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BIOLOGICAL ASSESSMENT OF PROPOSED ACTIONS IN THE ROCK ISLAND HYDROELECTRIC PROJECT HABITAT CONSERVATION PLAN

Prepared for the Federal Energy Regulatory Commission

By

The Public Utility District No. 1 of Chelan County

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Biological Assessment of Proposed Actions in the Rock Island Hydroelectric Project Habitat Conservation Plan

1. INTRODUCTION

The Public Utility District No. 1 of Chelan County (Chelan PUD) is proposing to implement a Habitat Conservation Plan (HCP) as a means to ensure prudent, long-term, management of anadromous salmonids in the Rock Island Hydroelectric Project area. Specific actions proposed for implementation during the term of the Rock Island HCP include adult fishway and juvenile bypass operations, turbine and spillway operations, fish predator control measures, a Tributary Conservation Plan, and a Hatchery Conservation Plan. In a separate but interrelated action to the HCP, Chelan PUD proposes to install and operate a small turbine unit in the attraction water conduit of the left bank adult fishway. Actions associated with construction and operation of the small turbine unit have previously received a "no effect" concurrence from the U.S. Fish & Wildlife Service (USFWS) relating to affects on listed and candidate species; therefore, these actions will only be reviewed for background information in this Biological Assessment (BA). This BA evaluates the potential effects of the proposed HCP on federally listed threatened and endangered species and proposed or designated critical habitat. This BA is was prepared as part of the Endangered Species Act Section 7 consultation between Chelan PUD and United States Fish and Wildlife Service.

1.1. Summary of Findings

Chelan PUD has completed numerous fish and wildlife studies and habitat projects spanning decades of research and work on Project lands and waters associated with the Rock Island Hydroelectric Development. Currently, Chelan PUD is proposing to implement a Habitat Conservation Plan (HCP) that identifies actions that will benefit fish and wildlife resources in the Project area for the next 50 years. Through consultations and regular communication with the USFWS, Chelan PUD has identified 14 species of fish, wildlife, and plants that are managed by the USFWS under the Endangered Species Act (ESA) and occur, or potentially occur in the Rock Island Project area. This BA evaluates the effects on these species that are reasonably expected to occur from actions resulting from implementation of the Rock Island HCP.

Table 1-1. Listed Species Effect Determination Summary

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Fish Species			
Columbia River bull trout (*Salvelinus confluentus*) Threatened	Likely to adversely affect	Would not result in destruction or adverse modification of proposed critical habitat	Migratory populations present in mainstem and tributaries; resident fish in tributaries
Wildlife Species			
Pygmy Rabbit (*Brachylagus Idahoensis*) Endangered	No effect	Critical Habitat not designated	No populations in or near Project Area or Action Areas
Bald Eagle (*Haliaeetus leueocephalus*) Threatened	May affect, not likely to adversely affect	Critical Habitat not designated	Nesting location present on Rocky Reach Reservoir
Lynx *(Lynx canadensis*) Threatened	No effect	Critical habitat not designated	Project area not located in Washington State Lynx Management Zones
Gray Wolf (*Canis lupus*) Threatened	No effect	Critical habitat not designated	No documented populations or suitable habitat within or near project area
Grizzly Bear (*Ursus horribilis*) Threatened	No effect	Critical habitat not designated	Some tributary headwater locations included in Grizzly Bear Recovery Area
Marbled Murrelet (*Brachyramphus marmoratus*) Threatened	No effect	Critical habitat not designated	Nesting habitat within North Cascades National Park, not part of Project Area or action areas
Northern Spotted Owl (*Strix occidentalis*) Threatened	No effect	No effect on designated critical habitat	Any tributary action in designated critical habitat requires federal oversight and review to ensure no effect
Plant Species			
Showy Stickseed (*Hackelia venusta*) Endangered	No effect	Critical habitat not designated	Population occurs on 2.5 acres of federal land on Wenatchee River at elevation above stream channel
Wenatchee Mountains Checker-mallow (*Sidalcea oregana*) Endangered	No effect	No effect on designated critical habitat	Populations occur in meadow habitat at elevations high above Wenatchee River
Ute ladies'-tresses (*Spiranthes diluvialis*) Threatened	May affect, not likely to adversely affect	Critical habitat not designated	Populations located along Rocky Reach Reservoir shoreline only; plants likely established and maintained by reservoir influence

Table 1-2. Candidate Species Effect Determination Summary

Candidate Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Wildlife Species			
Yellow-billed Cuckoo (*Coccyzus americanus)*	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population or suitable nesting habitat within action area
Western Sage Grouse (*Centrocercus urophasianus* phaios)	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population or suitable nesting habitat within action area
Washington ground squirrel (*Spermophilus washingtoni*)	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population within Project or action area

2. BACKGROUND

The proposed Habitat Conservation Plan (HCP) for the Rock Island Hydroelectric Development is the result of over nine years of planning and negotiations between the National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly National Marine Fisheries Service), the Public Utility District No. 1 of Chelan County (Chelan PUD), and other participants in the HCP process. These parties included the U.S. Fish and Wildlife Service (USFWS), the State of Washington Department of Fish and Wildlife (WDFW), the Confederated Tribes and Bands of the Yakama Indian Nation (Yakama), the Confederated Tribes of the Colville Reservation (Colville), and the Confederated Tribes of the Umatilla Indian Reservation (Umatilla), American Rivers, Inc., and representatives of the major wholesale purchasers of Chelan PUD's electricity. This effort culminated in the completion of three proposed anadromous fish agreements and habitat conservation plans (one each for Rock Island, Rocky Reach and the Wells hydroelectric projects) offered for signing on March 26, 2002.[4] All of the participants, with the exception of the Yakama and Umatilla tribes, and American Rivers, Inc.,

[4] The Wells Hydroelectric Project (FERC No. 2149) is owned by Public Utility District No. 1 of Douglas County (Douglas PUD). The Rocky Reach (FERC No. 2145) and Rock Island (FERC No. 943) Hydroelectric Projects are owned by Chelan PUD.

indicated their qualified support of the Rock Island HCP by signing the document in the spring of 2002.

