detection systems year-round within the Wells Dam fishways during the study period (2005 to 2008) and no PIT tagged sub-adult bull trout were detected. Additionally, sub-adult bull trout were to be PIT tagged opportunistically when encountered at the Wells Project; however, no sub-adult bull trout were encountered at Wells Dam during the study period.

No sub-adult bull trout were observed utilizing the fishways at Wells Dam during the 2004-2008 winter count seasons.

Habitat Conservation Plan

Water is purposely spilled through the JBS to facilitate fish outmigration. Constructed in 1989, the JBS utilizes five of eleven spillways equipped with constricting barriers to help guide juvenile migrating fish away from the turbines and through a safe passage route through the dam as required by the Wells HCP. The JBS is in operation annually from mid April until late August; consistent with the period of high bull trout and anadromous fish presence at the Wells Project. This configuration and operation timing 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, while maximizing fish passage and survival. The JBS has a passage efficiency rate of 92.0 percent for spring migrating salmon and steelhead and 96.2 percent for summer migrating Chinook salmon (Skalski 1993). Douglas PUD has conducted three years of juvenile survival studies at Wells Dam which have shown an average survival rate of 96.2 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). This is the highest survival rate for any dam on the Columbia or Snake rivers. It is reasonable to assume that the high survival rates shown for juvenile salmon and steelhead would be similar for juvenile bull trout.

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. Because juvenile bull trout are morphologically similar to anadromous salmonids it is expected that a similarly high proportion of juveniles, if present, would also utilize the JBS. The JBS is in operation annually from mid April until late August. This operating period is consistent with the period of high bull trout and anadromous fish presence at the Wells Project.

Douglas PUD operates the JBS each year to provide a non-turbine passage route through the dam for 95 percent of the spring and summer-run juvenile plan species outmigration. The procedures set forth in the Wells HCP are intended to guide the operating criteria for the JBS. This plan also includes specific operating criteria for the turbines and spillways sufficient to maximize fish use and survival through the JBS (USFWS 2004c). A more detailed description of JBS, spillway and turbine operations may be found in Section 4.3 and Appendix A of the Wells HCP.

Operation of the spillways may result in supersaturated levels of TDG. Supersaturated gases in fish tissues tend to pass from the dissolved state to the gaseous phase as internal bubbles or blisters. This condition, called gas bubble trauma (GBT) or gas bubble disease (GBD), can be debilitating or even fatal. Injury and mortality of bull trout may also occur as a result of contact with spillway structures. It is also likely that if juvenile bull trout pass through the spillway they may be subject to increased susceptibility to predation caused by disorientation or increased susceptibility to infection caused by scale loss or non-lethal wounds incurred during spillway passage (USFWS 2004c). While challenges exist, Chapman et al (1994a, b) concluded that spillways are currently the most benign routes for juvenile salmonids to pass the mid-Columbia River dams. 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).

Direct or indirect effects on adult and juvenile bull trout may occur as a result of downstream movement through turbines. These effects may include physical injury or mortality from contact with turbine structures including wicket gates, turbine runners, or the spiral case. Indirect effects may include increased susceptibility to predation caused by disorientation following turbine passage or increased susceptibility to infection caused by scale loss or non-lethal wounds incurred during turbine passage. However, based on radio-tracking studies at the Wells Dam, there has been no evidence that downstream passage via turbines has negatively affected bull trout (BioAnalysts, Inc. 2006).

Studies have not been conducted to determine the effects and survivability of passage by bull trout through Kaplan turbines. Turbine studies of other species have found that in general smaller fish survive at higher rates than larger fish (Eicher et al. 1987). All 27 downstream passage events of adult radio tagged bull trout that have been recorded at Wells Dam since the inception of telemetry studies occurred through the turbines or spillways as no downstream passage events were recorded via the fishways. Out of all the downstream passage events recorded, zero bull trout injury or mortality was observed at the Wells Project.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.2.4.7 Water Quality

Bull trout require specific water quality characteristics that include cool water with moderate to high levels of DO. 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). Studies have also demonstrated that the water found within the Wells Project is of high quality and is in compliance with the State WQS for all of the parameters measured. Notable exceptions to meeting the State WQS included seasonal exceedances in water temperature and TDG.

The mainstem Okanogan River within and above the Project Boundary is a relatively low gradient, broad channel that warms in the summer as water slowly moves near the confluence with the reservoir. However, below the SR 97 Bridge, there is significant mixing with Columbia River water. During the very hot summer months, releases from Chief Joseph Dam are significantly cooler than the very warm temperatures upstream in the Okanogan River and serve to lower the temperature of the lower portion of the river relative to non-inundated areas (WEST 2008). This area is not used by bull trout and poses little issue to migratory or foraging species. The few instances of relatively high water temperature within the mainstem reservoir were primarily a result of upstream releases of warm water from Grand Coulee and Chief Joseph dams.

Elevated TDG levels were identified in past studies in the tailrace of the Wells Dam. Each year from 2003-2008 during spring-runoff, Douglas PUD has undertaken spill tests to examine the relationship between water spilled over the dam and the production of TDG. These studies have helped Douglas PUD to modify spill operations and significantly reduce TDG in the Wells tailrace to levels that are in compliance with state water quality criteria for TDG during the fish passage season. Additional studies have also shown that passage survival at the dam is 96.2 percent for juvenile salmon and steelhead. This is the highest survival rate for any dam on the Columbia or Snake rivers and at the same time, the contribution to TDG levels downstream by the juvenile bypass system at Wells Dam is negligible (0-2 percent). Successful passage by juvenile and

adult anadromous salmonids suggests that water quality is not posing a notable risk to the survival of bull trout.

No effect was identified that related to any of the proposed measures.

4.2.4.8 Water Quantity

The quantity of water flowing through the Wells Project can create alterations to the reservoir environment that may affect bull trout. These alterations may include fluctuations in reservoir stage that may strand individuals in near shore habitat or possibly increase interaction with predators due to lower water volume.
The Wells Project is a run-of-river project meaning that average daily inflow equals daily outflow. As a result, the limited active storage capacity is only sufficient to regulate flow on a daily basis. Alterations in water volume or reservoir fluctuations are minimal and largely driven by the discharge of water from Chief Joseph Dam and Grand Coulee Dam. Typical operational fluctuations of the Wells Project are gradual, repetitive changes in reservoir stage that occur on a daily basis and generally result in reservoir elevation fluctuations of one to two ft (see Figure 2.3-1). During the five year operation period from 2001 through 2005, the reservoir has typically operated within the upper four ft (781 to 777 ft MSL in elevation) 95.1 percent of the time (DTA 2006). Further, no stranding was observed during stranding surveys for bull trout in 2006 and 2008 (DTA 2006).

No effect was identified that related to any of the proposed measures.

4.2.4.9 Riparian Cover

Riparian cover can provide important habitat for rearing sub-adult bull trout species. Significant riparian cover is found in riverine areas and is limited in lacustrine environments. In general, riparian cover is generally not sought after when bull trout initiate migratory behavior and reside within large rivers and lake systems more similar to the Wells Reservoir. Spawning and rearing habitat occurs in fluvial systems found within the upper Methow River which is outside of the action area and are not affected by the operation of the Wells Project.

The banks of the Wells Project offer limited riparian cover. This is largely a result of the typical lack of riparian cover in natural high desert ecosystems that define the Wells Project.

Habitat Conservation Plan

Additional funds provided by Douglas PUD for restoration measures occurring outside of the Wells Project are detailed in the TCP. Douglas PUD-funded projects will improve

habitat and potentially increase riparian cover. The potential for such riparian restoration to occur is contingent upon review and approval by the Wells HCP Tributary Committee.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.2.4.10 Critical Habitat

Bull trout critical habitat was designated by USFWS in 2005 (70 FR 56212). At that time, critical habitat for bull trout was not designated in the Wells Project. On September 30, 2010, the USFWS revised the designated critical habitat for bull trout. Newly designated critical habitat includes all of the Wells Project waters except the Okanogan River (75 FR 63898).

Habitat components important to bull trout that were generally identified by the USFWS in their determination in the Upper Columbia River basin include:

- juvenile rearing areas,
- juvenile migration corridors,
- areas for growth and development,
- adult migration corridors, and
- spawning habitat.

Within these habitat types, essential features include:

- adequate substrate,
- water quality,
- water quantity,
- water temperature,
- water velocity,
- cover/shelter,
- food,
- riparian vegetation,
- space, and
- safe passage conditions (65 FR 7764).

In a letter to the FERC dated August 5, 2011, the USFWS identified nine principle constituent elements (PCEs) required for bull trout as related to the Wells Project:

> 1) springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia; 2) migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers; 3) an abundant food base, including terrestrial organisms of riparian origin, aquatic macro invertebrates, and forage fish; 4) complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure; 5) water temperatures ranging from 2 to l5°C (36 to 59°F), with adequate thermal refugia available for temperatures that exceed the upper end of this range; 6) in spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival; 7) a natural hydro graph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph; 8) sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited; and 9) sufficiently lows levels of predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present are adequately temporally and spatially isolated from bull trout.

Subsequent to the 2010 designation, additional analsysis was conducted to address these PCEs. Section 4.2.4 of this document has been revised to provide a review of bull trout population data for the Wells Project, and the best available information regarding the status of critical habitat in the Wells Project. Table 4.2.4-1 addresses the status of PCEs relative to the designated critical habitat and potential Project effects. The Methow River Basin and the mainstem Wells Reservoir contain different habitat characteristics and are differentially influenced by Project operations; therefore, they are reviewed separately for each PCE. This review provides support for the effects determinations made in Section 4.2.5.

Table 4.2.4-1 Summary of Current Conditions and Description of Potential Effects within the Project Relative to Bull Trout Critical Habitat.

Primary Constituent Element	Description *(as quoted from USFWS Letter to FERC August 5, 2011)*	Description of Conditions and Potential Effects Within The Project	
		Mainstem Columbia River (Wells Reservoir)	**Methow River Basin (includes Twisp River)**
PCE - 1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.	The Project does not significantly affect the amount of available water or the amount of subsurface connectivity of water. The Project is a run-of-river project, where water can only be managed on a less than daily basis. Water storage is limited and fluctuations in stage are mild, ranging within the upper four feet over 95% of the operational record.	The Project influence consists of the Methow Hatchery, the Twisp Weir, acclimation ponds on the Methow and Chewuch River, and the lower 1.5 miles of the Methow River. The Project within the Methow River Basin does not significantly divert or alter the quantity of water flowing from the identified Project components. The Project related hatchery facilities do not consume water. The majority of water diverted from the river for hatchery use is returned a short distance downstream of Project facilities and water quality is monitored and maintained.
PCE - 2	Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	Radio telemetry studies and direct observations appear to have demonstrated no injury or mortalityof bull trout during passage through the Well Project. Studies have also demonstrated that the water found within the Wells Project is of high quality and is in compliance with the State WQS for all of the parameters measured. Notable exceptions to meeting the State WQS include seasonal exceedances in water temperature and occasional exceedances of total dissolved gas water quality standards. Recent studies have resulted in altered spill practices which have reduced the addition of TDG from Wells Project.	Within the Methow River Basin, the Twisp Weir is the only Project-related structure that has bull trout passage. Radio telemetry studies have demonstrated successful passage and that no bull trout were injured during passage over the Twisp Weir. Water quality in the Twisp and lower Methow rivers is considered to be excellent (NMFS 1998).

Primary Constituent Element	Description *(as quoted from USFWS Letter to FERC August 5, 2011)*	Description of Conditions and Potential Effects Within The Project	
		Mainstem Columbia River (Wells Reservoir)	**Methow River Basin (includes Twisp River)**
PCE - 3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macro invertebrates, and forage fish.	Results from the studies conducted in the Wells Project indicate that the Wells Project contains a native dominated aquatic plant, fish and macroinvertebrate community (Douglas PUD 2010). Attainment of water quality standards is excellent and nutrient levels of the reservoir are all within desirable limits to support healthy populations of salmonids and bull trout (Douglas PUD 2006b, Ecology 2006, 2008).	The lower 1.5 miles of the Methow River is primarily utilized as a migration corridor for bull trout seeking upstream habitat in the Methow or Twisp rivers. Regardless, healthy resident and anadromous fish populations in the lower Methow River suggest that ample resources are also available for bull trout passing through that section of river (NMFS 1998). Bull trout have also been documented in the Wells and Methow Hatchery outfalls where juvenile hatchery salmon are seasonally abundant. It is expected that bull trout have an increased potential to feed as a result.
PCE - 4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.	The Wells Reservoir primarily serves as a migratory corridor for bull trout to pass through to the Methow River. While in the reservoir, bull trout are exposed to a stable environment with minimal reservoir stage fluctuations and relatively abundant forage fish and macroinvertebrates. Accessible tributary habitat is nearby, which provides more complex riverine features for spawning and rearing in upper river areas.	The Methow River within the Project is a relatively deep, low gradient section of stream with intermittent shoreline vegetation and submerged aquatic macrophytes. While habitat structure is not diverse, it is characteristic of stream habitat near a reservoir confluence. The area is not utilized for bull trout spawning, but provides a migratory corridor for bull trout. As a result, the characteristics of the habitat are sufficient for bull trout. Upstream of the Project, complex riverine habitat is available in the upper Methow River and the Twisp River.
PCE - 5	Water temperatures ranging from 2 to 15°C (36 to 59°F), with adequate thermal refugia available for temperatures that exceed the upper end of this range.	Bull trout have been observed in the reservoir when seasonal temperatures exceed 15°C throughout the mainstem Columbia River. Access to thermal refugia is available in proximal Methow River tributary habitats. Telemetry studies have documented both the trend and success of bull trout migrating through the Project to the upper Methow River in early summer, with only limited time spent in the mainstem when temperatures annually exceed 15°C.	During the late summer months, water temperatures in the Methow and Twisp rivers annually exceed 15°C. Studies have shown bull trout pass through the lower Methow River into upstream habitat outside of the Project, where cooler water temperatures are found.

Primary Constituent Element	Description *(as quoted from USFWS Letter to FERC August 5, 2011)*	Description of Conditions and Potential Effects Within The Project	
		Mainstem Columbia River (Wells Reservoir)	**Methow River Basin (includes Twisp River)**
PCE - 6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival.	Bull trout spawning and rearing occurs in the upper Methow River and the Twisp River, outside of the Project. Passage through the Wells Dam does not limit access to these critical areas. Radio transmittered bull trout were documented successfully moving both upstream and downstream to tributary habitat where spawning and rearing have been observed.	Bull trout monitoring showed that spawning and rearing occurs in the upper Methow River and the Twisp River, outside of the Project. The Twisp Weir is the only Project facility that has bull trout passge in the Methow River Basin. Bull trout were found to successfully pass above the weir.
PCE - 7	A natural hydro graph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.	Over 90% of the base flow at Wells Dam is provided by the releases of water from the Federal Columbia River Power System and in particular Grand Coulee and Chief Joseph dams. The Project has little control to manipulate the discharge from the federal system to mimic a natural hydrograph. The Project is operated as a run-of-river project where water can only be managed on less than a daily basis. Water storage is limited and fluctuations in stage are mild, ranging within the upper four feet over 95% of the operational record.	Project operations do not alter the natural hydrograph of the river above the lowest 1.5 River Miles. The lower 1.5 miles of the Methow River is used primarily as a migratory corridor, and any effect of Project operations on the hydrograph would not affect bull trout passage.

Primary Constituent Element	Description *(as quoted from USFWS Letter to FERC August 5, 2011)*	Description of Conditions and Potential Effects Within The Project	
		Mainstem Columbia River (Wells Reservoir)	**Methow River Basin (includes Twisp River)**
PCE - 8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Water quality assessments have shown that the Wells Reservoir has excellent water quality with only a few seasonal temperature excursions from water quality standards when bull trout are not in the Reservoir. Elevated TDG levels can occur due to spill events; however, gas production dynamics research, and annual monitoring and refinement of spill management has reduced TDG production. There have not been any documented injuries or mortalities to bull trout as a result of water quality. Water quantity in the Wells Reservoir can fluctuate on a daily basis creating mild changes in reservoir stage. As a result, changes in water quantity are relatively mild. No stranding events of bull trout, as a result of fluctuations of the reservoir elevation, have been detected during bull trout stranding surveys or during other project monitoring activities.	There is little potential for Project activity in the Methow River basin to affect water quantity or quality. The Project related hatcheries located in the Methow Basin are non-consumptive users of river and ground water. The Methow Hatchery discharge water complies with the state water quality standards and guidelines and is monitored under a National Pollutant Discharge Elimination System (NPDES) permit which specifies withdrawal, discharge and monitoring requirements, in accordance with finfish culture specifications. Water quality is monitored and maintained within these standards.
PCE - 9	Sufficiently low levels of predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present are adequately temporally and spatially isolated from bull trout.	The Predator Control Program is an active effort to control imbalances in predatory fish density in Wells Reservoir. The program fishes small dead crickets on the bottom of the river with very small hooks and has resulted in no bull trout captures while allowing the removal of 154,000 predatory pikeminnow over the past 10 years. Smallmouth bass and walleye are found in very low abundance within the reservoir. Studies indicated that walleye are unable to successfully reproduce in the Wells Reservoir. Brook trout and brown trout have only occasionally been observed at the fish counting stations at Wells Dam	A high density of predatory fish are not found in the Project area of the Methow River. It is likely that the proximal Predator Control Program activity in the Wells Reservoir also influences the lower Methow River pikeminnow population that may move into and out of the reservoir. The relatively cold, clean and flowing waters of the Methow and Twisp rivers are not conductive to the life history of walleye, pike and bass. Brook trout have not been observed at the Twisp Weir count station. Isolated populations of brook trout are present in lake within the Twisp drainage but are not found in large numbers within the Twisp River.

Measures to manage the Wells Project consistent with the diverse needs of bull trout are documented within the BTMP. The BTMP is an important part of the Aquatic Settlement Agreement for the relicensing of the Wells Project. The BTMP was developed in order to identify, monitor, and address impacts, if any, to bull trout resulting from the Wells Project in a manner consistent with the USFWS Bull Trout Recovery Plan and the terms of the Section 7 ITS. The BTMP and other conservation, management, and recovery actions taken by Douglas PUD, in coordination with state and federal fish and wildlife agencies described throughout this BA document Douglas PUD's obligations to operate the Wells Project in a manner that minimizes impacts to bull trout critical habitat.

4.2.5 Determination of Effects

The following section provides a summary matrix (Table 4.2.5-1) of the potential effects described above and draws an effects determination based upon the dichotomous key developed by USFWS (1998b).

Table 4.2.5-1 Summary Effects Matrix for Bull Trout within the Wells Project.

Critical Habitat	Project Effect	Upper Columbia River Subbasin Designated Area Affected	Exposure over 50-year Duration of Proposed Action	Response	Limiting to Conservation
Spawning, incubation and larval development	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions, and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Spawning occurs more than 50 miles and 1,500 ft in elevation above the Wells Project Boundary in the upper reaches of the Methow River drainage.	Not significant. The reservoir does not support suitable spawning conditions	No effect
Rearing and migration within the Project	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, predator removal, Aquatic Settlement actions, and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Migratory life stages have been documented moving into Wells Reservoir for foraging. Sub adults have been documented passing over other mid Columbia projects, but not at the Wells Project.	Radio telemetry studies show that no individuals have been injured during passage through the Well Project. No bull trout have been captured during pikeminnow removal. Implementation of the Aquatic Settlement is not expected to result in incidental take of sub-adult or migratory bull trout.	Unlikely
Tributary rearing and migration (outside PB)	HCP Hatchery and Tributary Projects	The defined Action Area representing the Methow and Okanogan Rivers influenced by hatchery and tributary programs	Sub-adults and migratory life stages pass over brood stock traps and have been documented eating spring Chinook and steelhead released by hatchery programs.	Radio telemetry studies show that no individuals have been injured during passage through the ladder traps at Wells Dam or in passing over the Twisp Weir. For predator control, the potential for take is limited to longline angling, and to date, incidental catch of bull trout is zero. Small dead crickets fished on the bottom of the river with very small hooks has resulted in no bull trout captures while allowing the removal of 154,000 pikeminnow over the past 10 years.	Unlikely
Passage through Project reservoir and facilities	Predator control	Columbia River Corridor	Exposure will only occur during residence in the reservoir.	Not significant - potential for take is limited to longline angling, and to date, incidental catch of bull trout is zero. Small dead crickets fished on the bottom of the river with very small hooks has resulted in no bull trout captures while allowing the removal of 154,000 pikeminnow over the past 10 years.	Unlikely
Passage through Project reservoir and facilities	Adult upstream fish passage	Columbia River Corridor	Entire migration period (May through November)	Not significant - successful passage has been documented in fishways through observation and telemetry. No evidence of injury or incidental take during passage had been observed during more than 7 years of study	Unlikely
	Adult downstream fish passage	Columbia River Corridor	Year Round	Not significant - 27 radio tagged individuals safely navigated downstream without notable injury. Most downstream passage events take place during the operation of the juvenile fish bypass system (April – August. To date 27 migratory-sized bull trout have moved downstream through Wells Dam with no recorded injuries or incidental take. Fallback of upstream migrants has not been observed.	Unlikely

Water Quality	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions; actions described in the Terrestrial Resources Management Plans, increased TDG levels, elevated water temperature.	Columbia River Corridor	Exposure takes place during reservoir rearing periods. Most bull trout leave the reservoir during the summer to avoid water temperatures above 15° C and to be on the spawning grounds by September when staging for spawning begins. No sub-adult bull trout have been detected utilizing the Wells Reservoir. The bull trout MP will help identify timing and exposure.	Not significant - Studies indicate that the Wells Project has minimal impact on DO, ph, turbidity and water temperature. TDG levels can be elevated but rarely exceed 120% in the tailrace of Wells Dam. Operations have been tailored to provide conditions sufficient to achieve passage survival standards. Primary influence on water temperature is from Lake Roosevelt storage releases. Implementation of the Water Quality Management Plan is expected to improve water quality in the Wells Project.	Unlikely
Water Quantity	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions and actions described in the Terrestrial Resources Management Plans.	Columbia River Corridor	Exposure takes place during reservoir rearing periods.	Not significant - Wells Project is operated in a run-of-river mode, with water quantity largely dependent on incoming river flows. The project is not a consumptive user of water. In general daily inflows from Grand Coulee and Chief Joseph are equal to daily discharge at Wells Dam.	Unlikely
Riparian Cover	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions and actions described in the Terrestrial Resources Management Plans.	Columbia River Corridor and tributaries within Project Boundary	Exposure takes place during reservoir rearing periods.	Not significant - proposed action will have no impact on the limited natural riparian cover along the mainstem Columbia River, which is not typically used by migrating fish. Tributary enhancements funded through the HCP Tributary Committee are expected to benefit riparian cover in the Methow River Basin.	Unlikely

Application of USFWS (1998b) decision matrix dichotomous key to determine potential effects on bull trout.