2.1. History of Anadromous Fish Agreements and Habitat Conservation Plan

The history leading up to the Rock Island Anadromous Fish Agreement and Habitat Conservation Plan (Rock Island HCP) dates back to 1978, when NOAA, Washington Department of Fish and Wildlife (WDFW), the Confederated Tribes and Bands of the Yakama Indian Nation (Yakama) and other entities filed various petitions with the Federal Energy Regulatory Commission (FERC) seeking spill, improved flows, and other modifications of operations at the Project to protect downstream migrating juvenile fish. In response to these petitions, the Commission in March 1979 set for hearing, before an administrative law judge, a consolidated proceeding on juvenile fish protection at all five Mid-Columbia projects owned by Chelan, Douglas, and Grant County PUDs. This consolidated proceeding has become known as the *Mid-Columbia Proceeding*. In 1979, under the direction of then Presiding Administrative Law Judge Allen Lande, the parties to the *Mid-Columbia Proceeding* negotiated a series of interim settlement agreements that provided for spill, hatchery compensation, and studies to improve fish protection. In 1984, at the end of the *Mid-Columbia Proceeding*, the three PUDs entered into another five-year agreement called the *Mid-Columbia Stipulation.*

In 1989, the Commission approved a long-term settlement agreement for the Rock Island Project known as the *Rock Island Settlement Agreement.* This agreement set hatchery production and operation goals that included specified spill levels. The Rock Island Project was operated under this agreement until 2002, when Chelan began operating Rock Island according to the proposed Rock Island HCP. In 1990 Douglas PUD negotiated a long-term settlement agreement for the Wells Project while Rocky Reach Dam continued to operate under the *Mid-Columbia Stipulation* and its various revised interim stipulations (1 through 4).

In August 1993, Douglas, Chelan, and Grant, initiated discussions with NOAA, USFWS, and WDFW 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). As these discussions proceeded and began to gain momentum, other parties, such as the Colville, the Yakama, the Confederated Tribes of the Umatilla Indian Reservation (Umatilla), American Rivers, and FERC staff, joined the negotiations.

These discussions first explored the possibility of developing an ecosystem-based plan for managing fish and wildlife resources inhabiting the Mid-Columbia River Basin, but because of the immense breadth of this type of plan the Parties decided to focus on an agreement for aquatic species inhabiting the Mid-Columbia River Basin, including fish, plants and animals. After extensive review, the Parties further concluded, given the likelihood that certain species of salmon and steelhead would be listed in the near future under the ESA and given the lack of information regarding other aquatic species, decided that the best basin-wide approach would be to develop an agreement for anadromous salmonids, specifically: spring, summer/fall chinook salmon (*O. tshawytsha*); sockeye salmon (*O. nerka*); coho salmon (*O. kisutch*); and steelhead (*O. mykiss*). These species are collectively referred to as plan species in this document and in the Rock Island HCP Agreement.

The Rock Island HCP is intended to be a comprehensive and long-term management plan for anadromous salmonids affected by the Project, and will supercede the *Rock Island Settlement Agreement*. The objective of the Rock Island HCP is to achieve "No Net Impact" (NNI) for each of the anadromous fish stocks including chinook salmon, sockeye salmon, coho salmon, and Upper Columbia River (UCR) steelhead, affected by the Project, and to maintain the same for the duration of the HCP. The term "No Net Impact" is defined by the following: Project survival of both juvenile and adult fish would contribute 91 percent to the NNI goal, while off-site hatchery programs would contribute 7 percent and habitat restoration and conservation work conducted in mid-Columbia tributary streams would contribute 2 percent, to achieve the 100% survival goal.

In 1998, following five years of negotiations, Chelan submitted an unexecuted form of the HCP Agreement to the NMFS along with an Application for Individual Incidental Take Permit (ITP). NOAA, as lead agency, and the FERC, as a cooperating agency,

prepared a DEIS on the unexecuted form of the HCP Agreement. Following a review of the public comments on the DEIS, the Parties developing the HCP Agreement engaged in further analysis, discussion and negotiations to clarify the terms of the HCP Agreement. The Parties executed the HCP Agreement in April 2002, subject to regulatory review.

2.2. Existing ESA Consultations

2.2.1. Interim Protection Plan for (UCR) Steelhead

On October 9, 1997, Chelan PUD petitioned FERC for approval of an Interim Protection Plan for UCR steelhead at the Project. The Interim Protection Plan described interim fish protection measures intended to avoid, reduce, and mitigate for the effects of project operations on UCR steelhead. In November 1997, FERC designated Chelan PUD its non-Federal representative for the purpose of developing a draft BA on the effects of the proposed Interim Protection Plan. Chelan PUD submitted a draft BA to FERC in February 1998. In March 1998, FERC requested consultation regarding the effects of the Interim Protection Plan on UCR steelhead and conferencing regarding UCR spring-run chinook salmon (listed as endangered in March 1998). A final BA of the Rock Island Project Interim Protection Plan was attached. In a July 14, 1998, letter to FERC, NOAA Fisheries did not concur with FERC's conclusion that the Interim Protection Plan was not likely to adversely affect UCR steelhead. NOAA Fisheries requested that FERC and Chelan PUD provide additional information to evaluate the effects of the Interim Protection Plan on both UCR steelhead and UCR spring-run chinook salmon. On February 1, 1999, Chelan PUD provided a draft BA evaluating the effects of the Rock Island Hydroelectric Project Interim Protection Plan on UCR spring-run chinook salmon. After many months of discussion, and the development of a draft biological opinion, Chelan PUD filed a notice of withdrawal of its Interim Protection Plan in July 2001, which became effective in accordance with FERC regulation. Thus ESA Section 7 consultation has never been completed for this Project.

2.2.2. Installation of a Small Turbine Unit

On July 27, 2001, FERC provided letters and attached biological assessment/environmental assessments (BA/EA) requesting that NOAA Fisheries and the U.S. Fish and Wildlife Service concur with its finding that the installation of a small turbine generator in the left bank adult fishway water conduit at Rock Island Dam was not likely to adversely affect ESA-listed UCR steelhead, UCR spring-run chinook salmon, bull trout, bald eagles, or Ute ladies'-tresses.

The USFWS responded on August 17, 2001 and concurred with the BA findings that installation and operation of a small turbine unit at Rock Island was not likely to adversely affect bull trout, bald eagles or Ute ladies'-tresses. NOAA Fisheries responded in an August 27, 2001, letter that it did not concur with those findings and requested that FERC provide additional information. In a September 6, 2001, letter, FERC provided additional information and requested the initiation of formal consultation. In a December 21, 2001, letter, FERC requested that NOAA Fisheries issue its biological opinion by January 9, 2002. In a January 8, 2002, letter, NOAA Fisheries informed FERC that, with the support of Chelan PUD, the consultation on the proposed installation of a small turbine unit would not occur, until other higher priority work relating to these same projects had been completed. On January 24, 2002, FERC requested that NOAA Fisheries provide its biological opinion by the end of February to facilitate FERC's proceeding. On March 14, 2002, FERC issued an order amending the licenses for the Rock Island and Rocky Reach projects; the order authorized Chelan PUD to install at each project a small turbine generator in the adult fishway attraction water conduit. Many intervening parties requested rehearing of this decision. On January 16, 2003, FERC denied these requests for rehearing. In a February 14, 2003, letter, NOAA Fisheries requested a rehearing of this FERC decision, relating to the installation of small turbine units at Chelan PUD's Rock Island and Rocky Reach Hydroelectric projects. This letter informed FERC of NOAA Fisheries' intent to include the installation of the small turbines as an interrelated action in the biological opinion on proposed issuance of the HCP incidental take permits (ITPs).

2.3. Proposed ESA Consultation prior to Approval of the Rock Island HCP

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with U.S. Fish and Wildlife Service (USFWS) and NOAA, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats.

In this instance, FERC is required to consult with the USFWS under section 7 of the ESA for implementation of the Rock Island HCP. The term of the proposed action is 50 years following approval of FERC. Douglas PUD also proposes to implement a concurrent and related HCP for operation of their Wells Project. Rock Island, Rocky Reach, and Douglas' Wells project are located in the middle-reach of the Columbia River in Chelan, Douglas and Okanogan Counties, Washington.

The USFWS proposes to require FERC to consult under section 7 (a)(2) of the ESA regarding the implementation of the Rock Island HCP. The term of the proposed action is 50 years following approval of FERC. Douglas PUD is proposing to implement a concurrent and related HCP for operation of their Wells Project. All three of these projects are located in the middle-reach of the Columbia River in Chelan, Douglas and Okanogan Counties, Washington.

In accordance with the conservation and mitigation measures proposed in the Rock Island HCP for operations of the Rock Island Project, off-site hatchery facilities and implementation of a tributary enhancement program, the USFWS has 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 shall serve as Chelan PUD's Biological Assessment for listed species under the jurisdiction of the USFWS, pursuant to section 7(a)(2) of the ESA.

Chelan PUD expects that the USFWS will utilize this document during its preparation of a biological opinion related to the effects of the proposed actions on ESA listed or candidate species.

3. PROPOSED ACTIONS

Chelan PUD has applied to, and received from NOAA Fisheries, an ITP under Section 10(a)(1)(B) of the ESA for continued operation of the Rock Island Hydroelectric Project in the middle reach of the Columbia River. The HCP was developed to conserve and protect ESA-listed and unlisted anadromous fish species over the long term, and to support ongoing compliance with the ESA, while allowing continued operation of the Project. All measures proposed in the HCPs are intended to minimize and mitigate impacts to the Plan species (see Table 1), to the "maximum extent practicable" as required by the Endangered Species Act. The HCPs will mitigate impacts from dam operations in areas directly affected by those operations - approximately 1,000 feet downstream of the Rock Island Dam (tailrace) to 1,000 feet downstream of the next dam upstream (Rocky Reach Dam). Chelan PUD will also provide funding for hatchery supplementation and tributary habitat improvement programs to offset losses not directly mitigated at the project.

The objective of the HCP is to achieve NNI for each Plan Species affected by the Project on the schedule set, and to maintain NNI for the duration of the Agreement. NNI consists of two components: (1) 91% Combined Adult and Juvenile Project Survival achieved by project improvement measures implemented within the geographic area of the Project, (2) 9% compensation for Unavoidable Project Mortality provided through hatchery and tributary programs, with 7% compensation provided through hatchery programs and 2% compensation provided through tributary programs. The Parties intend these actions to contribute to the rebuilding of tributary habitat production capacity and basic productivity and numerical abundance of Plan Species.

3.1. Rock Island HCP Plan Area and Project Description

The Rock Island Hydroelectric Project (FERC Project No. 943) includes the reservoir, forebay, dam, and tailrace. As defined, the Project boundary is approximately 1,000 feet downstream of the Rock Island Dam (tailrace) to 1,000 feet downstream of the next dam upstream (reservoir), a distance of approximately 21.1 miles (see FEIS figure 1-2). The 42-foot-high concrete gravity dam is located approximately 12 miles south of Wenatchee, Washington, on the mainstem Columbia River at RM 453.5 (see FEIS figure 1-1). The reservoir formed by the Project extends to the tailrace of Rocky Reach Dam (see FEIS figure 1-2), contains 126,000 acre feet of water, and has a surface area of 3,470 acres at the normal pool elevation of 613 feet above mean sea level (msl). Based on a draft limit of 4 feet, usable storage is less than 12,500 acre-feet. The annual median flow is 115 thousand cubic feet per second (kcfs) (see FEIS table 2-1).

The Project includes a spillway, two powerhouses, a passive juvenile bypass system (JBS), and three adult fishways (see FEIS figure 2-3). The spillway consists of 31 spillway gates with a combined capacity of 943 kcfs. Powerhouse 1 consists of 4 Nagler turbines (units 1-4) and 7 Kaplan turbines (units 5-10) and Powerhouse 2 consists of 8 bulb turbines, with a combined hydraulic capacity of 205 kcfs, producing about 624 megawatts of electricity (see FEIS table 2-2 and FEIS section 2.2.1.3). Rock Island Dam has three adult fishways: a right bank fishway, a left bank fishway, and a middle fishway. Each fishway consists of an entrance, a collection channel, a fish ladder, and an exit in the forebay. A detailed description of these structures and their operation is provided in the FEIS (sections 2.2.1 and 2.2.2).

Because the HCP proposes to fund activities for the protection and restoration of Plan species habitat, the geographic boundaries of the HCP also include four tributaries. These include the Okanogan, Methow, Entiat, Chelan, and Wenatchee river watersheds. Of these, only the Wenatchee River directly enters the Project impoundment. However, Plan species from tributaries further upstream are also affected as they migrate through the Project, so habitat protection and restoration activities would likely occur in these tributaries as well as in the Wenatchee River.

3.2. Description of the Action Area

The action area includes all areas affected directly or indirectly by the Federal Action and not merely the immediate area involved in the action. The Rock Island HCP action area is defined as the mainstem Columbia River from river mile (RM) 544.9 (a point approximately 1,000 feet downstream of Chief Joseph Dam) downstream to RM 356 (the upper end of the McNary Dam Reservoir), a distance of roughly 190 miles. The action area also includes the Wenatchee, Entiat, Chelan, Methow, and Okanogan river systems.