The following is a stepwise assessment of potential effects on bull trout based on a dichotomous key developed by USFWS (1998b)

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Bull trout are a listed species that occur in Wells Reservoir, tailrace and the Methow River watershed. Radio tracking has shown that the Wells Project primarily serves as a migratory corridor. The potential also exists for sub-adult and adult bull trout to be foraging within the mainstem Columbia River (i.e., Wells Reservoir) throughout the year. Releases of juvenile hatchery salmonids have also shown to concentrate adult bull trout in the Wells Hatchery outfall channel, where increased prey availability exists.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

Yes. The proposed action may result in delay, stress or mortality during passage through Wells Project facilities. Sub-adult bull trout may be exposed to increased predation by pikeminnow or white sturgeon during migration. Downstream passage by sub-adults may subject bull trout to injury or mortality through interaction with turbine, spillway, or juvenile bypass system structures. Adults passing through the fish ladder or Twisp weir may exert increased levels of energy. Sub-adults or adults passing through the Wells Project tailrace may experience high levels of TDG, causing stress or injury.

The overall potential for these identified effects to impact the core population of bull trout is low. Bull trout primarily reside in tributary habitat where documented Wells Project effects are absent. The number of bull trout passing through the Wells Project facilities is limited (annual average is 64 total from 1998 – 2008) when compared to other projects such as Rocky Reach (annual average is 155 total from 1998-2008). None of the 67 sub-adult bull trout PIT tagged in the Methow River from 2004 – 2008 were detected at the Wells Dam (Douglas PUD 2008b) and no sub-adult bull trout have been counted by the video fish counting system located in the fish ladders at Wells Dam. Longline predator control efforts have also never captured a bull trout or any other salmonid, displaying the effective selectivity of the control method. From telemetry research, passage at the dam has little documented effect (Douglas PUD 2008b). Passage times were reasonable relative to the species migration and spawn timing. Out of all the adult downstream passage events recorded, zero bull trout injury or mortality was observed at the Wells Project. Wells Project facilities have shown an average survival rate of 96.2 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). It is reasonable to expect that the survival rates for juvenile bull trout would be similar to the high survival rates shown for juvenile salmon and steelhead.

Fishway operations and closely monitored spill control measures are expected to further reduce the potential for take and minimize TDG levels. Twisp weir trapping operations for anadromous salmonids are closely monitored, and to date no effects on bull trout have been detected, minimizing potential for take.

The proposed action will also result in positive effects to bull trout that may exceed the potential negative impacts described above. Existing management efforts and the implementation of the BTMP and Wells HCP will provide benefits to bull trout. Predator control efforts will continue to reduce the number of northern pikeminnow. Artificial enhancements through the Hatchery Management Plan will produce increased numbers of salmonids, resulting in a more robust number of prey that may be available to bull trout and an increase in marine derived nutrients in the Methow and Columbia rivers. The Tributary Enhancement Plan will also help to restore habitats used for spawning and rearing outside of the Wells Project area.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

Yes. Although lethal take of bull trout has not been observed at any passage facilities or during other Project-related activities, the operation of any passage facilities is expected to have some potential risk of causing immediate or inevitable mortality. Adverse affects are all other situations that cause a temporary, but not life-threatening impact. The low potential of bull trout mortality, small numbers of bull trout passing the counting facilities and the lack of documented events do not permit an accurate estimation of lethal take. As a conservative estimate, take rates established by USFWS and NMFS for spring Chinook and steelhead represent a combined 91 percent juvenile and adult survival requirement. Applying the same criteria to bull trout would provide a reasonable baseline to research and manage future bull trout passage. The likelihood of utilizing the nine percent take is unlikely as Project- related bull trout mortality has not been documented to date and survival for salmon and steelhead at Wells facilities was estimated based upon mark-recaptures studies at over 96 percent (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). Additional monitoring and adaptive management within the BTMP will also help to limit the likelihood of lethal take.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposal to relicensing the Wells Project will not modify the existing environmental baseline associated with the Wells Project. There will be no change in project configuration or operation associated with bull trout habitat that exists within the Wells Project.

Water velocities within Wells tailrace are similar to those present in the mainstem Columbia Rive prior to inundation. These areas of higher water velocity may pose brief energetic challenges or delays during upstream migrations. While the reservoir is considered critical habitat, it is used primarily as a migration corridor.

The Twisp Weir and acclimation pond are located downstream of important spawning and rearing grounds. The weir does not have an impact on spawning habitat.

Restoration and protection measures funded by Douglas PUD through the TCP of the HCP have and will continue to improve important spawning and rearing habitat found in the Methow Basin. In addition, actions within the BTMP will monitor and minimize impacts on bull trout. The measures contained withint he Land Use Policy will continue to protect important bull trout habitat located within the Wells Project.

Based on the application of these criteria, the determination of effects of this proposed action on bull trout is: MAY EFFECT, LIKELY TO ADVERSELY AFFECT bull trout and MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT designated critical habitat. The designation of 'likely to adversely affect' is established on the individual bull trout level and not the population level. The primary basis for reaching this determination was to allow for the potential of any situation where documented individual bull trout mortality may occur. Given that bull trout mortality has never been documented in the Wells Project over the eight years of monitoring, the potential is notably low. The more realistic potential effect would likely not exceed temporary harassment from Project operation or possible delay in migration.

Although individual bull trout would be subject to take at passage facilities, the proposed action would not jeopardize the continued existence of the species, DPS, or the quality of critical habitat. Habitat components for spawning and rearing lie outside of the Wells Project. Critical habitat is not significantly affected by the Project. Bull trout use of the Project area is primarily as a migratory corridor. Therefore, the potential for the Project to impact critical habitat for the Columbia River bull trout populations is neglible. Further, the TCP will work to protect and restore important spawning grounds. PMEs provided by the BTMP, the Douglas PUD Land Use Policy and ongoing monitoring and adaptive management by Douglas PUD will work to protect and sustain existing bull trout populations.

4.3 SPRING CHINOOK

The NMFS final determination to list the UCR spring-run Chinook salmon as an endangered species under the federal ESA was issued on March 24, 1999 (64 FR 14308); endangered status was reaffirmed on June 28, 2005 (70 FR 37160). 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 (excluding the Okanogan River), as well as six artificial propagation programs: the Twisp River, Chewuch River, Methow Composite, Winthrop NFH, Chiwawa River, and White River spring-run Chinook hatchery programs (NMFS 2009).

On April 4, 2002, NMFS defined interim abundance recovery targets for each spawning aggregation in this ESU. These numbers are intended to represent the number and productivity of naturally-produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. They should not be considered in isolation, as they represent the numbers that, taken together, may be needed for the population to be self-sustaining in its natural ecosystem. For UCR spring-run Chinook salmon which pass through the Project, the interim recovery level is 2,000 spawners in the Methow River (NMFS 2002b).

4.3.1 Life History

The Ecologically Significant Unit (ESU) for UCR spring-run Chinook salmon includes all naturally reproducing populations in all river reaches accessible to Chinook salmon in the mid-Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam, excluding the Okanogan River. NMFS has initially identified three important spawning populations within this ESU: the Wenatchee, Entiat, and Methow river populations (NMFS 2002a). These populations are genetically and ecologically separate from the summer/fall run populations in the lower parts of many of the same river systems. Hatchery reared Chinook salmon (and their progeny) from the following stocks are considered part of the listed ESU: Chiwawa River, Methow River, Twisp River, Chewuch River, White River, and Nason Creek.

NMFS determined that spring Chinook salmon are at risk of becoming extinct in the foreseeable future, listing them as endangered under the ESA on March 24, 1999 (64 FR 14308). NMFS reaffirmed their listing determination on June 28, 2005 (70 FR 37160). On April 4, 2002, NMFS adopted the Upper Columbia Salmon Recovery Board (UCSRB) Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan as its final recovery plan for upper Columbia spring Chinook and steelhead (UCSRB 2007). This plan defined abundance recovery targets for each spawning aggregation in this ESU. These numbers are intended to represent the number and productivity of naturally produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. They should not be considered in isolation, as they represent the numbers that, taken together, may be needed for the population to be self sustaining in its natural ecosystem. For spring Chinook salmon, recovery levels are 2,000 spawners in the Wenatchee River, 500 spawners in the Entiat River, and 2,000 spawners in the Methow River (UCSRB 2007).

The construction of Grand Coulee Dam (completed in 1942) blocked anadromous fish access to habitat upstream of RM 596.6 after 1938. The concurrent Grand Coulee Fish Management Plan (GCFMP) influenced the present distribution of the ESU. Production of non listed Carson-origin spring run Chinook salmon has also taken place within the UCR spring-run Chinook salmon ESU. Non listed spring run Chinook salmon hatchery populations contained within this ESU include fish from the Leavenworth, Entiat, and Winthrop National Fish hatcheries.

Methow River spring Chinook salmon exhibit classic stream type life history strategies, emigrating from freshwater as yearling smolts and undertaking extensive offshore ocean migrations. The majority of these fish mature at 4 years of age and return to the Columbia River from March through mid May. In the mid-Columbia River Basin, Chinook salmon passing Wells Dam before June 28 are considered spring Chinook salmon (NMFS 2002a).

After entering the Methow River and other mid-Columbia tributaries, adult spring Chinook salmon hold in the deeper pools and under cover until the onset of spawning. They may spawn near their holding areas or move upstream into smaller tributaries. Spawning generally occurs from late July through September and typically peaks in late August, although the peaks vary among tributaries (Chapman et al. 1995). Spring Chinook salmon eggs hatch in late winter and the fry emerge from gravel in April and May (Chapman et al. 1995). Most of these juveniles (73-193mm in size) rear in tributary headwater streams for 1 year before migrating to the ocean, typically during the months of April, May, and June (Douglas PUD 2002).

4.3.2 Presence in Action Area

Between the years of 1998 and 2007 the number of spring Chinook salmon migrating over Wells Dam has averaged 4,345 adults a year and ranged from 345 adults in 1999 to 10,871 adults in 2001 (Table 4.3.2-1).

Table 4.3.2-1 Annual Count of Spring Chinook Salmon Migrating Over Wells Dam.

Year	Number Counted	Year	Number Counted
		2003	4,702
		2004	4,793
1998	363	2005	4,996
1999	345	2006	4,376
2000	2,587	2007	2,793
2001	10,881	Average	3,735
2002	7,626		

Source: CBFAT 2009

The primary spawning areas for spring Chinook salmon are the mainstem Methow River upstream of the Chewuch River confluence, the Twisp, Chewuch, and the Lost rivers, and Thirtymile and Lake creeks. Spawning is observed occasionally in the Methow Hatchery outfall and Foghorn Ditch as well, but it is likely that the fish spawning here are of hatchery origin. A very limited amount of spawning has also been reported in Early Winters, Wolf, and Gold creeks (NMFS 2002a). Documented spawning sites for spring Chinook in the Methow drainage are located 40 miles upstream of the Wells Project Boundary which extends up to RM 1.5 on the Methow River.

Upon hatching, spring Chinook salmon generally rear in their natal tributary streams for one year prior to migrating to the ocean. Spring Chinook salmon utilize the mainstem Columbia River primarily as a migration corridor and as a result, they spend little time rearing in Wells Reservoir (NMFS 2002a).

4.3.3 Critical Habitat Designations

The mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Methow rivers, along with the accessible portions of the Methow River Basin, are included in the critical habitat listed for spring Chinook in the Wells Project area (70 FR 52731).

4.3.4 Environmental Measures and Analysis of Effects

The objective of the Wells HCP is to achieve NNI for each Plan Species (spring Chinook, UCR summer/fall-run Chinook salmon, Okanogan River sockeye salmon, steelhead and coho salmon). 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 Wells Project survival standard achieved by Wells Project improvement measures implemented within the geographic area of the Wells Project, and 2) up to 9 percent compensation for unavoidable Wells Project related mortalities. Compensation to meet NNI is provided through a hatchery and a tributary program under which 7 percent compensation is provided through hatchery production and 2 percent compensation is provided through the funding of enhancements to tributary habitats that support Plan Species. The Wells HCP also requires the formation of four committees that are used to implement, monitor and administer the agreement namely a 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 spring Chinook.

Considerable planning, monitoring, research and action have been implemented to ensure that the Wells Project operates in a manner that is supportive of spring Chinook salmon. Mitigation and operational activities address all critical components of the life history of the species. Each critical component of spring Chinook is addressed below.

4.3.4.1 Spawning, Incubation, and Larval Development

Reproduction and early development of spring Chinook occurs in the surrounding tributaries of the Wells Project. Spawning and larval rearing do not occur in or near the Wells Project reservoir. Tributaries used include: the Methow River upstream of the Chewuch River confluence, the Twisp, Chewuch, and Lost rivers, and Thirtymile and Lake creeks. While Project-related mitigation (hatchery and tributary) activities do occur in select tributaries represented above, the location of the spawning is in the upper regions of the tributaries. As a result, utilized areas lie outside of the Wells Project action area. Therefore, reproduction and early development of spring Chinook will not be affected by Wells Project related activities or operations.

No effect was identified for any of the proposed measures.

4.3.4.2 Rearing and Migration Within the Project

Spring Chinook spend the majority of their early development rearing in Wells Project tributaries above the Wells Project. As these larval fish mature to fry and then yearling smolts, they emigrate downstream through the Wells Project from April through June on their outbound journey to the ocean. Smolt emigration is at a relatively consistent rate that provides little sedentary behavior for feeding or holding in the lower Wells Project tributaries or reservoir. As a result the lower Methow 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 extent primarily for fish migrating from the mouth of the Methow River to Wells Dam (a distance of 7 miles). Survival standards set by the HCP ensure that survival will be at or above 93 percent for spring Chinook smolts migrating through the Wells Project. Current monitoring indicates juvenile project survival is greater than 96 percent. Potential effects that may occur during the migration through the Action Area include reservoir stage fluctuation, reservoir impoundment, and predator exposure. The Wells Project has a 10 ft operating range, but typically operates within the upper one to two ft of the reservoir on any given day. During the five year operation period from 2001 through 2005, the reservoir has typically operated within the upper four ft (elevation 781 to 777 ft MSL in elevation) 95.1 percent of the time (DTA 2006). Infrequent operations resulting in

fluctuations over four ft in a 24-hour period have occurred 1.1 percent of the time from 2001 through 2005, and are discussed in Section 2.4 (DTA 2006). Reservoir stage fluctuation is a result of the "run-of-river" operations inherent to the multi-reservoir Columbia River projects. Water that is scheduled to arrive from the upstream reservoir is released in the current storage of Wells Reservoir to accommodate receiving capacity.

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 are a natural predator to migrating smolts. The increased migratory period within the reservoir and resultant elevated exposure to pikeminnow predation may pose a brief Project effect. To address this issue, a predator removal program was created to reduce the number of pikeminnow in the reservoir and tailrace of Wells Dam. In 1998, NMFS determined that the NPRP resulted in a net benefit to listed anadromous Columbia River salmonids (NMFS 1998).

Habitat Conservation Plan

Increased predator populations in Wells Reservoir may result in increased interaction rates with spring Chinook and unnatural salmon mortality. Conversely, predator removal may also result in harassment, capture and potential mortality of salmon. To address these issues, Section 4.3.3 of the Wells HCP requires Douglas PUD to implement a targeted northern pikeminnow, piscivorous bird and piscivorous mammal harassment and control program to reduce the level of predation upon salmonids in the Wells Project with minimal effect on salmonids.

Northern pikeminnow are native predators of juvenile Chinook salmon, and can rapidly increase in number in the absence of active management efforts. From inception in 1995 through 2007 Douglas PUD's NPRP has captured over 154,000 northern pikeminnow. These efforts are designed to provide an immediate and substantial reduction in the predator populations present within the waters of the Wells Project. There is a potential for individual salmon to be caught during operation of the northern pikeminnow removal program, although in the entire history of the program no Chinook salmon have ever been captured.

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 longline fishing equipment. Currently only longline fishing and fishing derbies are utilized. 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 species specifically.

More recently (2000-present), the NPRP has shifted to a longline fishing system. This system has proven to be more cost efficient and effective at targeting northern pikeminnow. Longline fishing gear has a low probability of catching Chinook 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 the incidental catch rate of all salmon by longline operations is zero.

Aquatic Settlement Agreement

The Aquatic Settlement Agreement includes implementation of the white sturgeon and resident fish management plans associated with and operation of the predator control program.

Increased predation may result from the enhancement of known native predators of UCR spring Chinook. One objective of the WSMP is to enhance white sturgeon populations through artificial propagation. The increased number of sturgeon may result in an elevated potential for predation. The WSMP has provisions for adaptive management of supplementation activities should conflicts develop between stocked sturgeon and ESA-listed species. The WSMP 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.

Other predation threats include piscivorous birds and mammals. The primary focus of managing these species at propagation facilities is not removal but hazing and access deterrents. Hazing includes propane cannons, pyrotechnics and the physical presence of hazing staff. Access deterrents include steel wires across the hatchery ponds and tailrace, fencing and covers for hatchery ponds, and electric fencing. When hazing and access deterrents fail, options for removal are also implemented by the USDA Animal Control staff hired to conduct the hazing programs. The minor increase in human activity as a result of these predator control measures is unlikely to adversely affect salmon.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.3 Tributary Rearing and Migration

Activities associated with the operation of the Wells Project also take place in upper portions of the tributaries outside of the Project.

Habitat Conservation Plan

The TCP found in Section 7 of the Wells HCP 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 Dam. The purpose of the Plan Species Accounts is to fund protection and restoration of 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 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. A separate Section 7 consultation is initiated for actions associated with the TCP.
The Tributary Coordinating Committee, comprised of various fisheries agencies and the Tribes, 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 on a long-term 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 reviewed by state and federal agencies to receive permits for construction projects. Tributary habitat projects will benefit spring Chinook through the protection and enhancement of critical habitat (USFWS 2002a). 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.

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 spring Chinook by creating additional aquatic habitat or removing upstream migration barriers, allowing spring Chinook access to historically utilized 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 River. In-stream restoration projects that have the potential to disturb spring Chinook or habitat will be required to go through a separate ESA Section 7(a)(2) consultation and authorization of incidental take of ESA-listed Permit Species.

In the long-term, any actions designed to remove migration barriers, stabilize stream channels and restore hydraulic equilibrium, increase riparian canopy cover, or increase base flows are expected to far outweigh small short term impacts and result in beneficial effects for spring Chinook.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.4 Adult Upstream Passage Through the Project Reservoir and Facilities

Four specific components of the adult migrations upstream and downstream of the Well's Dam may affect anadromous fish: 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 pre-spawning mortality (NMFS 2002a). Juvenile anadromous fish may experience increased mortality during their migration to the ocean as a result of passage through the Wells Project. 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 hydrocombine. Spring Chinook utilize these ladders to pass upstream of the Wells Project. Each of the two fishways 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 (located on the west and east shores) 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.

Habitat Conservation Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of unavoidable juvenile and adult losses for each of the Plan Species 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 Douglas PUD to be considered in compliance with the terms of the Wells HCP (Douglas PUD 2002).