3.3. Term of the HCP and Species Covered

The Rock Island HCP will become effective upon completion of all regulatory reviews including section 7 consultations, which will utilize this Biological Assessment. The HCP will become fully effective when the Federal Energy Regulatory Commission (FERC) incorporates the HCP Agreement into the Rock Island Project license.

The Rock Island HCP is a 50-year agreement that will remain in effect until the agreement expires, unless 1) the Commission issues a non-power license for the Project; 2) the Commission orders removal of the Project; 3) the Commission orders a drawdown of the Project; or 4) if Chelan or another signing party withdraws from the HCP Agreement.

The Parties to the HCP Agreement may elect to withdraw from the HCP Agreement when at least twenty-years has elapsed from March 1, 1998, subject to the following conditions: (1) No Net Impact has not been achieved or has been achieved but has not been maintained; or (2) the Project has achieved and maintained No Net Impact, but Plan Species are not rebuilding, and the Project is a significant factor in the failure to rebuild. In addition, the Parties may elect to withdraw from the HCP Agreement at any time upon the occurrence of any of the following situations: (1) non-compliance by Chelan PUD; (2) governmental action that is detrimental to the HCP Agreement, because it materially alters or is contrary to any of the terms of the HCP Agreement; (3) impossibility; (4) revocation of the permits issued by NMFS under Section 10 of the ESA; or (5) another Party to the HCP Agreement withdraws, provided proper notice is

given. In addition, NOAA and USFWS may withdraw from the HCP Agreement to seek drawdown, non-power operations, or other actions if No Net Impact is not achieved by 2018.

The proposed HCP is designed to minimize, to the extent practical, Project impacts to all Plan Species. Because native populations of coho salmon were extirpated by the 1940s from this reach of the Columbia River, coho salmon in this area are not protected under the ESA nor are they subject to provisions of ESA Sections 7 or 10. Thus, coho salmon are not counted among the Permit Species included in the ITP, but are included as a Plan Species. Table 3-1 summarizes the status of each Plan Species.

Two of the Permit species are currently listed for protection under the ESA: Upper Columbia River (UCR) summer steelhead and spring-run chinook salmon. Upon issuance, the ITP would be immediately effective for these species. For unlisted Permit Species, which are not presently protected under the ESA or subject to provisions of ESA Sections 7 or 10, the ITP would be effective upon any future listing of these species under the ESA.

Table 3-1. Plan and Permit Species/ESU and status under the ESA and HCP

Species	Evolutionarily Significant Unit	ESA Status	HCP Status
Steelhead	Upper Columbia River	Endangered (August 1997)	Plan and Permit Species
Spring-Run Chinook Salmon	Upper Columbia River	Endangered (March 1999)	Plan and Permit Species
Summer/Fall-Run Chinook Salmon	Upper Columbia River	Not Warranted (March 1998)	Plan and Permit Species
Sockeye Salmon	Okanogan River and Lake Wenatchee	Not Warranted (March 1998)	Plan and Permit Species
Coho Salmon	Not Applicable	Extirpated	Plan Species

3.4. Summary of HCP Actions

As previously noted, the objective of the HCP is to achieve and maintain a NNI standard for each Plan Species at the Rock Island Hydroelectric Project by March 1, 2013. The remainder of this section summarizes the HCP actions. More detailed descriptions can be found in the FEIS and HCP.

3.4.1. HCP Survival Standards

The HCP has specific performance standards relating to the survival of juveniles and adults migrating through the Project. The decision-making process for implementation of survival standards is depicted in Figure 1 of the HCP (Rock Island HCP Survival Standard Decision Matrix). The primary survival standard of the HCP is to achieve and maintain the 91% Combined Adult and Juvenile Project Survival standard. This translates to approximately 98% adult survival and approximately 93% juvenile survival (0.98 X 0.93 = 0.91). However, the Signatory Parties agree that adult fish survival cannot be measured conclusively with existing technologies at this time.

Until technology is available to differentiate hydro-related mortality from natural adult losses, Chelan PUD will implement the adult passage plan (section 5.4.2) and initiate studies, at the direction of the Coordinating Committee (section 3.3.3) to assess juvenile

fish survival at the Project. Methods to assess juvenile survival, in order of priority, are: (1) measured Juvenile Project Survival - 93 percent, (2) measured Juvenile Dam Passage Survival - 95 percent, and (3) calculated Juvenile Dam Passage Survival (JDPS) - 95 percent. The most appropriate standard for each species shall be determined by the Coordinating Committee, per guidelines established in the HCP. In the event that the Coordinating Committee determines that no current methodology is available for measuring a juvenile survival standard, the Coordinating Committee will use the best available information to calculate an estimate of Juvenile Dam Passage Survival. More detailed descriptions of the survival standards may be found in the FEIS (section 2.3.4.4) and HCP (section 5.1 and 5.2)

3.4.2. HCP Phase Implementation

Phase I studies to assess whether or not the most appropriate survival standard is being achieved for each Plan Species will begin in 2004 through 2006. Point estimates of survival measurements from three years of valid studies (meeting critical criteria identified in the HCP - see HCP section 5.2.3) for each species shall be averaged (arithmetic mean). The point estimate of the average will be used to compare against the pertinent survival standard. If the averaged point estimate equals or exceeds the survival standard, then the standard has been achieved. If the average is no more than 0.5 percent below the survival standard the Coordinating Committee may decide whether an additional year of study is appropriate. If an additional year of study is undertaken, the study result (if valid) will be included in the calculation of the arithmetic mean.

Phase II will apply in the event that averaged point estimates from Phase I Testing studies indicate that the survival standard being evaluated is not being met for a Plan Species. The Coordinating Committee, in that case, shall decide on Additional Tools for Chelan PUD to implement in order to achieve the survival standard. Until the survival standard being evaluated is achieved, the Coordinating Committee shall continue to implement Additional Tools for the standard and for each Plan Species that is not meeting the pertinent survival standard, except as set forth in the HCP section 2.4

"Impossibility." The Coordinating Committee will determine the number of valid studies (not to exceed three years) necessary to make a phase determination following the implementation of Additional Tools.

Phase III will apply in the event that the averaged point estimates from Phase I Testing studies (or studies implemented following Phase II) indicate that the survival standard being evaluated has either been achieved or is likely to have been achieved and provides additional or periodic monitoring to ensure that survival of the Plan Species remains in compliance with the survival standards for the term of the HCP.

More detailed descriptions of the phase implementation may be found in the Final Environmental Impact Statement (FEIS) (section 2.3.4.5) and HCP (5.3).

3.4.3. HCP Committees

To accomplish these objectives, the Rock Island HCP proposes to utilize four committees to adaptively manage the major components of the Rock Island HCP and one committee to provide policy oversight in the event of disputes amongst the Parties. Each committees acts upon the unanimous vote of those members present. More detailed descriptions of these committees may be found in the FEIS (section 2.3.4.7) and HCP (section 4, 7.3, 8.2, and 11.1).

The Coordinating Committee will be composed of one voting representative of each Party, in addition to a non-voting observer representing Chelan PUD's power purchasers. The Coordinating Committee serves as the primary means of consultation and coordination between Chelan PUD and the other Parties in connection with the conduct of studies and implementation of the measures set forth in the HCP and for dispute resolution.

The Tributary Committee will be composed of one voting representative of each Party choosing to appoint a representative to the committee. In addition to non-voting representatives of USFWS and a single non-voting observer representing Chelan PUD's power purchasers, the Tributary Committee may select other expert entities,

such as land and water trusts/conservancy groups, to serve as non-voting members of the committee. The Tributary Committee is charged with the task of selecting projects and approving project budgets from the Plan Species Account for the purposes of implementing the Tributary Plan.

The Hatchery Committee will be composed of one voting representative of each Party choosing to appoint a representative to the committee and a single non-voting observer representing Chelan PUD's power purchasers. The Hatchery Committee is responsible for overseeing the development of recommendations for implementation of the hatchery elements of the HCP that Chelan PUD is responsible for funding. This includes the overseeing of the implementation of improvements and monitoring and evaluation relevant to Chelan PUD's hatchery programs.

The Policy Committee would also be composed of one designated representative of each Party. The primary function of the Policy Committee would be to resolve disputes amongst the Parties.

The Parties shall choose, and Chelan PUD shall fund, a neutral third party to act as the chair of each committee, excepting that the chair of the Coordinating Committee shall also serve as the chair of the Policy Committee. The committee chairs would prepare annual lists of understandings based on the results of studies, progress reports, and meeting minutes; facilitate and mediate the meetings; and assist the members of the respective committees in making decisions.

3.4.4. HCP Dispute Resolution

The HCP provides a non-binding dispute resolution process. Disputes that cannot be resolved unanimously within 20 days by the Tributary or Hatchery Committees may be raised with the Coordinating Committee. If, at the end of 20 days, the Coordinating Committee is unable to reach unanimous agreement on the dispute, then the chair of the Coordinating Committee or any Party may request that the Policy Committee convene to resolve the dispute. Upon referral, the Policy Committee would have 30 days to convene and consider the dispute.

If the Policy Committee successfully resolves the dispute, then the Parties shall implement all aspects of the settlement that can lawfully be implemented without FERC approval, or the approval of another federal agency. If FERC or other federal agency approval is needed, all settling Parties shall jointly present the resolution of the dispute to FERC or the appropriate federal agency for approval. If the Policy Committee is unable to unanimously resolve the dispute, then any Party may pursue any other right they might otherwise have. More detailed descriptions of the dispute resolution process may be found in the FEIS (section 2.3.4.6) and HCP (section 11).

3.4.5. HCP Measures

To achieve the applicable survival standards (see Section 3.3.1 and Figure 1 of the HCP), a combination of spill, passive bypass system operations, possible turbine replacement, and predator control measures will be utilized. The appropriate mix of measures will vary depending upon the results of survival studies. Initial operations are described below.

3.4.5.1. Adult Fishway Operations

Chelan PUD has developed an operation and maintenance plan for the Project's fish passage facilities (Chelan PUD 2003a). The adult fishway facilities will be operated from March 1st to January 1st. The primary fish passage season is considered to be April through November. From January 2 through February 28 each year, the three fishways are dewatered one at a time in rotation to allow for inspections, maintenance and repairs. After completion of maintenance and repairs on one ladder, the ladder is watered up and made operational again and the next ladder is dewatered and readied for maintenance; this rotation keeps at least two fish ladders operating during the maintenance period at Rock Island.

From April 14th to November 14th the fishway is monitored 24 hours per day via digital recording equipment. Fish counters read the recordings from the previous day and report counts to the US Army Corps of Engineers. The adult fishways are composed of three separate ladders with entrances in the tailrace, and exits in the forebay near the

east and west banks of the river and in the center of the river. The ladders are operated to maintain a head differential at the entrance and at the weirs within the fishway of 1.0 to 1.5 feet, which produces an attraction velocity of approximately 7 to 8 fps at the vertical entrances and 6 to 8 fps at orifices in the weirs. During the migration season, the adult fishways will be inspected twice each day. WDFW personnel inspect the facilities on a monthly basis and provide monthly inspections reports to the Fish Passage Center.

Measures to enhance safe passage of all Plan Species adults will be emphasized in order to give high priority to adult survival in the achievement of 91% Combined Adult and Juvenile Project Survival as described in the FEIS and HCP. The Coordinating Committee may agree to implement additional measures to meet or achieve and maintain the 91% Combined Adult and Juvenile Project Survival Standard.

More detailed descriptions may be found in Section 5.4.2 of the HCP, Section 2.2 of the Rock Island and Rocky Reach Fish Passage Plans, and Section 2.3.4.8 of the FEIS.

3.4.5.2. Spillway and Turbine Operations

Spillway Operations for Juvenile Bypass

For the years 2004 through 2006, Chelan PUD will voluntarily spill 20% of the daily estimated flow to cover 95% of the spring and summer juvenile migration periods. The Coordinating Committee, based upon in-season migration information, will adjust the beginning and ending dates of the spill period on an annual basis.

Spill for fish bypass will encompass at least 95% of the spring and summer juvenile migration periods. Based on available information, the Signatory Parties agree that spring spill will generally begin no later than April 17 and end no later than June 15 of each year. Similarly, summer spill will generally begin no later than July 1 and end no later than August 15 of each year. However, the Coordinating Committee, based upon in-season migration information, may adjust the beginning and ending dates of the spring and summer spill periods.

It is unknown if bull trout use spillways to move downstream past Rock Island Dam; therefore it is unknown if spill, or changes in spill levels, will affect movement of these fish. During spring and summer months when the Project is spilling for juvenile anadromous migrants and/or headwater control, adult bull trout are observed moving upstream through fish ladders at Rock Island and subsequently into tributaries to spawn. Movement characteristics of juvenile bull trout in the mainstem are largely unknown, although juvenile bull trout have been observed moving upstream through fishways at Rock Island (Chelan PUD 2003, unpublished video photographs of juvenile bull trout in fish ladder counting window).