The Adult Passage Plan is a subcomponent within the larger Passage Survival Plan contained within Section 4.4 and Appendix A 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 passage success, 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 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). A similar study by English et al. (2006) reached similar conclusions during comparison of migration rates of steelhead through the mid-Columbia River when compared to unimpounded reaches of the Skeena and Fraser rivers. NMFS (2002a) concluded that this body of information strongly suggests that small delays at mid-Columbia River dams are more than compensated for by faster travel through the reservoir impoundments. In addition, any delays that do occur are more likely to affect species that spawn soon after completing their migration (summer/fall-run Chinook salmon or sockeye salmon are more likely to be affected than those that hold in the rivers or streams for considerable periods of time prior to spawning [i.e., steelhead or spring Chinook salmon]). The effect of delays passing the fishway (hours to a few days) on Permit Species is likely non-existent for currently ESA-listed Plan Species and non-existent to very small for currently unlisted Plan Species. Thus the proposed action should have no effect, or a slight beneficial effect, on upstream migrating adults compared to the migration observed under unimpounded conditions.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.5 Adult Downstream Passage Through the Project Reservoir and Facilities

The potential for adult spring Chinook to "fallback" through the dam once they have exited the fish ladder may result in injury due to contact with structural features of the dam (spillways, turbines, juvenile bypass, and fish ladder). Fallback is defined as voluntary or involuntary movement of a fish downstream past a dam once upstream passage has been achieved.

Habitat Conservation Plan

Fallback rates of spring Chinook salmon at the Project are low. Studies indicate that fallback rates at the Wells Project for spring or summer-run Chinook salmon are 3.6 to 5 percent (NMFS 2002a). Survival standards from the Wells HCP ensure that survival will be at or above 98 percent survival. Adult PIT-tag studies demonstrate survival is greater than 98 percent for the project (Douglas PUD and Anchor Environmental, L.L.C. 2009). The majority of fallback takes place through the JBS. Some mortality may occur through turbine and spillway passage, but overall survival is expected to be high with the JBS in operation during the entire spring Chinook migration and fallback time frame. Passage success and survival at dams 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 success. Fish that fail to ascend the dam may also be destined for a downstream spawning location or may have been injured prior to reaching the dam (as a result of natural or other effects) or may have been injured or harvested 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 mainstem Snake River and Columbia River Federal hydroelectric projects, dams, and reservoirs that are similar to the mid-Columbia hydroelectric projects. NMFS believes that the estimates made for species at these projects are generally applicable to the FERC-licensed projects on the mid-Columbia River for both listed and unlisted Permit Species. Estimates of average per-project mortality rates based on this analysis are 2.4 percent for spring Chinook salmon (NMFS 2000a, based on data in NMFS 2000b). More recently, adult

PIT-tag estimates from 2008 indicate survival is greater than 98 percent (Douglas PUD and Anchor Environmental, L.L.C. 2009).

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.6 Juvenile Passage

Habitat Conservation Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of unavoidable juvenile and adult losses for each of the Plan Species 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 (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 passing through Wells Dam are provided a safe, non-turbine passage route around the dam. The operational dates for the bypass are set annually by unanimous agreement of the parties to the Wells HCP. 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 2004b). 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.

The JBS utilizes five of eleven spillways equipped with constricting barriers to help 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 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.

The JBS serves as an effective 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 bypass system are important factors in limiting the amount of spill, and therefore TDG, while maximizing fish passage and survival.

Operation of the spillways may result in supersaturated levels of TDG. Supersaturated gases in fish tissues tend to pass from the dissolved state to the gaseous phase as internal bubbles or blisters. This condition, GBT or GBD, can be debilitating or even fatal. Injury and mortality of spring Chinook may also occur as a result of contact with spillway or turbine structures. It is also likely that juveniles that successfully pass through the spillway may be subject to increased susceptibility to predation caused by disorientation or increased susceptibility to infection caused by scale loss or non-lethal wounds incurred during spillway passage (USFWS 2004c).

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 ensure that survival will be at or above 93 percent. Douglas PUD has conducted three years of juvenile survival studies at Wells Dam which have shown an average survival rate of 96.2 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). This is the highest survival rate for any dam on the Columbia or Snake rivers and at the same time, the contribution to TDG levels downstream of Wells Dam from the JBS is negligible (0-2 percent).

The Hatchery Compensation Plan, as described in Section 8 of the Wells HCP, was established to provide hatchery compensation for up to 7 percent unavoidable juvenile passage losses of Plan Species passing through Wells Dam. The operation of Hatchery enhancement activities has the potential to create both positive and negative results for spring Chinook.

The goal of the program is to utilize hatchery produced fish to replace unavoidable passage losses in such a manner that the hatchery fish produced contribute to the rebuilding and recovery of naturally reproducing populations of Plan Species, in their native habitats, while maintaining the genetic and ecological integrity of each stock of Plan Species. Supporting harvest, where appropriate, was also identified as a goal of the Hatchery Compensation Plan.

Douglas PUD owns and provides funding for the operation and maintenance of two fish hatchery facilities, the Wells and Methow hatcheries. Both are operated by WDFW. Of the two hatcheries, spring Chinook are only produced at the Methow Hatchery. The Methow Hatchery is located approximately 51 miles upstream of the mouth of the Methow River near the town of Winthrop, Washington. The Methow Hatchery consists of 12 covered production raceways, three covered adult raceways, a centralized incubation, early rearing, administrative and hatchery maintenance building, one on-site acclimation pond, two satellite acclimation ponds and a separate set of residences for hatchery personnel. A detailed description of the Methow Hatchery is available in Section 2.

Construction of the Methow Hatchery was completed in 1992 and is the result of a long-term Fish Settlement Agreement dated October 1, 1990 (1990 Settlement Agreement) to mitigate for passage losses at the Wells Project. In 2004, the Wells HCP was approved by the FERC and superseded the 1990 Settlement Agreement. As a result, the terms of the Wells HCP now guide activities at the Methow Hatchery. The Methow Hatchery produces yearling spring Chinook and is dedicated to enhancing spring Chinook salmon in the Methow, Twisp and Chewuch river basins.

All 12 of the production raceways and the on-site Methow acclimation pond are equipped with an outlet channel to the Methow River for releasing juvenile spring Chinook. The Twisp Acclimation Pond is located at RM 11 on the Twisp River, and the Chewuch Acclimation Pond is located at RM 7 on the Chewuch River. The Methow Hatchery is owned by Douglas PUD and operated by WDFW. The program currently raises up to 550,000 yearling spring Chinook each year with fish of equal numbers released at each of the three acclimation ponds. Douglas PUD's current passage loss obligation for spring Chinook is 61,071 smolts. The remaining 489,000 fish (89 percent of the program) are provided to Chelan PUD (288,000 smolts) and Grant PUD (201,000 smolts) to support compliance with their passage loss obligations.

Adult spring Chinook are captured in the Twisp Weir during brood stock collection in April through June. Based on monitoring studies completed in 2008, the newly constructed Twisp Weir was found not to be a migration impediment or a stranding structure for adult spring Chinook. Juvenile spring Chinook are captured during hatchery evaluation actions such as screw trapping. Captured juveniles are released and this type

of monitoring is regulated by the HCP Hatchery Committee and governed by the three hatchery ITPs that are the foundation of the HCP agreement.

The BO on Artificial Propagation in the Columbia River (NMFS 1999a), the BO on Effects on Upper Columbia River Spring-run Chinook Salmon Supplementation Program and Associated Scientific Research and Monitoring Conducted by the WDFW and the USFWS (NMFS 2002c), and the BO for 1995-1998 Hatchery Operations in the Columbia River Basin (NMFS 1995) identify 11 general types of potential adverse effects of hatchery operations and production on natural fish populations. These effects include: (1) operation of hatchery facilities, (2) broodstock collection, (3) genetic introgression, (4) disease, (5) competition/density-dependent effects, (6) predation, (7) residualism, (8) nutrient cycling, (9) masking, (10) fisheries, and (11) monitoring and evaluation/research.

NMFS evaluated the above mentioned potential adverse effects in the BOs supporting the issuance of ESA Section 10 ITPs (permit 1395, 1391, 1347, and 1196) in accordance with Section 7 of the ESA. In the BO from NMFS, the agency determined that an annual take of endangered spring Chinook for scientific research and enhancement is not likely to jeopardize the continued existence of spring Chinook. In addition, NMFS concluded that the supplementation programs covered by the permits are expected to provide a survival benefit to spring Chinook by increasing the natural production of the Methow Basin.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.7 Water Quality

The distribution of spring Chinook salmon limits the extent of potential water quality issues to the Methow River, Wells Reservoir and the Reservoir tailrace. 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 Wells Project is of high quality and is in compliance with the State standards for all of the parameters measured. Within the confines of the species extent there are

two potential water quality issues that were documented through past research and have or are currently being addressed: water temperature and TDG.

Water temperature issues within the Wells Project primarily occur in the lower Okanogan River. 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 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. 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 also moderate the cold winter temperatures by 1-3°C, reducing the extent and length of freezing (WEST Consultants, Inc. 2008).

This area is not used by spring Chinook and poses little issue to migratory or foraging species. The few instances of relatively high water temperature within the reservoir were primarily a result of upstream releases from Grand Coulee and Chief Joseph dams.

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 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 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 well within Washington State WQS (< 120%) during a flood flow event equal to 246 kcfs (Politano et al. 2009). As previously addressed above in section 4.3.4.4, studies by Bickford et al. (1999, 2000, 2001) show that passage survival at the dam is 96.2 percent for juvenile salmon and steelhead. Successful passage by early life

stages of anadromous salmonids suggest that water quality is not posing a risk to survival.

No effect was identified that related to any of the proposed measures.

4.3.4.8 Water Quantity

The quantity of water flowing through the Wells Project can create alterations to the reservoir environment that may affect spring Chinook. These alterations may include fluctuations in reservoir stage that may strand individuals in nearshore habitat or possibly increase interaction with predators due to lower water volume.

The Wells Project is a run-of-river project meaning that average daily inflow equals daily outflow. As a result, the limited active storage capacity is only sufficient to regulate flow on a daily basis. Alterations in water volume or reservoir fluctuations are minimal and largely driven by the discharge of water from Chief Joseph Dam and Grand Coulee Dam. Reservoir stage fluctuation remains within one to two ft on a daily basis. Reservoir operations below 774 ft occur infrequently (generally no more than one a year) but do have a limited potential to strand fish in off-channel pools. Conditions that could result in stranding were surveyed in 2006 and 2008. During these surveys, no stranding of spring Chinook was observed.

No effect was identified that related to any of the proposed measures.

4.3.4.9 Riparian Cover

Riparian cover can provide important habitat for rearing spring Chinook. Significant riparian cover is found in riverine areas and is limited in lacustrine environments. Riparian cover is generally not sought after when juvenile spring Chinook initiate their seaward migration and leave the Methow River and enter the Wells Reservoir. Spawning and rearing habitat occurs in fluvial systems of the upper Methow River watershed more than 40 miles upstream of the Wells Project, and are not affected by Wells Project operations.

Habitat Conservation Plan

The banks of the Wells Project offer limited riparian cover. This is largely a result of the paucity of riparian cover typical of natural high desert ecosystems that define the Wells Project. Additional funds provided by Douglas PUD for restoration measures occurring outside of the Wells Project are detailed in the TCP. Douglas PUD funded projects will improve habitat and potentially increase riparian cover. The potential for such riparian restoration to occur is contingent upon review and approval by the Wells HCP Tributary Committee.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.3.4.10 Critical Habitat

The mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Methow rivers, along with the accessible portions of the Methow River Basin, are included in the critical habitat listed for UCR spring Chinook in the Wells Project (70 FR 52731).

Habitat components important to spring Chinook and other salmonid species in the Mid-Columbia River include:

- juvenile rearing areas,
- juvenile migration corridors,
- areas for growth and development to adulthood,
- adult migration corridors, and
- spawning habitat.

Within these habitat types, essential features include:

- adequate substrate,
- water quality,
- water quantity,
- water temperature,
- water velocity,
- cover/shelter,
- food,
- riparian vegetation,
- space, and
- safe passage conditions (65 FR 7764).

The diverse needs of spring Chinook are well known by Douglas PUD and effort to manage the Wells Project in light of these needs is consistent throughout the developed management plans and other conservation, management, or recovery actions taken by Douglas PUD. These actions are described throughout this BA and represent Douglas PUD's efforts to operate the Project and reduce or eliminate any potential impacts to spring Chinook critical habitat as a result of the Wells Project. Success of these efforts is demonstrated through achievement of the HCP NNI standard for spring Chinook.

Effects of the proposed action on individual critical habitat elements are addressed in the preceding assessments of potential effects of proposed measures on individual critical habitat elements, the determination of effects in section 4.3.5, and the summary effects matrix for spring Chinook in Table 4.3.5-1.

4.3.5 Determination of Effects

The following section provides a summary matrix (4.3.5-1) of the potential effects described above and draws an effects determination based upon the dichotomous key developed by USFWS (1998b).

Table 4.3.5-1 Summary Effects Matrix for Spring Chinook within the Wells Project.

Critical Habitat	Project Effect	Upper Columbia River Subbasin Designated Area Affected	Exposure over 50-year Duration of Proposed Action	Response	Limiting to Conservation
Spawning, incubation and larval development	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement Actions and actions described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Spring Chinook spawning occurs in the upper and middle Methow drainage over 40 miles upstream of the Wells Project Boundary	NA	No effect
Rearing and migration within the Project	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, HCP, predator control, Aquatic Settlement Actions and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Brief exposure during migration period. Juveniles migrate downstream from April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. For predator control, potential for take is limited to longline angling. No Chinook have ever been captured in the history of the program. Incidental captures of non-target fish are released immediately.	Unlikely
Tributary Rearing and Migration (outside PB)	HCP Hatchery and Tributary Projects	The defined Action Area representing the Methow River influenced by hatchery and tributary programs	Juvenile spring Chinook are captured during hatchery evaluation actions such as screw trapping. Adult spring Chinook are targeted for brood collection at the Twisp Weir during April through August.	Based upon monitoring in 2008, the newly constructed Twisp Weir is not a migration impediment nor is it a stranding structure for adult spring Chinook.	Unlikely
Passage through Project reservoir and facilities	Adult upstream fish passage	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July	Not significant - passage times and survival are comparable to conditions without the Project. Survival standards ensure that survival will be at or above 98% survival - Adult PIT-tag studies indicate survival is greater than 98% per project. Fallback rates are low.	Unlikely
	Adult downstream fish passage	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July	Not significant. Survival standards ensure that survival will be at or above 98% survival - Adult PIT-tag studies indicate survival is greater than 98% per project. Fallback rates are low. Most fallback takes place through the Juvenile Bypass System where survival is high.	Unlikely
	Sub-adult passage	Columbia River Corridor	Brief exposure during migration period. Juveniles migrate downstream from April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. Monitoring indicates greater than 96% survival.	Unlikely
Water Quality	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, and Aquatic Settlement actions; actions described in the Terrestrial Resources Management Plans; increased TDG levels, elevated water temperature.	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July and juveniles migrate downstream from April through June.	Not significant - Studies indicate that there is no project related impact to DO, ph, turbidity and water temperature. TDG levels can be elevated but rarely exceed 120% in the tailrace of Wells Dam. Operations have been tailored to provide conditions sufficient to achieve passage survival standards. Primary influence on water temperature is from Lake Roosevelt storage releases. Implementation of the Water Quality Management Plan is expected to improve water quality in the Wells Project.	Unlikely

Table 4.3.5-1 (Continued) Summary Effects for Spring Chinook within the Wells Project.

Critical Habitat	Project Effect	Upper Columbia River Subbasin Designated Area Affected	Exposure over 50-year Duration of Proposed Action	Response	Limiting to Conservation
Spawning, incubation and larval development	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement Actions and actions described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Spring Chinook spawning occurs in the upper and middle Methow drainage over 40 miles upstream of the Wells Project Boundary	NA	No effect
Rearing and migration within the Project	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, HCP, predator control, Aquatic Settlement Actions and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and surrounding tributaries	Brief exposure during migration period. Juveniles migrate downstream from April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. For predator control, potential for take is limited to longline angling. No Chinook have ever been captured in the history of the program. Incidental captures of non-target fish are released immediately.	Unlikely
Tributary Rearing and Migration (outside PB)	HCP Hatchery and Tributary Projects	The defined Action Area representing the Methow River influenced by hatchery and tributary programs	Juvenile spring Chinook are captured during hatchery evaluation actions such as screw trapping. Adult spring Chinook are targeted for brood collection at the Twisp Weir during April through August.	Based upon monitoring in 2008, the newly constructed Twisp Weir is not a migration impediment nor is it a stranding structure for adult spring Chinook.	Unlikely
Passage through Project reservoir and facilities	Adult upstream fish passage	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July	Not significant - passage times and survival are comparable to conditions without the Project. Survival standards ensure that survival will be at or above 98% survival - Adult PIT-tag studies indicate survival is greater than 98% per project. Fallback rates are low.	Unlikely
	Adult downstream fish passage	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July	Not significant. Survival standards ensure that survival will be at or above 98% survival - Adult PIT-tag studies indicate survival is greater than 98% per project. Fallback rates are low. Most fallback takes place through the Juvenile Bypass System where survival is high.	Unlikely
	Sub-adult passage	Columbia River Corridor	Brief exposure during migration period. Juveniles migrate downstream from April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. Monitoring indicates greater than 96% survival.	Unlikely
Water Quality	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, and Aquatic Settlement actions; actions described in the Terrestrial Resources Management Plans; increased TDG levels, elevated water temperature.	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July and juveniles migrate downstream from April through June.	Not significant - Studies indicate that there is no project related impact to DO, ph, turbidity and water temperature. TDG levels can be elevated but rarely exceed 120% in the tailrace of Wells Dam. Operations have been tailored to provide conditions sufficient to achieve passage survival standards. Primary influence on water temperature is from Lake Roosevelt storage releases. Implementation of the Water Quality Management Plan is expected to improve water quality in the Wells Project.	Unlikely

Application of USFWS (1998b) decision matrix dichotomous key to determine potential effects on UCR spring-run Chinook salmon.

The following is a stepwise assessment of potential effects on UCR spring-run Chinook salmon based on a dichotomous key developed by USFWS (1998b).

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Spring Chinook salmon are a listed species that occur in Wells Reservoir, tailrace and the Methow River watershed. The Wells Project area primarily serves as a migratory corridor for outmigrating smolts and returning adults. Usage of the Wells Project area is generally limited to the months of April through June for juveniles and April through early July for adults. Individual fish only spend a few days migrating through the Project. The Project does not contain significant rearing habitat for juvenile spring Chinook.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

Yes. The proposed action may result in delay, stress or mortality during passage through Wells Project facilities. Juvenile Chinook may be exposed to predators such as northern pikeminnow during migration. Returning adults may exert increased levels of energy to pass Project structures and may incur additional energetic costs associated with fallback and a second pass through the ladders. The primary route of fallback by adults and downstream migration by juveniles is through the juvenile bypass system or spillways both of which are typically in operating during April through August of each year. Some fish may also pass via the turbines where injury or mortality through interaction with turbine structures may take place. Juveniles or adults passing through the Wells Project tailrace may experience higher than ambient levels of TDG.

The overall potential for these identified effects to impact the population of spring Chinook salmon is low. Spawning and rearing of spring Chinook occur more than 40 miles upstream of the Project in the Methow River. Sensitive life history stages rear in locations where potential Project effects are absent. The use of the Wells Reservoir is primarily as a migratory corridor. Longline predator control efforts in the reservoir have never captured a salmonid, displaying the effective selectivity of the control method. Passage at the reservoir is efficient, with minimal mortality. NMFS (2002a) concluded that small delays of adult upstream migration at mid-Columbia River projects are more than compensated for by faster travel through the reservoir impoundments. Studies indicate that fallback rates at the Project for spring or summer-run Chinook salmon are low (3.6 to 5 percent, NMFS 2002a). NMFS estimated mortality rates were relatively minimal (2.4 percent) for spring Chinook salmon (NMFS 2000a, based on data in NMFS 2000b). Douglas PUD has conducted three years of juvenile survival studies at Wells Dam which have shown an average survival rate of 96.2 percent for yearling Chinook

(Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). This is the highest juvenile project survival rate for any dam on the Columbia or Snake rivers. More recently, adult PIT-tag estimates from 2008 indicate adult survival passing upstream though the Wells Project is greater than 98 percent (Douglas PUD and Anchor Environmental, L.L.C. 2009).

The proposed action will also result in numerous benefits to spring Chinook, the sum effects of which are expected to exceed the negative impacts described above. Existing management efforts and the implementation of Wells HCP management plans provide numerous benefits to spring Chinook salmon. Currently, the HCP mandates juvenile passage success of 93 percent. Predator control efforts will continue to reduce the number of northern pikeminnow. Artificial enhancements through the hatchery management plan help bolster wild population numbers and provide up to seven percent compensation for unavoidable Wells Project related effects. The Tributary Conservation Plan helps to restore habitats used for spawning and rearing outside of the Wells Project area and provides up to 2 percent compensation for unavoidable Wells Project related effects to adult UCR spring Chinook resulting in NNI.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

Yes. Juvenile mortality of three to seven percent during Project passage will likely continue, some portion of which is attributable to Project effects. Based upon PIT-tag data, take of adults is expected to be less than 2 percent. The Wells Project has achieved NNI for each Plan Species, including spring Chinook through a combination of high juvenile and adult survival through the Project coupled with hatchery compensation and tributary conservation efforts intended to replace the relatively small amounts of unavoidable "take" associated with operating the Wells Project (Douglas PUD and Anchor Environmental, L.L.C. 2009). Various plans to continue the achievement of NNI include the Passage Survival Plan, Wells Dam Juvenile Dam Passage Survival Plan, TCP, Hatchery Compensation Plan, Adult Passage Plan, and Predator Control Program. The standards and actions outlined in these plans will ensure low levels of take and provide measures to ensure that recovery of the species would not be jeopardized.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

Yes. Lower water velocities within Wells Reservoir may pose brief energetic challenges during downstream migration for juveniles. While the reservoir is considered critical habitat, it is used primarily as a migratory corridor. Conversely, the lower velocities require adult fish to expend less effort to reach spawning grounds in the Methow River. Important spawning and rearing grounds are not affected by the Wells Project. Restoration and protection measures within the TCP of the Wells HCP will improve important spawning and rearing habitat. The Wells HCP provides funding for habitat

improvements, as well as establishes a HCP Habitat Committee to prioritize expenditure of designated funds. Over the duration of the Wells HCP, habitat improvements secured by designated HCP Plan Species Account funding is expected to offset 2 percent or greater of the unavoidable project mortality for adult spring Chinook, and contribute to recovery of this species.