Turbine (Powerhouse) Operations

Turbines will be operated as efficiently as possible (within 1% of the peak efficiency for a given head and megawatt output) during the juvenile fish passage season. During other times when anadromous juvenile migrants are not present, turbine operations generally do not change; the units are operated to achieve the highest efficiency possible for a given headwater elevation and energy output.

Rock Island Powerhouse 2 has a high generating efficiency. It has a 410 megawatt (Mw) generating capability. Powerhouse 2 currently generates the majority of the energy produced by the Rock Island Project; all turbines are “minimum gap” units, having a gap distance between the runner blade and the hub of less than 3 mm (0.118 inches).

Rock Island Powerhouse 1 has a 210 Mw capability. Currently, Powerhouse 1 does not contain turbines with minimum gap characteristics. Chelan PUD is currently reviewing the feasibility of installing minimum gap runners on the turbines at Powerhouse 1. This feasibility study will be completed within the next three years.

3.4.5.3. Predator Control Measures

Chelan PUD, in cooperation with the Coordinating Committee, will refine and implement a comprehensive predator removal and harassment program for the protection of Plan Species. For northern pikeminnow, activities may include, but not be limited to, angling

and long-line fisheries and a sport fishing derby in the project area. For piscivorous birds (Caspian terns, double-crested cormorants, and various gull species), activities may include, but not be limited to, foraging deterrents (e.g., steel wires in the Rock Island Dam tailrace), hazing, and lethal removal of individual birds. These programs will generally occur in the spring and summer, coinciding with the juvenile outmigration.

3.4.5.4. Tributary Conservation Plan

The District shall provide a Plan Species Account to fund projects for the protection and restoration of Plan Species habitat within the Columbia River watershed (from the Chief Joseph tailrace to the Rock Island tailrace), and the Wenatchee, Entiat, Methow, and Okanogan River watersheds, in order to compensate for up to two percent of Unavoidable Project Mortality. This Tributary Committee will monitor and evaluate the relative performance of projects.

Chelan PUD will provide an additional $200,000 to monitor and evaluate the relative performance of projects approved by the Tributary Committee. It is not the intent of the tributary assessment program to measure whether the Plan Species Account has provided a 2 percent increase in survival for Plan Species. Instead, the program will ensure that the dollars allocated to the Plan Species Account are utilized in an effective and efficient manner.

While the HCP remains in effect, Chelan PUD shall contribute $229,800, in 1998 dollars, annually to the Plan Species Account. By joint written request, the agency representatives to the Tributary Committee may elect for Chelan PUD to contribute, in advance, any of the annual payments to be made during the first fifteen years of the Agreement, provided that, (1) each annual payment shall be adjusted by Chelan PUD for inflation based upon a nationally recognized index, (2) the total adjusted amount shall be reduced to present value by the actual discount rate applicable to Chelan PUD, and reduced by Chelan PUD's actual cost of financing, and (3) each election shall be for a minimum of three annual payments.

The first installment is due within ninety- (90) days of the Effective Date of the Agreement. The rest of the installments are due by the 31st day of January each year thereafter. The dollar figures shall be adjusted for inflation on the 1st day of January each year based upon the Consumer Price Index for all Urban Consumers for the Seattle/Tacoma area, published by the U.S. Department of Labor, Bureau of Labor Statistics. If said index is discontinued or becomes unavailable, a comparable index suitable to the Tributary Committee shall be substituted.

The Tributary Committee is charged with the task of selecting projects and approving project budgets from the Plan Species Account for purposes of implementing the Tributary Plan. Whenever feasible, projects selected by the Tributary Committee shall take into consideration and be coordinated with other conservation plans or programs. Whenever feasible, the Tributary Committee shall cost-share with other programs, seek matching funds, and piggy-back programs onto other habitat efforts. Habitat protection and restoration projects could include, but are not limited to, the following:

1. Opening fish passage to blocked stream sections or oxbows.
2. Changing the points of origin for problematic irrigation withdrawals to less sensitive site(s).
3. Purchasing, on a willing buyer/seller concept, water shares for the Trust Water Rights Program or conservation easements on private property.
4. Providing alternative sources of irrigation and domestic water to mitigate impacts of problematic surface water diversions.
5. Removing dams or other passage barriers on the tributaries.
6. Using mechanical means to encourage natural development of riparian areas.
7. Using engineering techniques which increase complexity of permanently altered habitats.

The overarching goal of the Tributary Enhancement Fund is the long-term protection or enhancement of Permit Species' habitats in the tributaries, which in turn should improve the productivity of salmon and steelhead populations in those basins. NOAA Fisheries and the USFWS anticipate that some activities will require additional permitting and

ESA consultation. Through these means and through its active participation on the Tributary Committee, NOAA Fisheries would ensure that any negative impacts to Permit Species and other listed species due to in-water or riparian tributary protection and enhancement activities would be minimized to the extent practical through choice of methodology, seasonal timing of work, and protection measures for short-term impacts, and would not jeopardize ESA-listed Permit Species.

More detailed descriptions may be found in Section 7 of the HCP and Section 2.3.4.8 of the FEIS.

Individual action associated with the Tributary Conservation Plan that may potentially affect listed species in the action area will under go a separate Section 7 Consultation.

3.4.5.5. Hatchery Compensation Plan

Chelan PUD will compensate for up to 7% of the unavoidable mortality at the Project for Plan Species originating upstream of Rock Island Dam through artificial production, or through measures to increase the off-site survival of naturally spawning fish or their progeny. Chelan PUD shall implement the specific elements of the hatchery program consistent with overall objectives of rebuilding natural populations and achieving NNI. Species specific hatchery program objectives may include contributing to the rebuilding and recovery of naturally reproducing populations in their native habitats, while maintaining genetic and ecologic integrity, and supporting harvest.

Hatchery production levels, except for original inundation mitigation, shall be adjusted in 2013 and every 10 years thereafter as is required to adjust for changes in the average adult returns of Plan Species and for changes in the adult-to-smolt survival rate, and for changes to smolt-to-adult survival rate from the hatchery production facilities, considering methodologies described in the Biological Assessment and Management Plan (BAMP) (National Marine Fisheries Service, et al. 1998). The Hatchery Committee will be responsible for determining program adjustments considering the methodology described in BAMP and providing recommended implementation plans to Chelan PUD. Chelan PUD will be responsible for funding the implementation plan.