Based on this analysis, the determination of effects of this proposed action on spring Chinook salmon is: MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT spring Chinook or designated critical habitat. Although individual Chinook would be subject to take, the proposed action would not jeopardize the continued existence of the species. Relative to the entire lifecycle, spring Chinook use of Wells Reservoir is minimal and except for functioning as a migration route to the ocean, the reservoir habitat is the least important of all habitat components. Further, continued implementation of Wells HCP measures would offset any take and could result in a net benefit due to population enhancement and habitat restoration.

4.4 UCR SUMMER-RUN STEELHEAD

NMFS considers all summer-run steelhead returning to tributary streams upstream of the confluence of the Yakima River and the Columbia River as belonging to the UCR DPS (NMFS 2008). The UCR summer-run steelhead was listed under the federal ESA as endangered in August 18, 1997 (62 FR 43937). The status of ESA-listed UCR summer-run steelhead was changed to threatened on January 5, 2006 (71 FR 834). This listing was reinstated to endangered status per US District Court decision in June 2007 (NMFS 2008). In March 2009 the Ninth Circuit upheld NMFS decision to list UCR summer-run steelhead as threatened and not endangered, overturning the June 2007 District Court decision. In June 2009 U.S. District Court issued an order upgrading status from endangered to threatened.

NMFS defined abundance recovery targets for each spawning aggregation in this ESU. These numbers are intended to represent the number and productivity of naturally-produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. They should not be considered in isolation, as they represent the numbers that, taken together, may be needed for the population to be self-sustaining in its natural ecosystem. For UCR steelhead, the interim recovery levels are 1,000 spawners in the Methow River, 1,000 spawners in the Wenatchee River and 500 spawners in the Entiat River (UCSRB 2007).

The majority of the steelhead are of hatchery origin (Chapman et al. 1994b). Steelhead hatchery programs that were included into the listing determination include the Wells and Eastbank Fish hatcheries. These programs release listed steelhead into the Okanogan, Similkameen, Methow and Wenatchee rivers.

4.4.1 Life History

The steelhead is an anadromous salmonid spawning in tributaries and migrating through the Columbia River to the ocean. Adult steelhead rear one to two years in the ocean before returning to the Columbia River from March through October. Returning adults typically pass the mid-Columbia River dams from June through October. The adult migration is protracted over a relatively long period. Further, spawning does not occur until the following March through July (Peven 1992). Unlike other anadromous salmonids, steelhead adults (kelts) return to the ocean after spawning and may spawn more than once during their lifetime; however, repeat spawners in the mid-Columbia River region represent only 2.1 percent of the population (Brown 1995).

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 are thought to 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. Such life history diversity is an effective strategy for ensuring the long-term viability of populations (NMFS 2002a).

4.4.2 Presence in Action Area

The majority of naturally and hatchery produced steelhead that are present in the Wells Project spawn in the Methow River watershed, with a small population spawning and rearing in the Okanogan River watershed. Although steelhead typically feed during their seaward migration, mid-Columbia reservoirs, such as Wells, serve primarily as migration corridors rather than as rearing habitat (Chapman et al. 1994b). Between the years of 1996 and 2005 the number of steelhead migrating upstream of Wells Dam annually has averaged 7,446 adults and ranged from 2,668 adults in 1998 to 18,483 adults in 2001 (Table 4.4.2-1).

Table 4.4.2-1 Annual Count of Migrating Steelhead Over Wells Dam.

Year	Number Counted	Year	Number Counted
1996	4,127	2003	9,963
1997	4,107	2004	9,317
1998	2,668	2005	7,203
1999	3,557	2006	6,674
2000	6,280	2007	7,500
2001	18,483		
2002	9,475	Average	7,446

Source: CBFAT 2009

Steelhead use spawning habitat in the mainstem Methow River and eleven of its tributaries located in the mid and upper reaches of the drainage (NMFS 2002a). Documented spawning sites for steelhead in the Methow drainage are located upstream of the Wells Project Boundary, which extends up to RM 1.5 on the Methow River. A small number of steelhead return to spawn on the lower Similkameen River, a tributary to the Okanogan River near the US-Canada Border (NMFS 2002a). Documented spawning sites for steelhead in the Okanogan drainage are located upstream of the Wells Project Boundary.

4.4.3 Critical Habitat Designations

Critical habitat was designated for the UCR summer-run steelhead ESU by NMFS on September 2, 2005 (70 FR 52630). Critical habitat does occur in the Wells Project area and includes: (1) the mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Okanogan rivers, (2) the accessible portions of the Methow River Basin, and (3) the accessible portions of the Okanogan River Basins, excluding the Colville Reservation and Salmon Creek (NOAA 2006).

4.4.4 Environmental Measures and Analysis of Effects

The objective of the Wells HCP is to achieve NNI for each Plan Species (spring Chinook, UCR summer/fall Chinook salmon, Okanogan River sockeye salmon, steelhead and coho salmon). 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 Wells Project survival standard achieved by Wells Project improvement measures implemented within the geographic area of the Wells Project, and 2) up to nine percent compensation for unavoidable Wells Project related mortalities. Compensation to meet NNI is provided through a hatchery and a tributary program under which seven percent compensation is provided through hatchery production and two percent compensation is provided through the funding of enhancements to tributary habitats that support Plan Species. The HCP also requires the formation of four committees that are used to implement, monitor and administer the agreement, namely policy, coordinating, hatchery, and tributary committees.

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.

4.4.4.1 Spawning, Incubation, and Larval Development

Adult steelhead utilize 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 above the Wells Project area. Spawning occurs primarily in late March, but may extend into July. Steelhead eggs incubate from late March through June, and fry emerge in late spring to August. In the Methow basin, spawning has been documented in the mid and upper mainstem Methow River and eleven of its tributaries located in the mid and upper reaches of the drainage (NMFS 2002a; Mullan et al. 1992). In the Okanogan basin, a small number of steelhead return to spawn on the lower Similkameen River, a tributary to the Okanogan River near the US-Canada Border (NMFS 2002a).

All spawning, incubation, and larval development occurs upstream of the Wells Project Boundary. Spawning and larval rearing does not occur in or near the Wells Project reservoir. While Wells Project-related hatchery activities do occur in the tributaries, these are unlikely to affect reproduction and early development. Therefore, it is unlikely that steelhead spawning, incubation, and larval development would be affected by Wells Project related activities or operations.

No effect was identified for any of the proposed measures.

4.4.4.2 Rearing and Migration Within the Project

Steelhead develop and rear upstream of the Wells Project Boundary in the mainstem and tributaries of the Methow and Okanogan river basins. 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. 1994b).

Smolt exposure to Wells Project effects is for a brief duration and limited extent. Survival standards set by the HCP ensure that survival will be at or above 93 percent for steelhead smolts migrating through the Wells Project. Current monitoring indicates juvenile project survival for steelhead is greater than 96 percent. Potential effects that may occur during the migration through the Action Area include reservoir stage fluctuation, reservoir impoundment, and predator exposure. Reservoir stage fluctuation is a result of the “run-of-river” operations inherent to the multi-reservoir Columbia River projects. The reservoir elevation typically fluctuates one to two ft daily. Reservoir operations below 774 ft 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 ft 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 historic, 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 consumption. Inversely, the slower water velocities can also affect the outmigration of juveniles by causing extended travel times and decreased survival rates. The extended travel time and low water velocities, compared to the unimpounded river, may result in greater energy expenditures by juvenile migrating steelhead.

Habitat Conservation Plan

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. 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 longline fishing equipment. Currently only longline fishing is being utilized 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 Project. The continual harvest of northern pikeminnow from these waters will provide additional decreases in predator abundance. Yearly removal efforts will also keep the northern pikeminnow population in a manageable state. In 1998, NMFS determined that the NPRP resulted in a net benefit to listed anadromous Columbia River salmonids (NMFS 1998).
From inception in 1995 through 2007 Douglas PUD's NPRP has captured over 154,000 northern pikeminnow. 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 species specifically.

More recently (2000-present), the NPRP has shifted to primarily a longline fishing system. This new system has proven to be more cost efficient and effective at targeting northern pikeminnow. Longline 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 the incidental catch rate of steelhead by longline operations is zero.

The NPRP is implemented to benefit listed Columbia River salmonids. Increased survival of salmonids will increase the distribution of ocean nutrients into the upper reaches and tributaries of the Columbia River when these fish return from the ocean to spawn and die.

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. Access deterrents include steel wires across the hatchery ponds and tailrace, fencing and covers for hatchery ponds, and electric fencing. When hazing and access deterrents fail, options for removal are also implemented by the USDA Animal Control staff hired to conduct the hazing programs. The minor increase in human activity as a result of these predator control measures is unlikely to adversely affect steelhead.

Aquatic Settlement Agreement

The Aquatic Settlement Agreement includes implementation of the white sturgeon management plan. Increased predation may result from the enhancement of white sturgeon 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. The WSMP has provisions for adaptive management of supplementation activities should conflicts develop between stocked sturgeon and ESA-listed species. The WSMP 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.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.4.4.3 Tributary Rearing and Migration

Activities associated with the operation of the Wells Project also take place in upper portions of the tributaries outside of the Project Boundary.

Habitat Conservation Plan

The TCP found in Section 7 of the Wells HCP 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. A separate Section 7 consultation is initiated for actions associated with the TCP.

The Tributary Committee comprised of various fisheries agencies and the Tribes, 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 long-term 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 to receive permits for construction projects. Habitat preservation projects will benefit steelhead through the protection and enhancement of critical habitat (USFWS 2002a). 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 utilized 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 and authorization of incidental take of ESA-listed Permit Species.

In the long-term, any actions designed to remove migration barriers, stabilize stream channels and restore hydraulic equilibrium, increase riparian canopy cover, or increase base flows are expected to far outweigh small short term impacts and result in beneficial effects for adult and juvenile steelhead.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.4.4.4 Adult Upstream Passage Through Project Reservoir and Facilities

Four specific components of the adult migrations upstream and downstream of Wells Dam may affect anadromous fish species: adult migrational delay at project fishways, fallback, passage success at Project structures 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 (NMFS 2002a). Juvenile anadromous fish may experience increased mortality during their migration to the ocean as a result of passage through the Wells Project.

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. Steelhead utilize these ladders to pass upstream of the Wells Project. Each of the two fishways 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 (located on the west and east shores) 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.

Habitat Conservation Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of unavoidable juvenile and adult losses for each of the Plan Species 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 (Douglas PUD 2002).

The Adult Passage Plan is a subcomponent within the larger Passage Survival Plan contained within Section 4.4 and Appendix A 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 passage success, timing and rates of fallback.

Numerous 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 for fish migrating through a normal river setting (NMFS et al. 2002a).

NMFS et al. (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 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). 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).

NMFS et al. (2002a) concluded that this body of information strongly suggests that small delays at these projects are more than compensated for by faster travel through the reservoir impoundments. In addition, any delays that do occur are more likely to affect species that spawn soon after completing their migration (summer/fall-run Chinook salmon or sockeye salmon are more likely to be affected than those that hold in the rivers or streams for considerable periods of time prior to spawning [i.e., steelhead or spring Chinook salmon]). The effect of delays passing the fishway (hours to a few days) on Plan Species is likely non-existent for currently ESA-listed ITP Species and non-existent to very small for unlisted Plan Species. The proposed action should have no temporal effect, or a slight beneficial effect, on upstream migrating adults compared to the migration observed under unimpounded conditions.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.4.4.5 Adult Downstream Passage Through Project Reservoir and Facilities

The potential for adult steelhead to "fallback" through the dam once they have exited the fish ladder may result in injury due to increased contact with structural features of the dam (spillways, turbines, juvenile bypass, and fish ladder). Fallback is defined as voluntary or involuntary movement of a fish downstream past a dam once upstream passage has been achieved.

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. Of the 11 fish that fell back in 1999, 4 re-ascended the ladder, 6 were found in spawning areas downstream of Wells Dam with only 1 fish classified as an involuntary fallback. These fallback rates were consistently lower than the other mid-Columbia River dams (range: 7 to 12 percent). English et al. (2001) also found that 94 percent of the fallback fish were of hatchery origin. In addition, 70 percent of the hatchery fish and 100 percent of the wild 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 overwinter in the Wells Hatchery outfall.

Habitat Conservation Plan

The adult survival standard from the Wells HCP ensures that survival will be at or above 98 percent survival. Adult PIT-tag studies indicate that adult survival has been consistently greater than 98 percent per project since 2004 when the HCP was implemented. The majority of steelhead fallback takes place through the JBS where survival is high.

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 operations including the JBS or spillways.

Survival rates of adult salmon and steelhead passing through the mid-Columbia River have not been estimated due to the inability to differentiate tag loss, tag failure, and fish loss (NMFS 2002a). It is not presently possible to measure adult survival with existing

technology. Although radio telemetry studies provide information on adult passage and apparent spawning distribution, uncertainties associated with the technology, and the inability to determine the ultimate fate or spawning success of radio-tagged fish, result in insufficient data to accurately estimate survival. In addition to the uncertainties related to the survival estimates developed through radio telemetry data, it is not possible to differentiate natural mortality from project-related mortality. However, PIT-tag studies have shown that minimum per-project survival rates exceed 98% per project, demonstrating that adult mortality rates are extremely low, irrespective of cause (Anchor and Douglas PUD 2009).

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.4.4.6 Juvenile Passage

Habitat Conservation Plan

The Passage Survival Plan contained within Section 4 of the Wells HCP provides specific detail regarding the implementation and measurement of unavoidable juvenile and adult losses for each of the Plan Species 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 (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 migration at Wells Dam are provided a safe, non-turbine passage route around the dam. The operational dates for the bypass are set annually by unanimous agreement of the parties to the Wells HCP. This plan also includes specific operating criteria for the turbines and spillways sufficient to maximize fish use and survival through the JBS (USFWS 2004b). 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.

The JBS utilizes five of eleven spillways equipped with constricting barriers to help 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 JBS serves as an effective 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, while maximizing fish passage and survival.

Operation of the spillways may result in supersaturated levels of total dissolved gasses. Supersaturated gases in fish tissues may pass from the dissolved state to the gaseous phase as internal bubbles or blisters. This condition, GBT or GBD, can be debilitating or even fatal. Injury and mortality of steelhead may also occur as a result of contact with spillway structures. It is also likely that juveniles that successfully pass through the spillway may be subject to increased susceptibility to predation caused by disorientation or increased susceptibility to infection caused by scale loss or non-lethal wounds incurred during spillway passage (USFWS 2004c). Douglas PUD closely monitors TDG level and as stated within objective 1 of the Water Quality Management Plan, Douglas PUD will implement “reasonable and feasible measures” to ensure that Douglas PUD is in compliance with TDG standards (Douglas PUD 2008g).

Direct or indirect effects on juvenile steelhead are likely to occur as a result of downstream movement through turbines. These effects may include physical injury or mortality from contact with turbine structures including wicket gates, turbine runners, or the spiral case. Indirect effects may include increased susceptibility to predation caused by disorientation following turbine passage or increased susceptibility to infection caused by scale loss or non-lethal wounds incurred during turbine passage.

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.

Survival standards outlined in the HCP ensure that survival will be at or above 93 percent. Douglas PUD has conducted three years of juvenile survival studies at Wells

Dam which have shown an average survival rate of 96.2 percent for yearling Chinook and steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). This is the highest survival rate for any dam on the Columbia or Snake rivers.

The operation of Hatchery enhancement activities has the potential to create both positive and negative results for steelhead. The Hatchery Compensation Plan, as described in Section 8 of the Wells HCP, was established to provide hatchery compensation for up to 7 percent unavoidable juvenile passage losses of Plan Species passing through Wells Dam. The goal of the program is to utilize hatchery produced fish to replace unavoidable passage losses in such a manner that the hatchery fish produced contribute to the rebuilding and recovery of naturally reproducing populations of Plan Species, in their native habitats, while maintaining the genetic and ecological integrity of each stock of Plan Species. Supporting harvest, where appropriate, is also identified as a goal of the Hatchery Compensation Plan.

Douglas PUD owns and provides funding for the operation and maintenance of two hatchery facilities, the Wells and Methow hatcheries. Both are operated by WDFW. Of the two hatcheries, steelhead are only produced at the Wells Hatchery. The hatchery is located immediately adjacent to Wells Dam on the west tailrace embankment. The steelhead raised at the Wells Hatchery are either transported and released by truck or acclimated in the Methow and Okanogan rivers. No juvenile steelhead are released through the hatchery outfall channel.

The Wells Hatchery is operated to provide compensation for both inundation and passage losses as described in the Wells HCP. The inundation compensation is related to Wells Project construction and includes the production of 300,000 yearling steelhead. The juvenile passage loss compensation provided by the Wells Hatchery is currently set at 48,858 yearling steelhead (3.8 percent) (Douglas PUD 2006b). In addition to the steelhead raised for Douglas PUD, the Wells Fish Hatchery also produces up to 80,000 steelhead smolts for Grant PUD to support compliance with their passage loss obligations.

Natural and hatchery steelhead are collected at the west ladder of Wells Dam. Collections at Wells Dam and FH have provided steelhead to various locations, including Winthrop NFH, Chelan Falls FH, Eastbank FH, and at times, to Ringold Springs FH. Adult steelhead retained at Wells Dam and FH for broodstock are selected by proportional return time (i.e., 20 percent August returns, 30 percent September returns, etc.). Steelhead are spawned at the hatchery from January through early March. In comparison, wild fish spawn in the rivers from March through May. An average of 7.5 percent of the females spawned at Wells FH are wild fish (NMFS 2002a), which typically spawn later in the year than hatchery fish. In addition, Winthrop NFH rears an additional 100,000 Wells stock steelhead smolts for release into the Methow River at Winthrop

(NMFS et al. 1998). A description of the Wells and Methow FH hatchery programs are available in Section 3.

Adult steelhead are incidentally captured in the Twisp Weir during brood stock collection for spring Chinook in April through June. Based on monitoring studies completed in 2008, the newly constructed Twisp Weir was found to not be a migration impediment or a stranding structure for adult steelhead and kelts. Juvenile steelhead are captured during hatchery evaluation actions including screw traps and residual steelhead sampling. Captured juveniles are released and this type of monitoring is unlikely to cause a significant impact.

The BO on Artificial Propagation in the Columbia River (NMFS 1999a), the BO on Effects on Upper Columbia River Spring-run Chinook Salmon Supplementation program and associated scientific research and monitoring conducted by the WDFW and the USFWS (NMFS 2002c), and the BO for 1995-1998 Hatchery Operations in the Columbia River Basin (NMFS 1995) identify 11 general types of potential adverse effects of hatchery operations and production on natural fish populations. These effects include: (1) operation of hatchery facilities, (2) broodstock collection, (3) genetic introgression, (4) disease, (5) competition/density-dependent effects, (6) predation, (7) residualism, (8) nutrient cycling, (9) masking, (10) fisheries, and (11) monitoring and evaluation/research.

NMFS evaluated the above mentioned potential adverse effects in the BOs supporting the issuance of ESA Section 10 incidental take permits (permit 1395, 1391, 1347, and 1196) in accordance with Section 7 of the ESA. In the BOs from NMFS, the agency determined that an annual take of endangered steelhead for scientific research and enhancement of steelhead is not likely to jeopardize the continued existence of steelhead and spring Chinook salmon. In addition, NMFS concluded that the supplementation programs covered by the permits are expected to provide a survival benefit to steelhead by increasing the natural production of Wenatchee, Methow, and Okanogan basins.

Aquatic Settlement Agreement

No potential effects were identified.

Terrestrial Resources Management Plans

No potential effects were identified.

Off-License Agreement

No potential effects were identified.

4.4.4.7 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 Wells Project 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 Wells Project is of high quality and is in compliance with the State standards for all of the parameters measured. Notable exceptions to meeting the State standards included seasonal exceedances in water temperature and TDG.

Water temperature issues within the Wells Project primarily occur in the lower Okanogan River. 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 Consultants, Inc. 2008).

The model analyses demonstrated that "with Project" temperatures in the Columbia, Okanogan and Methow rivers do not increase more than 0.3oC compared to ambient ("without Project") conditions anywhere in the reservoir, and that the Project complies with state water quality standards for temperature. 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 also moderate the cold winter temperatures by 1-3°C, reducing the extent and length of freezing.

The lower Okanogan is utilized 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. The few instances of relatively high water temperature within the mainstem Columbia River were primarily a result of upstream releases from Grand Coulee and Chief Joseph dams.

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 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 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 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. As previously addressed above in section 4.4.4.4, studies by Bickford et al. (1999, 2000, 2001) show that passage survival at the dam is 96.2 percent for juvenile salmon and steelhead. Successful passage by these young and sensitive life stages suggests that water quality is not posing a notable issue for survival.

No effect was identified that related to any of the proposed measures.

4.4.4.8 Water Quantity

The quantity of water flowing through the Wells Project can create alterations to the reservoir environment that my affect steelhead. These alterations include fluctuations in reservoir stage that may strand individuals in near shore habitat or possibly increase interaction with predators due to lower water volume.

The Wells Project is a run-of- river project meaning that average daily inflow equals daily outflow. As a result, the limited active storage capacity is only sufficient to regulate flow on a daily basis. Alterations in water volume or reservoir fluctuations are minimal and largely driven by the discharge of water from Chief Joseph Dam and Grand Coulee Dam. Reservoir stage fluctuation remains within one to two ft on a daily basis. Reservoir elevations below 774 ft MSL do not occur very often (generally no more than one a year) but have the potential to strand fish in large off-channel pools. Conditions that could results in stranding were surveyed for steelhead in 2006 and 2008. No stranding was observed (LGL and Douglas PUD 2008).

No effect was identified that related to any of the proposed measures.

4.4.4.9 Riparian Cover

Natural cover can provide important habitat for rearing sub-adult steelhead. Significant riparian cover is found in riverine areas and is limited in lacustrine environments. Cover is generally not utilized when steelhead migrate through Wells Reservoir. Spawning and rearing habitat occurs in the upper Methow River which is outside of the action area and will not be affected by Wells Project operations.

The banks of the Wells Project offer limited riparian cover. This is largely a result of the typical lack of riparian cover in natural high desert ecosystems typical of the Wells Project.

Additional funds provided by Douglas PUD for restoration measures occurring outside of the Wells Project are detailed in the TCP. Douglas PUD funded projects will improve habitat and potentially increase riparian cover. The potential for such riparian restoration to occur is contingent upon project selection by the Tributary Committee.

No effect was identified that related to any of the proposed measures.

4.4.4.10 Critical Habitat

Designated critical habitat for steelhead occurs within the Wells Project, and include: (1) the mainstem Columbia River from the Wells Tailrace to the confluence of the Columbia and Okanogan rivers; (2) the accessible portions of the Methow River Basin; and (3) the accessible portions of the Okanogan River Basins, excluding the Colville Reservation and Salmon Creek (NOAA 2006).

Habitat components important to steelhead in the mid-Columbia River basin include:

- juvenile rearing areas,
- juvenile migration corridors,
- areas for growth and development,
- adult migration corridors, and
- spawning habitat.

Within these habitat types, essential features include:

- adequate substrate,
- water quality,
- water quantity,
- water temperature,
- water velocity,
- cover/shelter,
- food,
- riparian vegetation,
- space, and
- safe passage conditions (65 FR 7764).

The diverse needs of steelhead are well known by Douglas PUD. Efforts to manage the Wells Project consistent with these needs are documented throughout the developed management plans and other conservation, management, and recovery actions taken by the PUD, in coordination with state and federal fish and wildlife agencies. These actions are described throughout this BA and represent Douglas PUD's efforts to operate the Wells Project and eliminate population-level impacts to steelhead critical habitat as a

result of the Wells Project. Success of these efforts is demonstrated through achievement of the HCP NNI standard for steelhead.

Effects of the proposed action on individual critical habitat elements are addressed in the preceding assessments of potential effects of proposed measures on individual critical habitat elements, the determination of effects in section 4.4.5, and the summary effects matrix for steelhead in Table 4.4.5-1.

4.4.5 Determination of Effects

The following section provides a summary matrix (Table 4.4.5-1) of the potential effects described above and draws an effects determination based upon the dichotomous key developed by USFWS (1998b).

Table 4.4.5-1 Summary Effects Matrix for UCR Summer-run Steelhead within the Wells Project

Critical Habitat	Project Effect	Upper Columbia River Subbasin Designated Area Affected	Exposure over 50-year Duration of Proposed Action	Response	Limiting to Conservation
Spawning, incubation and larval development	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions, and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and tributaries	All spawning occurs upstream of the Project area. Spawning takes place in the mainstem Methow River and its tributaries. Spawning also occurs in the Lower Similkameen River--a tributary to the upper Okanogan River outside the Project Boundary.	NA	No effect
Rearing and migration within the Project	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions, and action described in the Terrestrial Resources Management Plans.	The defined Action Area representing Wells Reservoir and tributaries	Brief exposure during migration period. Steelhead smolts migrate through the project during April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. Monitoring indicates juvenile project survival is greater than 96%. Regarding predator control, potential for take is limited to longline angling. No steelhead have ever been captured in the history of the longline pikeminnow removal program. Any incidentally captured fish are released immediately.	Unlikely
Tributary Rearing and Migration (outside PB)	HCP Hatchery and Tributary Projects	The defined Action Area representing the Methow and Okanogan Rivers influenced by hatchery and tributary programs	Juvenile steelhead are captured during hatchery evaluation actions including screw traps and residual steelhead sampling. Adult steelhead are incidentally captured at the Twisp Weir during brood collection for spring Chinook in April through June.	Based upon monitoring in 2008, the newly constructed Twisp Weir is not a migration impediment nor is it a stranding structure for adult steelhead and kelts.	Unlikely
Passage through Project reservoir and facilities	Adult upstream fish passage	Columbia River Corridor	Brief exposure during migration period. Adults return from June through October	Not significant - passage times and survival are comparable to conditions without the Project	Unlikely
	Adult downstream passage	Columbia River Corridor	Brief exposure during migration period. Adults return from June through October. Kelts (post-spawn steelhead) migrate late April through June.	Not significant. Survival standards ensure that survival will be at or above 98% survival - Adult PIT-tag studies indicate survival is greater than 98% per project. Fallback rates are low. Most fallback takes place through the JBS where survival is high. A limited number of kelts passing downstream during late April through June when the JBS is in full operation. Most kelts likely use surface JBS. Some mortality may occur through turbines and spillway passage, but overall survival is expected to be high with JBS in place.	Unlikely
	Sub-adult passage	Columbia River Corridor	Brief exposure during migration period. Juveniles migrate downstream from April through June.	Not significant. Survival standards ensure that survival will be at or above 93%. Monitoring indicates 96% survival.	Unlikely

Table 4.4.5-1 (Continued) Summary Effects Matrix for UCR Summer-run Steelhead within the Wells Project.

Critical Habitat	Project Effect	Upper Columbia River Subbasin Designated Area Affected	Exposure over 50-year Duration of Proposed Action	Response	Limiting to Conservation
Water Quality	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions and actions described in the Terrestrial Resources Management Plans.	Columbia River Corridor	Brief exposure during migration period. Adults return from June through October and juveniles migrate downstream from April through June. Kelts migrate from late April through June.	Not significant - Wells Project is operated in a run-of-river mode, with water quantity largely dependent on incoming river flows. The project is not a consumptive user of water. In general daily inflows from Grand Coulee and Chief Joseph are equal to daily discharge at Wells Dam.	Unlikely
Water Quantity	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions and actions described in the Terrestrial Resources Management Plans.	Columbia River Corridor	Brief exposure during migration period. Adults return from June through October and juveniles migrate downstream from April through June. Kelts migrate from late April through June.	Not significant - proposed action will have no impact on the limited natural riparian cover, which is not typically used by migrating steelhead.	Unlikely
Riparian Cover	Project operations, including reservoir impoundment, reservoir fluctuation, maintenance, hydropower generation, Aquatic Settlement actions, actions described in the Terrestrial Resources Management Plans and Off-License Agreement.	Columbia River Corridor	Brief exposure during migration period. Adults return from April through early July and juveniles migrate downstream from April through June.	Not significant - proposed action will have no impact on the limited natural riparian cover, which is not typically used by migrating fish. TCP, Douglas PUD Land Use Policy, Aquatic Settlement Agreement and Off-License Agreement will have positive impacts to riparian cover within the Project. The TCP will have beneficial effects on riparian habitat in the tributaries outside of the Project Boundary.	Unlikely

Application of USFWS (1998b) decision matrix dichotomous key to determine potential effects on UCR summer-run steelhead.

The following is a stepwise assessment of potential effects on UCR summer-run steelhead salmon based on a dichotomous key developed by USFWS (1998b).

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Steelhead are a listed species that occur in Wells Reservoir, tailrace and the Methow and Okanogan river watersheds. The Wells Project primarily serves as a migratory corridor for returning adults and outmigrating smolts and kelts. Usage of the Wells Project area is generally limited the months of April to June for juveniles and kelts and the months of June to October for adults. Individual fish spend a few days migrating through the Project thereby reducing overall exposure and take. The Project does not contain significant rearing habitat for juvenile steelhead.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

Yes. The proposed action may result in delay, stress or mortality during passage through project facilities. Juvenile steelhead may be exposed to predators such as northern pikeminnow during migration. Returning adult steelhead may exert increased levels of energy to pass the dam and may incur additional energetic costs associated with fallback and a second pass through the ladders. The primary route of fallback is through the juvenile bypass system during June through August and through turbines during September and October. The primary route of downstream passage for juvenile and kelt steelhead is through the juvenile bypass system that is in operation during their entire downstream migration (April – June). Less than 5 percent of the downstream migration juvenile steelhead are exposed to injury or mortality through interaction with the turbines. Juveniles or adults passing through the Wells Project tailrace may experience higher than ambient levels of TDG.

The overall potential for these identified effects to impact the population of steelhead is low. Spawning and rearing occur outside of the Project in the upper Methow and Okanogan rivers and tributary streams. Sensitive life history stages rear in locations where Project effects are absent. Use of the lower tributaries and the Wells Reservoir is primarily as a migratory corridor. Longline fishing predator control efforts in the reservoir have never captured a steelhead, displaying the effective selectivity of the control method. Passage at the reservoir is highly efficient and with minimal mortality. NMFS et al. (2002a) concluded that small delays at mid-Columbia River projects are more than compensated for by faster travel through the reservoir impoundments. 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. Of the 11 radio-tagged steelhead that fell back in 1999, four re-ascended the ladder and six were found in spawning areas downstream of Wells Dam, with only one fish classified as an involuntary fall back. NMFS estimated mortality rates were relatively minimal (3.2 percent) for steelhead (NMFS 2000a, based on data in NMFS 2000b). Douglas PUD has conducted three years of juvenile survival studies at Wells Dam which have shown an average survival rate of 96.2 percent for steelhead (Bickford et al. 1999; Bickford et al. 2000; Bickford et al. 2001). More recently, adult PIT-tag estimates from the 2008 annual HCP report indicate that adult project survival is greater than 98 percent (Douglas PUD and Anchor Environmental, L.L.C. 2009).

The proposed action will also result in numerous benefits to steelhead that are expected to exceed the negative impacts described above. Existing management efforts and the implementation of Wells HCP management plans will provide numerous benefits to steelhead. Currently, the Wells HCP mandates juvenile passage survival of at least of 93 percent. Predator control efforts will continue to reduce the number of northern pikeminnow. Artificial enhancements through the hatchery management plan help bolster wild population numbers and provide up to 7 percent compensation for unavoidable Wells Project related effects. The Tributary Conservation Plan will help to restore habitats used for spawning and rearing outside of the Wells Project area and provide up to 2 percent compensation for unavoidable Wells Project related effects to adult steelhead.

Step 3. Does the proposed action have the potential to result in "take" of any listed or proposed species?

Yes. Juvenile mortality of three to seven percent during Project passage will likely continue, some portion of which is attributable to Project effects. Based upon PIT-tag data, take of adults is expected to be less than 2 percent. The Wells Project has achieved NNI for each Plan Species, including steelhead through a combination of high juvenile and adult survival through the Project coupled with hatchery compensation and tributary conservation efforts intended to replace the relatively small amounts of unavoidable "take" associated with operating the Wells Project (Douglas PUD and Anchor Environmental, L.L.C. 2009). Various plans to continue the achievement of NNI include the Passage Survival Plan, Wells Dam Juvenile Dam Passage Survival Plan, TCP, Hatchery Compensation Plan, Adult Passage Plan, and Predator Control Program. The standards and actions outlined in these plans will ensure low levels of take and provide measures to ensure that recovery of the species would not be jeopardized.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

Yes. Lower water velocities within Wells Reservoir may pose brief energetic challenges during downstream migration of juveniles and kelts. While the reservoir is considered critical habitat, it is used primarily as a migratory corridor. Conversely, the lower velocities require less effort by returning adults. Important spawning and rearing grounds are not affected by the Wells Project. Restoration and protection measures within the TCP of the HCP will improve important spawning and rearing habitat. The HCP provides funding for habitat improvements and establishes an HCP Habitat Committee to prioritize expenditure of designated funds. Over the duration of the HCP, habitat improvements secured by designated HCP Plan Species Account funding is expected to offset 2 percent or greater of the unavoidable project mortality for steelhead, and contribute to recovery of this species.

Based on this analysis, the determination of effects of this proposed action on the steelhead is: MAY EFFECT, NOT LIKELY TO ADVERSELY AFFECT steelhead or designated critical habitat. Although individual steelhead would be subject to take, the proposed action would not jeopardize the continued existence of the species or subsequent ESU's. Relative to the entire life cycle of steelhead, use of Wells Reservoir is minimal and excepting function as a migration corridor, reservoir habitat is the least important of all habitat components. Further, HCP implementation measures would offset any take and could result in a net benefit due to population enhancement and habitat restoration.

4.5 MARBLED MURRELET

The USFWS listed the marbled murrelet as threatened under the ESA on September 28, 1992 (57 FR 45328). In 1997, the USFWS finalized a recovery plan for this species (USFWS 1997b). A five-year review of the marbled murrelet was completed on September 1, 2004 to ensure accuracy of the species' ESA classification (73FR 57314). This review found that the California, Oregon, and Washington marbled murrelet population was not a DPS; however, the USFWS believes the analysis of the discreteness of this population segment was flawed (73 FR 57314). The USFWS initiated a rangewide status review of the marbled murrelet on October 2, 2008 to determine if delisting the California, Oregon, and Washington population is warranted (73 FR 57314).

4.5.1 Life History

The marbled murrelet is a small (9-12 ounces) seabird that spends most of its life in marine environments, but usually nests in forested habitats within 30 miles (but sometimes up to 50 miles) of the Pacific Coast, from Alaska to central California (McShane et al. 2004). Marbled murrelet nesting habitat is typically associated with

large core areas of mature and old-growth coniferous forests with low amounts of edge and fragmentation in mesic forest zones (includes "west-side mid-and late-seral conifer and mixed forests in zones below the Mountain Hemlock zone west of the Cascade crest, and Interior Western Hemlock just east of Snoqualmie Pass" [Smith et al 1997]). These forests provide large limbs and natural platforms that these birds use as nest sites. Typically a single egg is laid in a mossy depression or on dwarf mistletoe on a large-diameter branch; both parents help feed the chick, spending time away from the nest site foraging in nearshore saltwater. Marbled murrelets also sometimes lay eggs on bare talus slopes or cliff edges; there is only one documented occurrence of cliff nesting in Washington (Raphael and Bloxton 2008). These nest sites are common in Alaska where cliffs are more abundant.

Marbled murrelets have occasionally been observed using inland lakes as resting or foraging locations in British Columbia; however, most of these lakes were located within 12 miles of the ocean, and few were as far as 45 miles (Carter and Sealy 1986). The inland lakes appeared to be near mature old-growth nesting areas (Carter and Sealy 1986).

4.5.2 Presence in the Action Area

The Action Area of the Wells Project is well outside of the known range of marbled murrelet and does not contain suitable marbled murrelet habitat. The mature conifer forested areas in the Wells Project area do not consist of large core areas and are generally dominated by ponderosa pine (Douglas PUD 2006a); these forests are outside of the habitat zones for this species (Smith et al. 1997). The Wells Project is located more than 100 miles from the Pacific Coast, which is farther inland than marbled murrelet is known to occur (Whitworth et al. 2000, as cited in McShane et al. 2004). None of the habitats in the Wells Project area correspond to known marbled murrelet nesting habitat (Smith et al. 1997). This species has never been documented in the Wells Project area and was not included on a USFWS list of threatened and endangered species that may be present near the Wells Project (Douglas PUD 2006c).

4.5.3 Critical Habitat Designations

The USFWS designated 32 critical habitat units for the marbled murrelet in California, Oregon, and Washington on June 24, 1996 (61 FR 26256), and proposed to revise the designated critical habitat by removing acreage in California and Oregon on July 31, 2008 (73 FR 44678). No critical habitat for marbled murrelet occurs in Chelan, Douglas, or Okanogan counties (USFWS 2009b). The nearest marbled murrelet critical habitat to the Wells Project area is about 60 miles west of the Wells Project.

4.5.4 Environmental Measures and Analysis of Effects

No suitable marbled murrelet habitat exists in the Wells Project area. Based on the known distribution of this species and the lack of habitat, marbled murrelet are not expected to occur within the Wells Project area. The licensee proposes no changes in operations that would increase or decrease the likelihood of marbled murrelets using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

No. The marbled murrelet is not present in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the marbled murrelet.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the marbled murrelet.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on marbled murrelet habitat.

4.5.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on the marbled murrelet is: NO EFFECT.

4.6 GREATER SAGE-GROUSE

The Columbia Basin DPS of the greater sage-grouse is currently a candidate species under review for ESA listing. The USFWS initiated a status review to determine if the species warrants protection under the ESA in any portion of its range on February 26, 2008 (73 FR 10218). The final decision on whether the greater sage-grouse should be protected under the ESA originally due in May 2009, has been delayed pending new

information about the species and its habitat. Publication of this new information is currently expected during the summer of 2009.

4.6.1 Life History

The greater sage-grouse is the largest (3-6 pounds) grouse species in North America. This species is found in a variety of shrub-steppe habitats, and relies heavily on sagebrush for nesting habitat, roosting cover, and food, especially during the winter. In the breeding season, sage-grouse males gather at leks to display to and compete for females. Leks are located on relatively open sites typically surrounded by denser shrub-steppe vegetation that is used for cover, thermal protection and feeding. Leks range in size from 0.1 acre to 90 acres and may be traditional (i.e., used in successive years) (USFWS 2008a). Greater sage-grouse populations in Washington have low reproduction rates and relatively high mortality rates (Hays et al. 1998).

The reduction in sage-grouse numbers and distribution in Washington is primarily attributed to loss and degradation of habitat through conversion to agriculture and other land uses. Before the arrival of early settlers, the climax condition in the shrub-steppe region of eastern Washington consisted of tracts of native sagebrush and bunchgrass species. Agricultural expansion, overgrazing, and sagebrush control through burning, mechanical removal, and chemical control, severely degraded and fragmented sage-grouse habitat. Approximately 40 percent remains of the estimated 4.16 million ha (10.4 million acres) of shrub-steppe that existed in eastern Washington before European settlement, and much of what remains is fragmented. Sage-grouse habitat is a subset of this remaining acreage, and factors affecting occupancy include elevation, slope, soil type, habitat quality, and patch size (Stinson et al. 2004).

4.6.2 Presence in Action Area

Sage-grouse were found throughout the shrub-steppe and meadow steppe vegetation zones before settlement of eastern Washington State (Hays et al. 1998). Based on botanical surveys by Douglas PUD, shrub-steppe comprises 19.8 percent (502 acres) of the 2,539 acres of non-aquatic habitat found in the study area (Douglas PUD 2006a). Although the historical range of the species encompassed the entire Wells Project, the current range is entirely outside the Wells Project Boundary (Schroeder et al. 2000; Hays et al. 1998). Sage-grouse are now confined to two isolated populations, one in Douglas and Grant counties approximately 5-10 miles from the Wells Project area and the other on the Yakima Training Center in Kittitas and Yakima counties over 60 miles from the Wells Project area. The statewide breeding population of sage-grouse in Washington in 1997 was estimated to be approximately 900-1,000 birds. About 600 sage-grouse occur in Douglas County and 300-400 are located in Kittitas and Yakima counties. The closest occupied habitat to Wells Reservoir is situated on the Waterville Plateau in northern Douglas County (Hays et al. 1998). The Wells Project's 230kV transmission lines

crosses historically occupied sage-grouse habitat however the surveys for sage grouse conducted during 2008 did not document any occurrences of the species within or adjacent to the Project (Douglas PUD 2009a).

Targeted surveys of the 230kV transmission line and the Wells Project area were conducted in 2008 and revealed no evidence of use by greater sage-grouse (Douglas PUD 2009h). The nearest known sage-grouse lek in the vicinity of the study area is approximately 5 miles east of the transmission line corridor, near the northern end of the route. This lek was last known to be active in 1995; no activity was observed during surveys in 2000 (M. Schroeder, WDFW, personal communication as cited in Douglas PUD 2008a).

4.6.3 Critical Habitat Designation

No critical habitat has been designated for the greater sage-grouse.

4.6.4 Environmental Measures and Analysis of Effects

Although there is approximately 500 acres of shrub-steppe habitat in the Wells Project area, greater sage-grouse populations in Washington State appear to be restricted to locations well outside of the Wells Project area (USFWS 2008a). There is no known information to suggest any effect of the Wells Project on the reduction in sage-grouse numbers and distribution in Washington. The licensee proposes no changes in operations that would increase or decrease the availability of preferred habitat for this species or the likelihood of greater sage-grouse using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Greater sage-grouse is a proposed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on greater sage-grouse.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to greater sage-grouse.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on greater sage-grouse habitat.