The Hatchery Committee shall oversee development of recommendations for implementation of the hatchery elements of the Agreement that Chelan PUD is responsible for funding. This includes overseeing the implementation of improvements, monitoring and evaluation relevant to Chelan PUD's hatchery programs, as identified in the Hatchery Compensation Plan, the Hatchery Permits[9] and this Agreement. Hatchery Committee decisions shall be based upon: the likelihood of biological success, the time required to implement, and cost-effectiveness of solutions. The Hatchery Committee will also coordinate in-season information sharing and shall discuss unresolved issues.

A separate Section 7 Consultation will occur for future individual actions associated with the Hatchery Compensation Plan that may potentially affect listed species.

3.4.5.6. Installation of a Small Turbine Unit

FERC has previously authorized the construction of a small, 0.8 Megawatt, fixed-blade propeller turbine generator in the attraction water conduit that provides supplemental flow to the spillway entrance of the left bank adult fishway. On August 17, 2001 the USFWS sent a letter to FERC concurring with the determination made in FERC's BA (submitted to USFWS on July 27, 2001) that no significant impacts to bull trout would occur as a result of the proposed construction and operation of a small 0.8 MW Kaplan turbine unit (USFWS 2001a).

The following sections summarize the construction activities and proposed protection measures associated with the installation of the small turbine unit. More detailed descriptions of the construction activities, protection measures, and future operations of the small turbine unit can be found in FERC's BA/EA (2001a), in FERC's response to NOAA Fisheries' request for additional information (2001b), and in FERC's Order Amending Licenses (2002).

Construction Activities

[9] NOAA Fisheries is preparing separate Opinions evaluating its issuance of Incidental and Direct Take Permits for the species-specific hatchery programs in the Mid-Columbia basin.

The following would occur as part of the small turbine unit construction activities.

1. Construction activities would occur only during the normal fishway outage period (i.e., between early December and the end of February), and could result in construction activities occurring in multiple years (Christman 2003).
2. The attraction flow conduit would be dewatered and demolition and construction would occur within this area.
3. Protective measures would be installed below the work areas to prevent debris, tools, and workers from falling into the fishway.
4. All work in the dry (i.e., work that occurs outside of the Project forebay, fishway, and fishway attraction water conduits) would be performed in a manner not disturbing the fishway and not conducive to foreign objects or materials entering the water.

Proposed Environmental Measures

The following measures have been proposed to mitigate for any potential adverse impacts to anadromous fish species arising from the construction and maintenance of the small turbine unit.

1. Use biodegradable and non-toxic vegetable-based oil to lubricate the turbine in order to minimize adverse impacts of potential oil spills to migrating adults.
2. Implement filed plans for responding to lubricant leaks or spills.
3. Assure that all construction-related materials and fluids have been removed prior to the start of new turbine operation.
4. Install an automated valve or gate bypass system that would redirect flows into the fishway, bypassing the turbine, whenever the main system is incapable of providing the necessary attraction flows.
5. Conduct hydraulic monitoring at the diffuser gratings during operation and testing of the turbine flow bypass system.
6. Conduct hydraulic monitoring at the diffuser gratings when the new turbines are operating, and make any necessary adjustments to ensure that the diffuser gratings are operating properly.

7. Screen the attraction flow conduit intakes to prevent juvenile salmonids from entering the attraction flow systems.

Operation Activities

The following measures will occur when operating the small turbine unit during the normal fishway operation period.

1. In the event of a scheduled or unscheduled turbine shutdown during the normal fishway operation period, maintain adequate flows in the fishway diffusion area through the use of the permanent bypass pipe with an automatic valve.

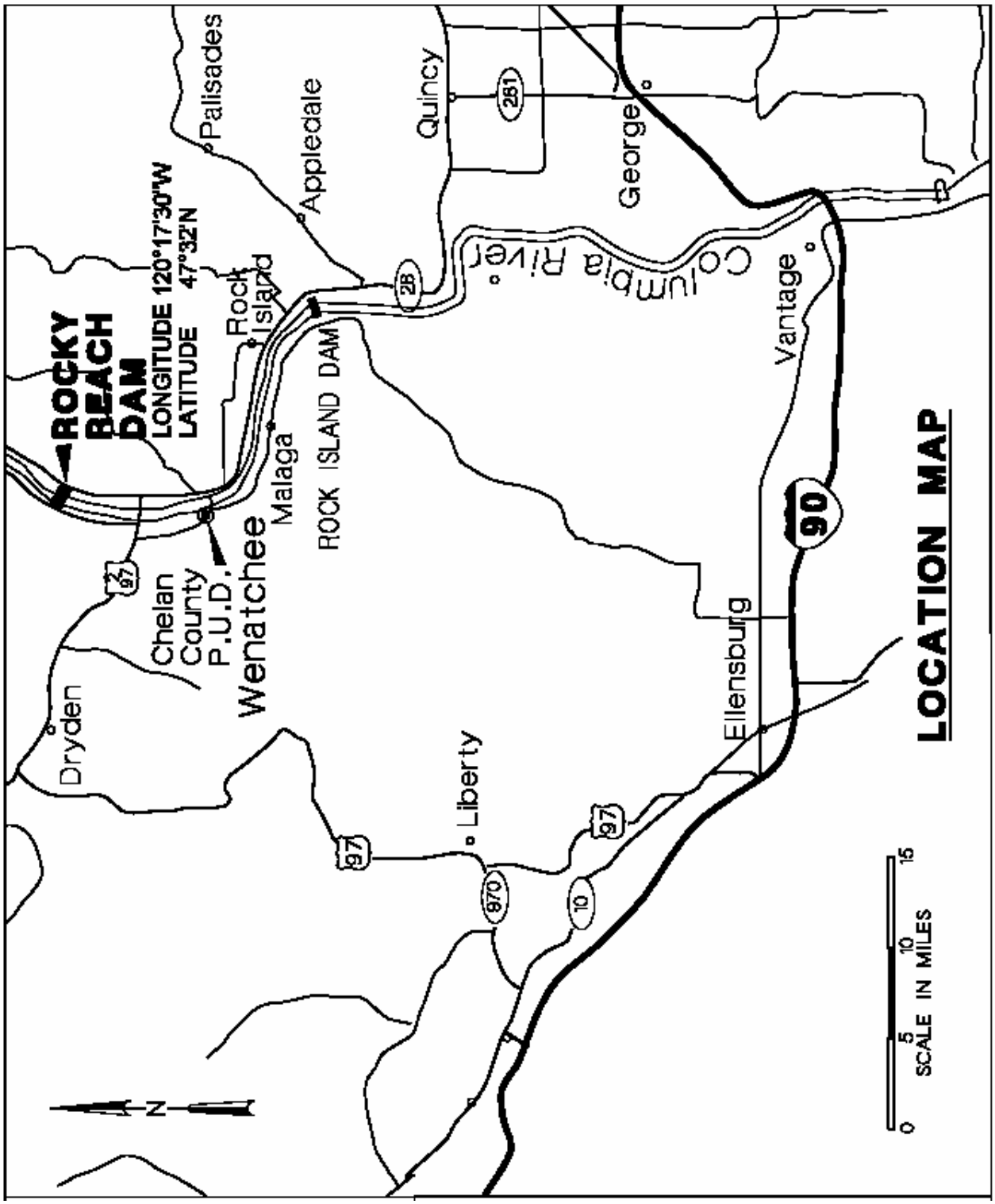
2. Initiate appropriate environmental clean-up procedures in the tailrace area of the Project n the event of an oil spill.