4.6.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on greater sage-grouse is: NO EFFECT.

4.7 FISHER

The West Coast DPS of the fisher is a candidate species for ESA-listing; listing was found to be warranted but precluded by higher priority actions on April 8, 2004 (68 FR 18770). The determination of "preclusion" is based on the species' listing priority number (LPN; range from 1 to 12) and the listing workload of the USFWS. Preparation of a listing proposal for this species is therefore delayed until higher priority actions are completed. The fisher is assigned a LPN of 6, a moderate priority.

4.7.1 Life History

The fisher is a medium-sized (3-13 pounds), stocky member of the weasel family. It is a generalist predator and inhabits closed-canopy coniferous, deciduous, and mixed forest types with large trees, snags, and large woody debris: characteristics typical of mature and old-growth forests. The fisher is solitary and avoids non-forested and open areas (Powell and Zielinski 1994).

Historically, fisher were widespread in low- to mid-elevation forests (up to 8,200 ft) throughout the Cascades, Olympic Peninsula, and other parts of Washington State (Powell and Zielinski 1994). More recently, fisher have typically been found from 3280 to 7200 ft elevation in the Cascade Range of Washington (Powell and Zielinski 1994). Due to over-trapping and loss of habitat, mostly due to logging, the fisher is currently very rare in the state.

4.7.2 Presence in the Action Area

No suitable mature forest habitat was located near or in the Wells Project area (Johnson and Cassidy 1997). Based on botanical surveys, upland mature closed-canopy forest comprises less than 0.2 percent of the 2,539-acres of non-aquatic habitat found in the study area (Douglas PUD 2006a). However, these forest types in the Wells Project area are dominated by ponderosa pine (Douglas PUD 2006a); and there are no records of fisher using this type of forest (Johnson and Cassidy 1997). The habitat found in the Wells Project area includes mostly open water, irrigated agriculture, shrub-steppe,

emergent wetland/pond, and riparian shrub without a tree overstory (Douglas PUD 2006a, b). None of these habitats are preferred by fishers. In addition, mammal surveys conducted in the Wells Project area did not reveal any fisher or evidence of fisher (Douglas PUD 2006c). The fisher is not included in the mammal species that may occur in the transmission line study area (Douglas PUD 2009h).

4.7.3 Critical Habitat Designations

No critical habitat has been designated for the fisher.

4.7.4 Environmental Measures and Analysis of Effects

Less than five acres of ponderosa pine-dominated, forested lands occur in the Wells Project area. These forested areas are typically open stands along the shoreline of the reservoir, or along the Okanogan River (Douglas PUD 2006a). There is no evidence that fisher use ponderosa pine-dominated forest (Johnson and Cassidy 1997). No suitable habitat for the fisher occurs in or near the immediate Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of fisher using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The fisher is a candidate species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the fisher.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the fisher.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on fisher habitat.

4.7.5 Determination of Effects

Based on this key, the determination of effects of this proposed action on the fisher is: NO EFFECT.

4.8 COLUMBIA BASIN PYGMY RABBIT

The USFWS listed the Columbia Basin pygmy rabbit, a distinct subpopulation of the pygmy rabbit, as endangered under emergency provisions on November 30, 2001 (66 FR 59734); the listing rule was finalized on March 2003 (68 FR 10388). The USFWS issued a draft recovery plan for the pygmy rabbit in 2007 (USFWS 2007a). On January 8, 2008 the USFWS issued a 90-day finding on a petition to list the pygmy rabbit as threatened or endangered and initiated a status review to determine if listing is warranted (73 FR 1312).

4.8.1 Life History

The pygmy rabbit is the smallest rabbit in North America. It has a relatively small home range during the winter (30 to 100 meters from the burrow), and a larger range during the breeding season: female home ranges average 7 acres, whereas males have an average home range of 50 acres (WDFW 1995; USFWS 2007a; NatureServe 2009). Pygmy rabbits breed from February to June; gestation lasts approximately 22 to 24 days with up to six young per litter, and up to four litters per year. Kits emerge from their burrows after about two weeks (USFWS 2007a).

The pygmy rabbit is an herbivore; its primary food source is sagebrush, particularly during the winter months. Grasses and herbaceous plants supplement the diet during mid-to-late summer. Predation is the main cause of mortality for the pygmy rabbit; predators include badger, long-tailed weasel, coyote, bobcat, great horned owl, long-eared owl, ferruginous hawk, northern harrier, and common raven (USFWS 2007a; NatureServe 2009).

This species occurs throughout most of the semiarid, shrub-steppe biome of the Great Basin and nearby intermountain areas of the western United States. Within this biome, the pygmy rabbit prefers habitat types that include tall, dense stands of sagebrush, which they are highly dependent upon for food and shelter throughout the year. This species is one of only two rabbits in North America that digs its own burrow and is most often found in areas that include relatively deep, loose soils that allow burrowing (USFWS 2007a).

4.8.2 Presence in the Action Area

The historical distribution of the pygmy rabbit includes a core range in the northern Great Basin and a population in the Columbia Basin that has been genetically isolated from the core population for at least 7,000 to 10,000 years, and potentially as long as 115,000 years (Grayson 1987; Lyman 1991; Lyman 2004, as cited in USFWS 2007a). The Columbia Basin population had a broader distribution approximately 7,000 to 3,000 years ago; however, gradual climate change affected the distribution and composition of sagebrush habitat types, causing the range of the pygmy rabbit to shrink around 3,000 years ago (Lyman 1991; Lyman 2004, as cited in USFWS 2007a).

During the early 1900s, the pygmy rabbit was considered rare with local areas of occurrence within the Columbia Basin and was thought to be extirpated from the State of Washington during the mid-1900s. Pygmy rabbits likely occurred in portions of six Washington counties during the first half of the 1900s, including Douglas, Grant, Lincoln, Adams, Franklin, and Benton counties (USFWS 2007a). This species has only been found in southern Douglas and northern Grant counties since the mid-1900s (WDFW 2000, as cited in USFWS 2007a).

Five subpopulations were known in Douglas County (about 30 miles south of the Wells Project area) in 1987-1988 (USFWS 2007a). The largest known population was located at the Sagebrush Flat area in south-central Douglas County. In 1993, this population had an estimated 588 active burrows and fewer than 150 rabbits. A subpopulation was discovered on private land in northern Grant County in 1997 (USFWS 2007a). All known Columbia Basin pygmy rabbit populations experienced drastic declines due to catastrophic fire and other unknown reasons from 1997 to 2004 and are now considered extirpated; this may indicate that the Columbia Basin DPS of the pygmy rabbit is extirpated from the wild (USFWS 2007a).

In 2001, the WDFW initiated a captive breeding program for the Columbia Basin pygmy rabbit (Hays 2003). WDFW reintroduced 20 captive-bred rabbits to historically occupied habitats in the Columbia Basin (about 30 miles south of the Wells Project area) in March of 2007. A high level of predation reduced their numbers to five over the first several weeks (USFWS 2007a).

The Wells Project area contains some shrub-steppe habitat, but it is outside of the historical distribution, potentially occupied habitats, recovery emphasis areas, and the six-mile buffer of the Columbia Basin pygmy rabbit historic range in Douglas County, Washington (USFWS 2007a; Johnson and Cassidy 1997). No evidence of pygmy rabbits was detected during Wells Project baseline or relicensing studies (Douglas PUD 2006c, 2009h).

4.8.3 Critical Habitat Designations

No critical habitat has been designated for the Columbia Basin DPS of the pygmy rabbit due to a lack of information regarding specific habitat features essential to the species (68 FR 10388).

4.8.4 Environmental Measures and Analysis of Effects

The pygmy rabbit is unlikely to occur in the Wells Project area because it is well outside of the known historical population range, recovery emphasis areas, and the six-mile buffer. Douglas PUD proposes no changes in operations that would increase or decrease the availability of suitable habitat or the likelihood of pygmy rabbit using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Pygmy rabbit is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on pygmy rabbit.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to pygmy rabbit.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on pygmy rabbit habitat.

4.8.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on pygmy rabbit is: NO EFFECT.

4.9 GRAY WOLF

The USFWS listed the gray wolf as endangered within the contiguous 48 states on January 4, 1974 (39 FR 1171). In April of 2003, the USFWS reclassified the Western DPS of gray wolves as threatened (68 FR 15804). In March 2008, the Northern Rocky Mountains population of the gray wolf was established as a DPS and this species was federally delisted in Idaho, Montana, Wyoming and in far eastern Washington (not including the Wells Project area) and Oregon (73 FR 10514). The western limit of the Northern Rocky Mountain DPS includes lands east of Highway (Hwy) 97 in Okanogan County, north of the junction with Hwy 17; and Hwy 17 to the Oregon Border in Washington State. The Wells Project area lies just west of the western boundary of the Northern Rocky Mountains DPS. Wolves in Washington west of the Northern Rocky Mountains DPS, including the Wells Project area, have been continuously protected under the ESA since 1974.

4.9.1 Life History

Gray wolves are highly territorial, social and live in packs. The pack typically consists of a socially dominant (alpha) pair and its offspring; one or more family groups could be present in a pack. Pack size is highly variable, generally ranging between 4 and 11, although packs with as many as 27 members have been reported (NatureServe 2009; WDFW 2009b). The pack hunts, feeds, travels, and rests together, and also shares pup-rearing responsibilities (WDFW 2009b). Lone wolves are not uncommon and may move through territories of established packs (Natureserve 2009; WDFW 2009b).

The alpha pair breeds between January and March. Litter size ranges from 4 to 10 pups, averaging 6 to 7 pups. Some offspring remain with the pack; others disperse as they mature (NatureServe 2009; WDFW 2009b). Gray wolves are crepuscular or nocturnal. During the fall and winter in northern states, wolves spend a majority of their time sleeping, resting or traveling, with little time feeding (NatureServe 2009).

The gray wolf is a habitat generalist and can be found in a variety of terrestrial environments including alpine, desert, grassland/herbaceous, savanna, shrubland/chaparral, tundra, and conifer, hardwood, and mixed forest and woodland (NatureServe 2009). Agricultural lands, non-forested rangelands, and developed areas are unsuitable for gray wolf persistence due to "high rates of wolf mortality, high densities of livestock compared to wild ungulates, chronic conflict with livestock and pets, local cultural intolerance of large predators, and wolf behavioral characteristics that make them vulnerable to human-caused mortality in open landscapes" (WDFW 2009b). This species predominantly preys on ungulates. When the dominant prey is scarce or seasonally unavailable, wolves will prey on smaller animals, scavenge carrion, and even eat vegetation (NatureServe 2009; WDFW 2009b).

4.9.2 Presence in the Action Area

Gray wolves were common throughout most of Washington prior to 1800. Trapping of wolves as a commercial source of fur began in earnest during the 1820s. Despite the fur trade, wolves remained common in many areas of Washington into at least the 1850s. As ranching and farming became established during the last half of the 1800s, gray wolf populations declined due to trapping, hunting, and poisoning; the species was considered extirpated from Washington by the 1930s (WDFW 2009b).

Reports of wolf sightings and discovery of wolf tracks in Washington have increased since 2002; in most cases, these were individual wolves in Pend Oreille and Stevens counties. In 2007 and 2008, the presence of this species has been reported in Chelan (unconfirmed report), Okanogan, Stevens, Pend Oreille, and Garfield/Asotin counties (WDFW 2009b). A pack with pups was detected in the western part of Okanogan County in 2008. Wolves in northern Washington are likely individuals that have dispersed from Montana, Idaho, or British Columbia.

The WDFW classifies Douglas County as outside of the current range of the gray wolf (WDFW 2008b). While parts of Okanogan and Chelan counties contain suitable habitat, (WDFW 2008b; WDFW 2009b; Johnson and Cassidy 1997), the surrounding agricultural croplands and non-forested rangelands as well as human presence preclude wolf pack persistence in the Wells Project area as these lands are unsuitable for wolves (WDFW 2009b; Johnson and Cassidy 1997). The significant presence of agriculture and developed lands (32 percent of the Study Area; 822 acres) and the proximity of human presence to the Wells Project Boundary (generally within 50 ft of the shoreline) makes the Wells Project area unsuitable for the gray wolf (Douglas PUD 2006a).

The Northern Rocky Mountains DPS includes lands east of Hwy 97 in Okanogan County, north of the junction with Hwy 17; and Hwy 17 to the Oregon Border in Washington State. The Wells Project area lies west of the western boundary of the Northern Rocky Mountains DPS.

4.9.3 Critical Habitat Designation

There is currently no critical habitat designation for the Northern Rocky Mountain grey wolf population.

4.9.4 Environmental Measures and Analysis of Effects

No suitable gray wolf habitat occurs in the Wells Project area. Based on the known distribution of this species and the lack of habitat, gray wolves are not expected to occur within the Wells Project area. The licensee proposes no changes in operations that would increase or decrease the likelihood of the gray wolf using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The gray wolf is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the gray wolf.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the gray wolf.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on gray wolf habitat.

4.9.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on the gray wolf is: NO EFFECT.

4.10 GRIZZLY BEAR

The USFWS listed the grizzly bear as threatened on July 28, 1975 for the lower 48 states, except where listed as an experimental population or delisted (40 FR 31734). A recovery plan for the grizzly bear was approved in 1982 and finalized on September 10, 1993 (USFWS 1993). In June of 1997, the USFWS finalized a supplement to the grizzly bear recovery plan for the North Cascades ecosystem (USFWS 1997a). In February of 1993, the USFWS found the reclassification of the Selkirk population (in the extreme northeast corner of Washington State) from threatened to endangered unwarranted (58 FR 8250); in June of 1998, the USFWS found the reclassification of populations in the North Cascades from threatened to endangered warranted, but precluded by higher listing priorities (63 FR 30453). On April 18, 2007, the USFWS initiated a 5-year review of this species to ensure that the classification of this species as threatened on the List of Endangered and Threatened Wildlife and Plants is accurate (72 FR 19549).

4.10.1 Life History

Grizzly bears are large (250-600 pounds) and have extensive home ranges (50 to 500 square miles). This species requires large areas of relatively undisturbed habitat with diverse topography and vegetation (USFWS 1993). The grizzly bear is normally solitary in nature, but may congregate in areas with abundant food or when breeding or caring for young. Females typically breed every 2 to 4 years during late spring and early summer. Cubs are born in winter (litter size is 1 to 4) and remain with the mother for the first two winters. Young are born in a den, cave, crevice, hollow tree, hollow dug under a rock, or similar sites (USFWS 1993; NatureServe 2009). Grizzly bears dig their own hibernation den and enter dormancy in October and November; they emerge in the spring, usually in April or May.

Grizzly bears mostly occur in arctic and alpine tundra, and subalpine forests, although historically they occurred in a greater variety of habitats including open prairie, brushlands, riparian woodlands, and semidesert scrub. Preferred habitats are open meadows and avalanche chutes in the spring, and timberlands with berry bushes in later summer and fall. This species is commonly found only where food sources are abundant and concentrated (e.g., salmon runs or caribou calving grounds) (USFWS 1993; NatureServe 2009).

The grizzly bear is an opportunistic omnivore; vegetable matter (green vegetation, wild fruits and berries, insects, nuts, bulbs, and roots) predominates, with the rest of the diet comprised of carrion, fish and sometimes elk or moose calves or other small animals (USFWS 1993; NatureServe 2009).

4.10.2 Presence in the Action Area

In North America, the historical range of the grizzly bear extended from the mid-plains westward to the California coast and south into Texas and Mexico. Between 1800 and 1975, the population in the lower 48 States receded from an estimate of over 50,000 to less than 1,000 individuals (USFWS 1993). Currently, the US range includes Alaska and portions of Montana, Idaho, Wyoming, and Washington; these areas in the lower 48 states support approximately 1,200 to 1,400 individuals. In the latter four states, only five areas in mountainous regions, national parks and wilderness areas contain either self-perpetuating or remnant populations of grizzly bear (USFWS 1993). Recovery zones for the grizzly bear in Washington State include the Selkirk Mountains (2,200 square miles) with approximately 40 to 50 bears in the extreme northeast section of the state and less than 20 bears in the North Cascades (9,500 square miles) (USFWS 1993; USFWS 2009a).

The North Cascades Recovery Area includes the North Cascade National Park, the Wenatchee and Okanogan National Forests, and most of the Mount Baker-Snoqualmie National Forest. The North Cascades Recovery Area includes part of the Methow River upstream of the Wells Project area, but the area does not border the Columbia River and does not include the Wells Project area. Most of the Wells Project area is at low elevations whereas grizzly bears and grizzly bear habitats are likely to be at high elevations.

Douglas County is outside of the grizzly bear distribution and does not contain suitable habitat (WDFW 2008b; Johnson and Cassidy 1997). Portions of Okanogan and Chelan counties potentially support this species, but only in areas outside of the Wells Project area at high elevations (WDFW 2008b).

4.10.3 Critical Habitat Designations

Critical habitat for the grizzly bear was designated on November 5, 1976 (41 FR 48757). In Washington, grizzly bear critical habitat is located in the extreme northeastern corner of the State (41 FR 48757).

4.10.4 Environmental Measures and Analysis of Effects

Grizzly bear distribution and the North Cascade Recovery Area are outside of the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of grizzly bears using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The grizzly bear is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the grizzly bear.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the grizzly bear.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on grizzly bear habitat.

4.10.5 Determination of Effects

Based on this key, the determination of effects of this proposed action on the grizzly bear is: NO EFFECT.

4.11 CANADA LYNX

The USFWS listed the Canada lynx as threatened under the ESA on March 24, 2000 (65 FR 16051) and began a 5-year review of the Canada lynx population on April 18, 2007 to ensure accuracy of listing status (72 FR 19549).

Seven national forests manage Canada lynx habitat according to a cooperative conservation agreement between the USFS and USFWS (USFS and USFWS 2005).

4.11.1 Life History

The Canada lynx is a medium-sized felid (Adult males average 22 pounds in weight, and females average 19 pounds (McCord, and Cardoza 1982) that occurs in boreal and mountain regions dominated by large stands of mature, uneven-age coniferous or mixed forest with a well-developed understory and abundant large woody debris (Eder 2002).

Lynx in the Okanogan National Forest in Washington State prefer lodgepole pine forests over all other habitats (McKelvey et al. 1999b). This habitat type is associated with higher snowshoe hare densities; snowshoe hares are the primary prey base for lynx. While lynx sometimes enter open forest, rocky areas, and tundra to forage for prey, they are rarely found in dry forests, areas without forest cover, and shrub-steppe habitats (McKelvey et al. 1999a). Long distance foraging and dispersal movements of up to about 150 miles have been recorded, especially when prey is scarce (Saunders 1963; Mech 1980; Ward and Krebs 1985); but most lynx occurrences in non-forested areas are located within 6 miles of a coniferous forest; and dispersals over 62 miles from coniferous forests are extremely rare (McKelvey et al. 1999a). Population density usually is less than 10 per 40 square miles, and is dependent upon prey availability (McCord and Cardoza 1982).

Suitable lynx denning habitat is often found in mature and old-growth forests with substantial amounts of coarse woody debris; however, early successional forests with windthrow and snags may also provide suitable habitat (Aubry et al. 1999). The lower

elevation range for lynx in Washington is typically 4,000 ft MSL (Johnson and Cassidy 1997).

4.11.2 Presence in the Action Area

The Wells Project area and surrounding lands, which are all at relatively low elevation (about 770 - 1,400 ft MSL within the Project Boundary; and up to about 4,200 ft MSL along the transmission line), do not constitute suitable lynx habitat. The habitat found in the Wells Project area includes mostly open water, irrigated agriculture, shrub-steppe, emergent wetland/pond, and riparian shrub without a tree overstory (Douglas PUD 2006b; Douglas PUD 2006a). None of these habitats are preferred by lynx. Conifer cover types within the Wells Project area are dominated by ponderosa pine and constitute 5.3 acres, or 0.21 percent, of the study area lands. This cover type, however, is located at elevations 900 ft MSL and lower, which is outside of the range for Canada lynx.

The highest elevations in the Wells Project area could potentially extend into the range of Canada lynx; the transmission line crosses forested land at an elevation of approximately 4,200 ft MSL 6 mi northeast of the Rocky Reach Dam. This forest is a relatively small isolated patch, mostly below 4,000 ft MSL, and surrounds a local peak of 4,254 ft MSL; therefore it is unlikely to support lynx. This forest is across the Columbia River, and isolated from the Okanogan-Wenatchee National Forest, where lynx have been documented. Additionally, the Canada lynx in not included in the mammal species that may occur in the transmission line study area (Douglas PUD 2009h). A portion of the Wells Project area along the Methow River is 2.5 miles northeast of suitable lynx habitat in the Okanogan-Wenatchee National Forest; this land is approximately 840 ft MSL and is non-forested.

While suitable lynx habitat occurs near the Wells Project area, and lynx could use the site, Project lands could be used only as a travel corridor. The habitats within the Wells Project area are not preferred by lynx. Additionally, small mammal surveys conducted within the Wells Project area show that the primary prey item for lynx (snowshoe hare) is not known to occur in the Wells Project area (Douglas PUD 2006c).

4.11.3 Critical Habitat Designations

On November 9, 2006, the USFWS designated critical habitat for the Canada lynx in three units, including one in the North Cascades National Park in Washington (71 FR 66007). On February 28, 2008, the USFWS proposed a revision to the designated critical habitat for the Canada lynx that would add to the existing critical habitat (73 FR 10859). The nearest current Canada lynx critical habitat to the Wells Project is on lands above 4,000 ft MSL in the North Cascades National Park; located approximately 33 miles northwest of the Wells Project area. The proposed revision to the critical habitat includes lands above 4,000 ft MSL in the Okanogan-Wenatchee National Forest; located

approximately 2.5 miles west of the Wells Project area. The Wells Project area is not within designated critical habitat.

The USFS has documented the occurrence of lynx in the Okanogan-Wenatchee National Forest in the higher elevation mountains to the west of the Wells Project; however, the lack of suitable habitat in the immediate Wells Project area suggests that lynx rarely travel within the Wells Project.

4.11.4 Environmental Measures and Analysis of Effects

Preferred lynx habitat does not occur in the Wells Project area and it is unlikely that lynx would occur within the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of Canada lynx using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Canada lynx is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on Canada lynx.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to Canada lynx.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on Canada lynx habitat.

4.11.5 Determination of Effects

Based on this key, the determination of effects of this proposed action on Canada lynx is: NO EFFECT.

4.12 NORTHERN SPOTTED OWL

The northern spotted owl was listed as threatened throughout its range in California, Oregon, and Washington on June 26, 1990 (55 FR 26114). The USFWS conducted a 5-year review of the northern spotted owl in April of 2003 (68 FR 19569) and finalized a recovery plan in May of 2008 (USFWS 2008c).

4.12.1 Life History

The northern spotted owl is a medium-sized (1-1.5 pounds) owl that typically nests in old-growth or mature conifer forests; younger stands are sometimes used for foraging and roosting. Typical suitable forests have moderate to high canopy closure, multilayered canopy, abundant large trees with large cavities, broken tops, snags, and large woody debris. This nocturnal species preys primarily on flying squirrels and wood rats. Spotted owls form long-term pair bonds that are maintained throughout the year. Nest sites include natural hollows in large trees with broken tops, artificial nest boxes, mistletoe tangles and old stick nests left from other species; nest sites are reused for many years. Females typically lay 2 eggs, which hatch in 30 days. Spotted owls do not migrate, but may shift their range in order to find prey (e.g., heavy snow may prompt a shift to lower elevations).

4.12.2 Presence in the Action Area

Suitable habitat for the northern spotted owl does not occur within the Wells Project area (Douglas PUD 2006a; Smith et al. 1997). The conifer forest found in the Wells Project area is dry, inland ponderosa pine forest type, which typically does not support spotted owl (Thomas et al. 1990). Pine forests do not usually have structural characteristics necessary for suitable spotted owl habitat, particularly multilayered canopies (Thomas et al. 1990). Terrestrial habitats found in the Wells Project area are mostly irrigated agriculture, shrub-steppe, emergent wetland/pond, and riparian shrub without a tree overstory (Douglas PUD 2006a; Douglas PUD 2006b).

This species was not detected in avian surveys for the Forest Service and was not included in the Wells PAD as it is unlikely to occur in the Wells Project area (Douglas PUD 2006c; Douglas PUD 2006b).

4.12.3 Critical Habitat Designations

Critical habitat for the northern spotted owl was designated in 1992 (57 FR 1796) and revised in 2008 (73 FR 47326). In Washington, there are about 1.8 million acres of critical habitat in six units; the nearest to the Wells Project area is in the Okanogan Unit in the Okanogan National Forest. This critical habitat unit consists of 115,600 acres of Forest Service land and the nearest subunit is located 14.7 miles west of the Wells Project area.

4.12.4 Environmental Measures and Analysis of Effects

No suitable habitat for the northern spotted owl exists in the immediate Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the availability of suitable habitat or the likelihood of northern spotted owl using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The northern spotted owl is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the northern spotted owl.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the northern spotted owl.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on northern spotted owl habitat.

4.12.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on the northern spotted owl is: NO EFFECT.

4.13 WASHINGTON GROUND SQUIRREL

The Washington ground squirrel was listed as a candidate species by the USFWS in October 25, 1999 throughout its range in Oregon and Washington (64 FR 57533). In Washington, there are currently no formal agreements to protect the species. In Oregon, however, actions have been taken to address agricultural threats to a large portion of Washington ground squirrel habitat and, therefore, the overall threats are not considered imminent, which keeps its federal listing priority at a moderate level (73 FR 75175).

4.13.1 Life History

The Washington ground squirrel occurs in shrub-steppe and grassland habitats of the Columbia Plateau east and south of the Columbia River in Washington and Oregon. This species was historically associated with sagebrush and bluebunch wheatgrass habitats; however, removal and alteration of the native flora on non-agricultural land has allowed cheatgrass and rabbitbrush to proliferate in these habitats (Finger et al. 2007; USFWS 2008d; NatureServe 2009). The establishment of these species alters available cover, food quantity and quality, and increases fire intervals (73 FR 75175).

This small ground squirrel is diurnal and prefers areas of deep, undisturbed soils suitable for burrowing as it spends much of its time underground (Finger et al. 2007; USFWS 2008d; NatureServe 2009). Food sources for this species include herbaceous vegetation, roots, bulbs, seeds, and insects; native plants play an important dietary role (USFWS 2008d; NatureServe 2009).

The Washington ground squirrel breeds once per year, during late January to early February, soon after emergence from hibernation. In Douglas County, at the highest elevation and furthest northern limit of the range, emergence from hibernation occurs a month later, late February to early March. It is assumed other life history events are similarly delayed, compared to published studies which occurred further south and at lower elevations. Initiation of hibernation coincides with senescence of cool season grasses (personal communication, Beau Patterson). Young are born 23 to 30 days after breeding and litter size ranges from 5 to 11. In late May to June, ground squirrels enter their burrows and hibernate for 7 to 8 months. Individuals live alone or in colonies (USFWS 2008d; NatureServe 2009).

The main predator of the Washington ground squirrel is the badger (*Taxidea taxus*); others include northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), long-tailed weasel (*Mustela frenata*), mink, coyote (*Canis latrans*), striped skunk (*Spilogales putorius*), bald eagle, great horned owl (*Bubo virginianus*), black-billed magpie (*Pica pica*), common raven (*Corvus corax*), western rattlesnake (*Crotalus viridus*), and gopher snake (*Pituophis melanoleucus*) (Finger et al. 2007; NatureServe 2009).

This species is highly vulnerable to local extirpation because many extant colonies are small and isolated from other colonies, and land use patterns are not conducive to conservation. The Washington ground squirrel is sometimes considered an agricultural pest and is subject to recreational shooting (USFWS 2008d; NatureServe 2009).

4.13.2 Presence in the Action Area

The Washington ground squirrel is endemic to the Columbia Plateau, east and south of the Columbia River and east of the John Day River. Populations were historically located in Garfield, Spokane, Grant, Adams, Douglas, Franklin, Walla Walla, Lincoln, Columbia, and Whitman counties (Finger et al. 2007; USFWS 2008d). Recent occurrences in Washington are concentrated in Franklin, Lincoln, Walla Walla, Adams, Douglas, and Grant counties (Finger et al. 2007; USFWS 2008d).

In 2004, surveys of historical Washington ground squirrel sites found 47 active burrows in four locations in Douglas County: Foster Coulee, Jameson Lake, Sagebrush Flats, and Duffy Creek (Finger et al. 2007). The nearest active sites were located about 15 miles south and 15 miles east of the Wells Project area.

The Washington State Priority Habitats and Species List data indicates the Washington ground squirrel occurs in Douglas County (WDFW 2008a), south and east of the Wells Project. Suitable habitats are located in southern Douglas County (Johnson and Cassidy 1997). No evidence of Washington ground squirrels was detected during Wells Project baseline or relicensing studies (Douglas PUD 2006c, 2009h).

4.13.3 Critical Habitat Designations

No critical habitat has been designated for the Washington ground squirrel at this time.

4.13.4 Environmental Measures and Analysis of Effects

Washington ground squirrel distribution and known colony locations are outside of the Wells Project area. The licensee proposes no changes in operations that would increase or decrease the likelihood of Washington ground squirrel using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The Washington ground squirrel is a listed species in the watershed (Douglas County).

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the Washington ground squirrel.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the Washington ground squirrel.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on Washington ground squirrel habitat.

4.13.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on the Washington ground squirrel is: NO EFFECT.

4.14 YELLOW-BILLED CUCKOO

The western US DPS of the yellow-billed cuckoo is a candidate for ESA-listing; the USFWS determined that listing of this species as threatened is warranted, but precluded (69 FR 24876). In May of 2005, the USFWS elevated the ESA-listing priority of the yellow-billed cuckoo because threats are ongoing and, therefore, imminent (70 FR 24870).

4.14.1 Life History

The yellow-billed cuckoo is a robin-sized, grayish-brown and white bird with a down-curved bill. The cuckoo breeds in large sections of deciduous woodlands and riparian shrub; nesting sites are typically found in dense understory foliage. Cottonwoods and willows provide important foraging habitat, particularly for the western US population. Yellow-billed cuckoos eat primarily caterpillars and other insects. Young develop rapidly (17 days from egg laying to fledging of young) and both parents participate in brooding. Yellow-billed cuckoos occasionally lay eggs in the nests of other cuckoos or other bird species (USFWS 2008b).

In Washington, the yellow-billed cuckoo was historically fairly common locally along the lower Columbia River (Jewett et al. 1953; Roberson 1980; Marshall 1996, as cited in USFWS 2008b), but rare east of the Cascades. The species is now thought to be extirpated in Washington, Oregon, and British Columbia (USFWS 2008b).

4.14.2 Presence in the Action Area

The yellow-billed cuckoo is not likely to occur in the Wells Project area. Although surveys conducted in 2005 indicate that potentially suitable habitat (riparian deciduous tree cover including willows and cottonwoods) occurs in 141.9 acres (5.6 percent) of the Study Area (Douglas PUD 2006a), this species is believed to be extirpated from Washington and, therefore, it is not likely to be present in the Wells Project area. No cuckoos were detected during avian surveys of the Project area (Douglas PUD 2009h; Douglas PUD 2006c).

4.14.3 Critical Habitat Designations

No critical habitats have been designated for this species.

4.14.4 Environmental Measures and Analysis of Effects

It is unlikely that the yellow-billed cuckoo would occur in the Wells Project area as this species is believed to be extirpated from Washington. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of yellow-billed cuckoo using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Yellow-billed cuckoo is a candidate species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on yellow-billed cuckoo.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to yellow-billed cuckoo.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on yellow-billed cuckoo habitat.

4.14.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on yellow-billed cuckoo is: NO EFFECT.

4.15 WENATCHEE MOUNTAINS CHECKER-MALLOW

The USFWS listed the Wenatchee Mountains checker-mallow as federally endangered throughout its range on December 22, 1999 (64 FR 71680). A recovery plan was finalized for this species in 2004 (USFWS 2004a).

4.15.1 Life History

The Wenatchee Mountains checker-mallow, a member of the mallow family (*Malvaceae*), is a perennial herb with a stout taproot that gives rise to several stems 8 to 60 inches high. This species bears pale to bright pink flowers between June and August. The Wenatchee Mountains checker-mallow is endemic to Chelan County and known to occur at only five localities (USFWS 2004a). This species grows in moist meadows with saturated soil or surface water, though it is occasionally found in open conifer stands between elevations of 1970 and 3,300 ft MSL (CPC 2008b).

4.15.2 Presence in Action Area

The Wenatchee Mountains checker-mallow is currently known to occur in only five populations, all 40 to 45 miles southwest of the Wells Project area. Further, the Washington State Natural Heritage Program (WSNHP) database (2007) does not have records of occurrence in areas near the Wells Project area. This species is not described in the PAD because it is unlikely to be present in the Wells Project area. In addition, this species was not encountered during rare plant surveys conducted in the Wells Project area in 2005 (Douglas PUD 2009h; Douglas PUD 2006a).

4.15.3 Critical Habitat

The USFWS has designated 6,135 acres of critical habitat for the Wenatchee Mountains checker-mallow in Chelan County, approximately 40 miles southwest of the Action Area (USFWS 2004a).

4.15.4 Environmental Measures and Analysis of Effects

The Wenatchee Mountains checker-mallow is not known to occur in the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of the Wenatchee Mountains checker-mallow occurring in the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The Wenatchee Mountains checker-mallow is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the Wenatchee Mountains checker-mallow.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the Wenatchee Mountains checker-mallow.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on Wenatchee Mountains checker-mallow habitat.

4.15.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on the Wenatchee Mountains checker-mallow is: NO EFFECT.

4.16 SHOWY STICKSEED

The USFWS classified the showy stickseed as federally endangered throughout its range in Washington state on February 6, 2002 (67 FR 5515). A recovery plan for the showy stickseed was finalized by the USFWS in cooperation with the USFS in 2007 (USFWS 2007b).

4.16.1 Life History

Showy stickseed, a member of the borage family (*Boraginaceae*), is a short-statured upland plant (8-16 inches tall) with large, showy, white flowers (CPC 2008a). It is endemic to the Wenatchee Mountains in Washington and grows on steep slopes of granitic sand and rocks in openings within conifer forests that are maintained by periodic wildfires. Showy stickseed is found at elevations from 1600 to 2500 ft MSL (CPC 2008a). According to the USFWS (67 FR 5515), showy stickseed is extant at only one

location in Chelan County, Washington, with a population of 150-500 individuals entirely on federal land.

4.16.2 Presence in Action Area

Showy stickseed is not expected to occur in the Wells Project area because the species is only extant at one location near the City of Leavenworth, WA (50 miles southwest of the Wells Project area) (USFWS 2002b; USFWS 2007b). Showy stickseed was also not included in the target list of RTE plant species potentially occurring in the study area (which was developed from USFWS and Washington State DNR lists of RTE species that may be present near the Wells Project), and also was not detected in botanical surveys (Douglas PUD 2006a, 2009h). Further, the WSNHP database (2007) does not indicate any populations of showy stickseed in the general vicinity. This species is not described in the PAD because it is unlikely to be present in the Action Area (Douglas PUD 2006b).

4.16.3 Critical Habitat Designations

No critical habitat has been designated for showy stickseed as it was not deemed to benefit species conservation; rather a designation would likely increase collection and both direct and inadvertent habitat degradation and destruction (67 FR 5515).

4.16.4 Environmental Measures and Analysis of Effects

The one known population of showy stickseed does not occur in the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of the presence of this species in the Wells Project area.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Showy stickseed is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on showy stickseed.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to showy stickseed.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on showy stickseed habitat.

4.16.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on showy stickseed is: NO EFFECT.

4.17 UTE LADIES'-TRESSES

The USFWS listed Ute ladies'-tresses as threatened throughout its range (Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming) on January 17, 1992 (57 FR 2048). In 1995, the USFWS finalized a recovery plan for this species (USFWS 1995). On October 15, 2004, the USFWS began a five-year review process of the Ute ladies'-tresses status to consider delisting the species due to new information about the abundance and distribution of the species (69 FR 60605).

4.17.1 Life History

Ute ladies'-tresses, a member of the orchid family (*Orchidaceae*), is a perennial with 7 to 32 inch stems arising from tuberous roots (USFWS 2004b). The species puts out a spike of white flowers between August and September. Ute ladies'-tresses grows in silty loam alluvial soils associated with wetlands and floodplains of valley streams. There are known extant populations in eight states, including Washington (CPC 2008c).

4.17.2 Presence in Action Area

Rare plant surveys for the Wells ILP found no populations of Ute ladies'-tresses, although potentially suitable habitat was documented at stabilized gravel bars on the Columbia River that are moist throughout the growing season and inundated early in the growing season (Douglas PUD 2006a, 2009h). The WSNHP database (2007) does not indicate any populations in the Action Area, but does include records of populations in the vicinity. The closest recorded population is 4.5 miles downstream of the Wells Dam.

4.17.3 Critical Habitat

At this time, there is no critical habitat designated for Ute ladies'-tresses (CPC 2008c; USFWS 2004b).

4.17.4 Environmental Measures and Analysis of Effects

No populations of Ute ladies'-tresses have been found in the Wells Project area, although suitable habitat is present. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of Ute ladies'-tresses occurring in the Wells Project area.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Ute ladies'-tresses is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on Ute ladies'-tresses.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to Ute ladies'-tresses.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on Ute ladies'-tresses habitat.

4.17.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on Ute ladies'-tresses is: NO EFFECT.

4.18 NORTH AMERICAN WOLVERINE

The North American wolverine is a candidate species for ESA-listing in the contiguous United States; listing was found to be warranted but precluded by higher priority actions on December 14, 2010 (75 FR 78030). The determination of "preclusion" is based on the species' listing priority number (LPN; range from 1 to 12) and the listing workload of the USFWS. Preparation of a listing proposal for this species is therefore delayed until higher priority actions are completed. The wolverine is assigned a LPN of 6, a moderate priority.

4.18.1 Life History

The wolverine is the largest terrestrial member of the family Mustelidae. Adult males weigh 12 to 18 kilograms (kg) (26 to 40 pounds (lb), and adult females weigh 8 to 12 kg (17 to 26 lb) (Banci 1994, *in* 75 FR 780530). In the southern portion of the species' range where ambient temperatures are warmest, wolverine distribution is restricted to high elevation alpine portions of Washington, Idaho, Montana, Wyoming, California, and Colorado (Copeland et al. 2010 *in* 75 FR 780530).

4.18.2 Presence in the Action Area

No suitable high elevation alpine habitat is located near or in the Wells Project area (Johnson and Cassidy 1997). The habitat found in the Wells Project area includes mostly open water, irrigated agriculture, shrub-steppe, emergent wetland/pond, and riparian shrub without a tree overstory (Douglas PUD 2006a, b). None of these habitats are preferred by wolverines. In addition, mammal surveys conducted in the Wells Project area did not reveal any wolverines or evidence of wolverines (Douglas PUD 2006c). The wolverine is not included in the mammal species that may occur in the transmission line study area (Douglas PUD 2009h).

4.18.3 Critical Habitat Designations

No critical habitat has been designated for the wolverine.

4.18.4 Environmental Measures and Analysis of Effects

No high elevation alpine habitats occur in the Wells Project area. No suitable habitat for the wolverine occurs in or near the immediate Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of wolverine using the Wells Project.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. The wolverine is a candidate species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on the wolverine.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to the wolverine.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on wolverine habitat.

4.18.5 Determination of Effects

Based on this key, the determination of effects of this proposed action on the wolverine is: NO EFFECT.

4.19 WHITEBARK PINE

The whitebark pine is a candidate species for ESA-listing in the contiguous United States; listing was found to be warranted but precluded by higher priority actions on July 19, 2011 (76 FR 42631). The determination of "preclusion" is based on the species' listing priority number (LPN; range from 1 to 12) and the listing workload of the USFWS. Preparation of a listing proposal for this species is therefore delayed until higher priority actions are completed. The whitebark pine is assigned a LPN of 2, a high priority based on imminent threats of high magnitude.

4.19.1 Life History

The whitebark pine is a member of the pine family (Pinaceae), and is a hardy conifer that tolerates poor soils, steep slopes, and windy exposures and is found at alpine tree line and subalpine elevations throughout its range (Tomback et al.2001, in 76 FR 42631). It grows under a wide range of precipitation amounts, from about 51 to over 254 cm (20 to 100 in.) per year (Farnes 1990, in 76 FR 42631). Whitebark pine may occur as a climax species, early successional species, or seral (mid-successional stage) codominant associated with other tree species. Although it occurs in pure or nearly pure stands at high elevations, it typically occurs in stands of mixed species in a variety of subalpine forest community types.

4.19.2 Presence in Action Area

Whitebark pine is not expected to occur in the Wells Project area because the species is found at alpine tree line and subalpine elevations in the eastern Cascades range. Whitebark pine was also not included in the target list of RTE plant species potentially

occurring in the study area (which was developed from USFWS and Washington State DNR lists of RTE species that may be present near the Wells Project), and also was not detected in botanical surveys (Douglas PUD 2006a, 2009h). Further, the WSNHP database (2007) does not indicate any populations of whitebark pine in the general vicinity. This species is not described in the PAD because it is unlikely to be present in the Action Area (Douglas PUD 2006b).

4.19.3 Critical Habitat Designations

No critical habitat has been designated for whitebark pine (76 FR 42631).

4.19.4 Environmental Measures and Analysis of Effects

There are no populations of whitebark pine in the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of the presence of this species in the Wells Project area.

Step 1. Are there any listed or proposed species present in the watershed?

Yes. Whitebark pine is a listed species in the watershed.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on whitebark pine.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to whitebark pine.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on whitebark pine habitat.

4.19.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on whitebark pine is: NO EFFECT.

4.20 NORTHERN WORMWOOD

Northern wormwood is a candidate species for ESA-listing. It is known from two populations along the banks of the Columbia River in Grant and Klickitat Counties, Washington. Listing was first found to be warranted but precluded by higher priority actions on October 25, 1999 (75 FR 69222). The determination of "preclusion" is based on the species' listing priority number (LPN; range from 1 to 12) and the listing workload of the USFWS. Preparation of a listing proposal for this species is therefore delayed until higher priority actions are completed. The northern wormwood is assigned a LPN of 3, due to imminent threats of high magnitude.

The species has never been found in Douglas County, Washington but has recently been added to the county list of listed and proposed endangered and threatened species and critical habitat by the USFWS (http://www.fws.gov/wafwo/pdf/DouglasCounty081111.pdf)

4.20.1 Life History

Northern wormwood is a perennial plant in the aster family (Asteraceae). Northern wormwood is a low-growing plant, generally 15–30 centimeters (cm) (6–12 inches (in)) tall, but may grow up to 40 cm (16 in) in height. This plant has a taproot, and basal leaves are crowded in rosettes. The basal leaves are 2–10 cm (1–4 in) long and divided two or three times in mostly linear divisions. Leaves on the upper stems are similar but smaller and less divided (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2XG).

This plant is restricted to exposed basalt, cobblysandy terraces, and sand habitat along the shore and on islands in the Columbia River.The two populations are located along the banks of the Columbia River in Grant and Klickitat Counties, Washington, and are separated by 200 miles (322 kilometers) of the Columbia River and three large hydroelectric dams. The Klickitat County population is declining; the status is unclear for the Grant County population; however, both are vulnerable to environmental variability. Surveys have not detected any additional plants (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2XG).

4.20.2 Presence in Action Area

The species has never been documented to occur north of the extant Grant County site (http://ecos.fws.gov/docs/candidate/assessments/2010/r1/Q2XG_P01.pdf). Rare plant surveys for the Wells ILP found no populations of Northern wormwood (Douglas PUD 2006a, 2009h). The WSNHP database (2007) does not indicate any populations in the Action Area.

4.20.3 Critical Habitat

At this time, there is no critical habitat designated for Northern wormwood (75 FR 69222).

4.20.4 Environmental Measures and Analysis of Effects

No populations of Northern wormwood have ever been found in the Wells Project area. Douglas PUD proposes no changes in operations that would increase or decrease the likelihood of Northern wormwood occurring in the Wells Project area.

Step 1. Are there any listed or proposed species present in the watershed?

No. Northern wormwood has never occurred in the watershed at or upstream from the Wells Project.

Step 2. Will the proposed action have any effect whatsoever (including small effects, beneficial effects, and adverse effects)?

No. The proposed action would have no direct or indirect effects on Northern wormwood.

Step 3. Does the proposed action have the potential to result in the "take" of any listed or proposed species?

No. The proposed action has no potential to cause any direct or indirect injury or harm to Northern wormwood.

Step 4. Does the proposed action have the potential to cause any adverse effect on any listed or proposed species habitat?

No. The proposed action has no potential to cause any adverse effect on Northern wormwood habitat.

4.20.5 Determination of Effects

Based on this analysis, the determination of effects of this proposed action on Northern wormwood is: NO EFFECT.

5.0 CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future state, tribal, local or private actions, not involving federal activities, that are reasonably certain to occur in the action area." Future Federal actions, including the ongoing operation of hatcheries, fisheries, and land management activities, are not considered within the category of cumulative effects for ESA purposes because they require separate consultations under Section 7 of the ESA after which they are considered part of the environmental baseline for future Section 7 consultations. 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 TMDL development and implementation, tribal efforts to restore native culturally important fish populations and public land use in the action area.

5.1 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.

5.2 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 stocks (specifically

salmon, steelhead, Pacific lamprey, and white sturgeon) in areas upstream of Bonneville Dam. 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.

5.3 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. Effects from public use of the action area would be addressed by Douglas PUD in the project environmental baseline and/or through consultation. Therefore, future public land use activities would not be considered as potential cumulative effects.

5.4 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. As a result, these activities would require Douglas PUD to initiate Federal consultation if the activity had not already been addressed in prior consultations. Therefore, no cumulative effects were identified based upon the NMFS and USFWS criteria.

6.0 SUMMARY OF EFFECTS DETERMINATION

A tabular summary of effects determinations for each of the 16 listed or candidate species considered here is provided below. Of the 16 analyzed species, only three fish species were identified as occurring in the action area. The proposed action is determined to have No Effect on 16 of the 19 species analyzed. The Effects Determinations for the three ESA-listed species found within the Wells Project include a Likely to Adversely Affect determination for bull trout and a May Effect, Not Likely to Adversely Affect determination for spring Chinook and steelhead (Table 6.0-1).

Table 6.0-1 Summary of Effects Determination for ESA-listed and Candidate Species.

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Fish Species			
Bull Trout (*Salvelinus confluentus*) Threatened	Likely to adversely affect	Habitat within the Project area primarily serves as a migratory corridor and would not result in destruction or adverse modification of designated or proposed critical habitat	Rearing and spawning occurs in the Methow and Twisp rivers. The lower Methow and Wells Project are used as a migration corridor. Some foraging may occur in the Wells Reservoir
Upper Columbia River Spring-run Chinook (*Oncorhynchus tshawytscha*) Endangered	May effect, not likely to adversely affect	Habitat within the Project area primarily serves as a migratory corridor and would not result in destruction or adverse modification of designated or proposed critical habitat	Rearing and spawning occurs in the Methow River (tributary). Lower tributary and reservoir used as a migratory corridor.
Upper Columbia River Summer-run Steelhead (*Oncorhynchus mykiss*) Threatened	May effect, not likely to adversely affect	Habitat within the Project area primarily serves as a migratory corridor and would not result in destruction or adverse modification of designated or proposed critical habitat	Rearing and spawning occurs in the Methow and Okanogan rivers (tributaries). Lower tributary and reservoir used as a migratory corridor.
Wildlife Species			
Marbled Murrelet (*Brachyramphus marmoratus*) Threatened	No effect	Would not result in destruction or adverse modification of designated or proposed critical habitat	Nesting habitat within North Cascades National Park, outside of Project Area
Greater Sage-Grouse (Columbia Basin DPS) (*Centrocercus urophasianus*) Candidate	No effect	Critical habitat not designated	No documented populations within the Project Area
Fisher (West Coast DPS) (*Martes pennanti*) Candidate	No effect	Critical habitat not designated	No documented populations or suitable habitat within or near the Project Area
Pygmy Rabbit (Columbia Basin DPS) (*Brachylagus idahoensis*) Endangered	No effect	Critical habitat not designated	Project Area outside of historical range and recovery emphasis areas
Gray Wolf (*Canis lupus*) Endangered	No effect	Critical habitat not designated	No documented populations or suitable habitat within or near the Project Area

Table 6.0-1 (continued)

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Wildlife Species			
Grizzly Bear (*Ursus arctos horribilis*) Threatened	No effect	Would not result in destruction or adverse modification of designated critical habitat	North Cascades Grizzly Bear Recovery Area includes part of Methow River upstream of Project Area
Canada Lynx (*Lynx canadensis*) Threatened	No effect	Would not result in destruction or adverse modification of designated or proposed critical habitat	Project area not located in Washington State Lynx Management Zones or designated critical habitat
Northern Spotted Owl (*Strix occidentalis caurina*) Threatened	No effect	Would not result in destruction or adverse modification of designated critical habitat	No documented populations or suitable habitat within the Project Area
Washington Ground Squirrel (*Spermophilus washingtoni*) Candidate	No effect	Critical habitat not designated	No documented populations within the Project Area
Yellow-billed Cuckoo (*Coccyzus americanus*) Candidate	No effect	Critical habitat not designated	No documented populations within or near the Project Area
North American Wolverine (*Gulo gulo luscus*) Candidate	No effect	Critical habitat not designated	No documented populations within or near the Project Area
Plant Species			
Wenatchee Mountains Checkermallow (*Sidalcea oregana var. calva*) Endangered	No effect	Would not result in destruction or adverse modification of designated critical habitat	No documented populations within or near the Project Area
Showy Stickseed (*Hackelia venusta*) Endangered	No effect	Critical habitat not designated	No documented populations within or near the Project Area
Ute Ladies'-tresses (*Spiranthes diluvialis*) Threatened	No effect	Critical habitat not designated	No documented populations within or near the Project Area

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Whitebark Pine (*Pinus albicaulis*) Candidate	No effect	Critical habitat not designated	No documented populations within or near the Project Area
Northern Wormwood (*Artemisia campestris ssp. borealis var. wormskioldii***)** Candidate	No effect	Critical habitat not designated	No documented populations within or near the Project Area

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APPENDIX A

ESSENTIAL FISH HABITAT

1.0 ESSENTIAL FISH HABITAT

In 1996, Congress added new habitat conservation provisions to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the federal law that governs US marine fisheries management. The Sustainable Fisheries Act of 1996 (Public Law 104-267) mandates the identification of essential fish habitat (EFH) for species regulated under the federal fisheries management plan, as well as the creation of measures to conserve and enhance the habitat necessary for fish to carry out their life cycles. "Essential fish habitat" is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal agencies are required to consult with the National Marine Fisheries Service (NMFS) on activities within their jurisdiction that may adversely affect EFH. NMFS must provide conservation recommendations for any Federal action that would adversely affect EFH. The objective of this EFH consultation are to determine whether the proposed action as described in section 2.0 of the BA would adversely affect designated EFH and to recommend conservation measures to avoid, minimize or otherwise offset potential adverse effects to EFH.

The Pacific Fisheries Management Council (PFMC) has designated both freshwater and marine EFH for Chinook salmon (*Oncorhynchus tshawytscha*) (PFMC, 2000). Freshwater EFH supports four major life cycle stages: (1) spawning and incubation; (2) juvenile rearing; (3) juvenile migration; and (4) adult migration and holding. EFH includes all those streams, lakes, ponds, wetlands and other water bodies currently viable. It includes all waters currently or historically accessible to salmon in Washington, Oregon, Idaho and California, except areas upstream of longstanding naturally impassible barriers (i.e., natural waterfalls in existence for several hundred years), the Dworshak Dam and Hells Canyon Complex. Because of the diversity of habitats utilized by the Chinook salmon and inadequate research to date, the PFMC had adopted a more inclusive, watershed-based description of EFH than has been employed for some other species of concerns.

The PFMC's marine EFH supports three life stages: (1) estuarine rearing; (2) ocean rearing; and (3) juvenile and adult migration. Limited and sometimes contrary information is available on the marine areas used by Chinook salmon, including whether populations exist in significant numbers beyond the continental shelf (Fisher and Pearcy, 1995; Fisher et al., 1983, 1984; Myers et al, 1996). As a result, the demarcation of a specific or uniform western boundary would "contain considerable uncertainty" (PFMC, 2000) and so the PFMC established the EFH as all marine waters within the United State's Exclusive Economic Zone (EEZ) north of Port Conception, California and extending to the salmon EFH off the coast of Alaska as set by the North Pacific Fishery Management Council (2005).

1.1 DESCRIPTION OF PROPOSED ACTION

The Proposed Action is FERC's issuance of a new operating license for the existing 774.3 MW Wells Project (FERC No. 2149) for a term of up to 50 years subject to conditions requiring implementation of the Wells HCP, the Aquatic Settlement Agreement and the terrestrial resources management plans discussed in sections 2.5.1.1-2.5.1.3 of the BA. While there are numerous management plans, pertinent plans include the Hatchery Passage Survival Plan, Wells Dam Juvenile Dam Passage Survival Plan, TCP, Hatchery Compensation Plan, Adult Passage Plan, Predator Control Program, and Public Utility District No. 1 of Douglas County's (Douglas PUD) Land Use Policy. The Wells Hydroelectric Project (Wells Project) was constructed between 1963 and 1967; the Wells Reservoir extends 29.7 miles up the Columbia River, from river mile (RM) 515.6 to the tailrace of Chief Joseph Dam at RM 545.3. The action area includes habitats that have been designated as EFH for various life-history stages of spring Chinook salmon and UCR summer/fall-run Chinook salmon. Two fisheries management plans and two terrestrial resource management plans associated with the proposed action will affect EFH: the Wells HCP, the Aquatic Settlement Agreement, Wildlife and Botanical Management Plan and Douglas PUD's Land Use Policy.

1.1.1 Wells HCP

The objective of the Wells HCP is to achieve No Net Impact (NNI) for each Plan Species, including spring and summer/fall Chinook salmon, through a combination of 1) a 91 percent combined adult and juvenile Wells Project survival standard; and 2) up to 9 percent compensation for unavoidable Wells Project-related mortalities. The HCP is intended to constitute the participating parties' terms, conditions and recommendations for these species under the EFH provisions of the Magnuson-Stevens Act. Section 5 of the Wells HCP requires Douglas PUD to manage the reservoir shoreline as habitat for Plan Species. This provision of the HCP provides significant protection to EFH for those lands owned by Douglas PUD within the Wells Project boundary.

1.1.2 Aquatic Settlement Agreement

The Aquatic Settlement Agreement provides for additional management efforts through plans addressing bull trout (*Salvelinus confluentus*), white sturgeon (*Acipenser transmontanus*), Pacific lamprey (*Lampetra tridentata*), aquatic nuisance species and resident fish. In addition, the Aquatic Settlement Agreement includes a Water Quality Management Plan (WQMP) requiring monitoring of key water quality parameters, achieving compliance with numeric water quality standards for Total Dissolved Gas (TDG), temperature, Dissolved Oxygen (DO) and pH, preventing and controlling hazardous materials spills, and participation in regional water quality protection efforts.

1.1.3 Terrestial Resource Management Plans

Two terrestrial resources measures, the Douglas PUD Land Use Policy and Wildlife and Botanical Management Plan (WBMP), contain complementary measures for the protection of habitat found within the Wells Project. In particular, the 2008 Land Use Policy prohibits the construction of new boat docks outside the city limits of Bridgeport, Brewster and Pateros in order to protect riparian and near shore rearing habitat and in order to maintain NNI for juvenile Plan Species migrating through the Wells Reservoir. The WBMP provides for the protection, enhancement and restoration of native plants found within the Wells Project including riparian and wetland plant communities that are important components of rearing habitat and security cover for juvenile Plan species.

1.2 EFFECTS OF PROPOSED ACTION ON SALMON EFH

1.2.1 Effects on Salmon Habitat

The continued existence and operation of the Project will continue to result in both short- and long-term adverse effects to a variety of habitat parameters. These adverse effects to Chinook salmon and coho salmon (once established) are:

Mainstem Spawning Habitat

• Inundation of mainstem summer/fall-run Chinook salmon spawning habitat upstream of the Project.
• Altered mainstem summer/fall-run Chinook salmon spawning habitat substrate downstream of the Project (reduced proportion of gravels and cobbles downstream of the Project).

Juvenile Rearing Habitat and Juvenile and Adult Migration Corridor

• Altered flow conditions (ramping) that can modify juvenile and adult fish distribution.
• Altered invertebrate (food) sources and production in the mainstem migration corridor for juvenile Chinook and coho salmon.
• Altered water quality, especially TDG resulting from uncontrolled spill at the Project.
• Higher than natural predation rates resulting from the Project enhancing predator habitat or foraging opportunities.
• Altered riparian vegetation which can influence cover, food production, temperature, and substrate.
• Altered juvenile behavior or reduced survival of juveniles migrating through the action area as a result of Project inundation and operations.
• Altered adult behavior or reduced survival or spawning success of adults migrating through the action area as a result of Project operations.

The HCP was developed to mitigate adverse impacts resulting from the existence and operation of the Wells Project on Plan Species, including Chinook salmon and coho salmon (once established). The HCP provides funding for habitat improvements, and establishes a HCP Habitat Committee to prioritize the expenditure of designated funds. Several habitat projects designed to improve conditions within critical habitat occupied by spring Chinook have already been implemented as of this writing. Although the effects of specific habitat projects can not usually be directly measured, it is expected that over the duration of the HCP the habitat improvements secured by designated HCP Plan Species Account funding will offset at least 2 percent of the unavoidable Project mortality for spring Chinook, and contribute to recovery for this species.

Measures prescribed in the WQMP to control TDG downstream of Wells Dam include reducing the frequency and volume of spill (e.g., by minimizing fish passage spill, spill due to maintenance, and spill past unloaded units) and reducing the amount of TDG introduced into the river during spill (e.g., by engaging in fish passage spill management and alternative spillway gate operations). Although limiting spill can avoid high TDG levels that may be harmful to spring Chinook salmon, spill limitations also result in higher proportions of migrating juveniles passing through turbine units potentially resulting in higher mortality rates for juvenile salmon at the dam. All such measures are subject to review and approval by the HCP Coordinating Committee, which is directed to consider how to minimize adverse effects on designated critical habitat.

Other operational plans may also influence salmon EFH. Douglas PUD's Land Use Policy provides protective controls that will produce long term benefits for aquatic species, including spring Chinook and its EFH. Similarly, the HCP established a Plan Species Account to provide funding for tributary habitat protection and restoration projects within the Wells Project Boundary and within the portions of the Methow and Okanogan rivers that are accessible to Plan Species. Any protection or restoration projects requiring in-water work or physical alterations to adjacent lands (riparian habitat or flood-plain) could affect EFH, by temporarily disturbing substrate and juvenile food supplies, temporarily increasing in sediment loads, removing structures providing cover and shelter to both adults and juveniles, or disturbing passage conditions. These effects are expected to be localized and of short duration, with a resulting net improvement in the habitat for juvenile and adult spring Chinook salmon.

1.2.2 Effects on Salmon

The HCP calls for reducing direct passage impacts due to Project operations by implementing HCP actions (such as passage improvements and predation reduction). The HCP implements measures to achieve survival performance standards, with the longer term goal to measure and accomplish survival performance standards. Implementing, monitoring, and evaluating at-Project HCP actions designed to improve

survival of spring Chinook is expected to ensure that recovery of spring Chinook is not impeded as a result of the Wells Project relicensing.

The Wells Project may reduce the transport of sediment materials and turbidity, potentially affecting juvenile survival by limiting the ability of juvenile salmon to evade predators. Any effect of reduced turbidity within the Wells Project's reservoir, forebay, and tailrace on juvenile survival will be offset by measures required by the HCP to meet NNI.

The HCP calls for hatchery-based artificial propagation programs for spring Chinook salmon. Hatchery-based artificial propagation techniques may provide benefits to fish populations, potentially accelerating the recovery of populations by increasing abundance in a shorter time frame than may be achieved through natural production. Potential negative effects include influencing the genetics of natural populations, competition for resources between artificially propagated and natural salmonids, predation of natural juvenile salmonids by artificially propagated fish, and the masking of the status of naturally producing stocks.

As part of its Predator Control Plan, the HCP proposes to continue implementing northern pikeminnow (*Ptychochelus oregonensis*), piscivorous bird, and piscivorous mammal control and removal measures to reduce the predation rates on juvenile migrants. The removal of northern pikeminnows, however, may adversely affect small numbers of juvenile and adult spring Chinook salmon, depending on the harvest methods used (e.g., hook and line and longlines). Since inception of the plan, no salmon have been captured during removal operations. Other predator control operations to target birds and mammals are primarily focused on hazing and access deterrents with no risk of take to juvenile and adult spring Chinook. It is expected that the predator removal program will result in overall improvements in spring Chinook salmon survival rates.

1.2.3 Effects on Associated Species, Including Prey Base

The Aquatic Settlement Agreement includes a White Sturgeon Management Plan. The expected increase in the white sturgeon population could adversely affect spring Chinook as white sturgeon are opportunistic predators which feed on a broad variety of aquatic organisms including salmon. Spring Chinook primarily use the Wells Reservoir (where white sturgeon stocking will occur) as a migration corridor; because the smolts of this species tend to migrate rapidly (1-4 days passage time), are surface oriented, and prefer the main channel flow (white sturgeon are typically found on the edges of waterways), the potential for extensive predation on these smolts by white sturgeon is low.

The Aquatic Settlement Agreement also includes two other species management plans for bull trout and Pacific lamprey. Implementation of any physical modifications to passage systems to support movement by these species could adversely affect freshwater

migration corridors if the modifications were to reduce the efficacy of the passage systems for Chinook. Again, the HCP Coordinating Committee must approve any such modifications to ensure consistency with passage system criteria established in the HCP for spring Chinook and so there is not likely to be any adverse effect on the migration corridor.

The HCP proposes to continue implementing northern pikeminnow and avian predator control and removal measures to reduce predation on juvenile migrants. Avian control measures consist largely of land-based activities that include gull wires installed across project tailraces and pyrotechnics to discourage predation. In addition, some avian predators are killed most years. These measures should improve juvenile salmon survival by reducing overall predation.

1.3 Proposed Conservation Measures

Conservation measures that Douglas PUD will undertake to protect and enhance EFH consist of those described in the Wells HCP and Aquatic Settlement Agreement, in addition to other plans (e.g., the Douglas PUD Land Use Policy) included as part of the proposed action.

1.4 Conclusions

The continued existence and operation of the Project would continue to adversely affect designated EFH for Chinook and coho salmon (once established). However, these adverse affects would be adequately mitigated through continued implementation of the Wells HCP and other measures. Monitoring has shown excellent adult and juvenile passage rates, good water quality, and relatively minimal take. No changes to the current operation of the Wells Project are proposed. Further, the implementation of the policy of NNI in the HCP ensures support of the existing salmon populations. The HCP requires each of its components to include a continuing process of the implementation of enhancement actions, measurement of effectiveness, and as-needed adjustment to ensure that NNI will be achieved and maintained for salmon for the duration of the HCP.

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