4. ENVIRONMENTAL BASELINE

4.1. Rock Island Hydroelectric Project

Rock Island was the first hydroelectric facility to harness the power of the mainstem Columbia River. Construction of the project involved raising a reinforced concrete structure that spanned the Columbia River at river mile (RM) 453.5, creating a 3,470-acre impoundment in central Washington (Figure 4-1). The original project included a spillway and abutment, and a powerhouse on the left (east) side of the river. Subsequent developments included expansion of the powerhouse to hold an additional six turbines, and construction of a second powerhouse (powerhouse 2) on the opposite side of the river.

Figure 4-1. Rock Island Project Location Map



Original construction of the Rock Island project was completed by the Puget Sound Power & Light Company in 1933 to provide hydropower to the greater Seattle area. Ownership of the Rocky Island Project was later transferred to the Chelan PUD. Chelan PUD serves electric customers in Chelan County with a portion of the energy generated at Rock Island Dam. Under terms of the 19 June 1974 power purchase contract, Puget Sound Power & Light Company, now Puget Sound Energy, purchases the remaining output.

4.2. Reservoir Environment

Daily operations of the Mid-Columbia reservoirs (inflow, discharge, reservoir elevation) including Rock Island Reservoir, are determined largely by daily and seasonal operations of large Federal storage projects, Chief Joseph Dam (US Army Corp of Engineers) and Grand Coulee Dam (US Bureau of Reclamation) further upstream on the Columbia River. Federal Columbia River Power System (FCRPS) operations, including flow augmentation for both adult and juvenile salmon and steelhead, flood control, and power production, have resulted in reduced Columbia River flows from January through April and increased flows from May through August.

The effects of flow augmentation for juvenile salmon are most apparent during years of average snowpack and drought, when power production in winter is reduced to hold water in storage for spring fish flow releases and in summer when reservoir refill probability is reduced in order to augment flows during June through August. In general, the federal storage reservoirs upstream of Rock Island Dam have been operated under three different operational regimes from 1973 to present. During operating regime from 1973 to 1982, reservoirs were managed primarily for flood control and power generation, with limited fish passage flows provided in May. From 1983 to 1991, annual flow augmentation was occurred from April 17 through June 15 under the Northwest Power Planning Council's Water Budget. In 1992, the NOAA Fisheries' Biological Opinion (BO) called for restructured storage releases to augment flows in the lower Columbia River from June through August. Federal reservoirs are currently operated in this fashion, resulting in severe reduction of mid-Columbia River flows in

April, as this water is now stored behind Grand Coulee Dam and other federal projects for flow augmentation later in the summer.

Rock Island Dam is operated as a run-of-river project (daily inflow approximately equals daily outflow) within the mid-Columbia Hourly Coordination operation. Hourly Coordination operates the generating units and reservoirs of the five mid-Columbia hydro projects as a single coordinated hydro resource. While the Project reservoir has a four foot operating range from elevation 609 to 613 msl, with 10,000 acre-feet of useable storage, reservoir drafts of more than several inches below full pool are infrequent and unplanned. Daily and seasonal in-flow into the Rock Island Project is primarily shaped by operations at Canadian and federal storage projects upstream of both Rock Island and Rocky Reach, particularly Grand Coulee Dam.

Anadromous salmonid fish species present in the Rock Island Project area (Table 4-1) include: spring, summer and fall chinook salmon *(Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*), Upper Columbia River steelhead (*O mykiss*), coho salmon (*O. kisutch*). Endemic stocks of coho salmon were historically present, but this stock was extirpated from the mid-Columbia region by the 1940's (Mullan 1984). Pacific lamprey is another non-salmonid anadromous fish species present in the project area.

Native resident fish species (Table 4-1) include white sturgeon (*Acipenser transmontanus*), mountain whitefish (*Prosopium williamsoni*), rainbow trout (*O. mykiss),* bull trout (*Salvelinus confluentus*), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth chub (*Mylocheilus caurinus)*, chiselmouth chub (*Achrocheilus alutaceus*) , largescale sucker (*Catostomus machrocheilus*), bridgelip sucker (*C. columbianus*), redside shiner (*Richardsonius balteatus*), sculpins (*Cottus sp*) and threespine stickleback (*Gasterosteus aculeatus*). Common introduced resident species include carp (*Cyprinus carpio*), tench (Tinca tinca) largemouth (*Micropterus salmoides*) and smallmouth bass (*Micropterus dolamieui*), pumpkinseed sunfish (Lepomis gibbosus), walleye (*Stizostedien vitreum*), yellow perch (*Perca flavescens*), and brown bullhead (*Ictalarus nebulosus).* Bull trout, the only federally listed resident fish species, is known to overwinter in Rock Island Reservoir (BioAnalysts 2003 Draft).

Rock Island Reservoir currently has extensive rearing habitat for ocean-type (sub-yearling) chinook salmon and resident species such as suckers, pikeminnows, chubs, shiners, and stickleback (Chelan PUD 1991c). Ocean-type chinook salmon tend to use the edge waters in late spring and early summer. Larger chinook fingerlings and stream-type (yearling) chinook use pelagic waters in the spring and summer for rearing and as a migration corridor. Juvenile ocean-type chinook in the Snake River use shallow areas with sandy substrate between the shoreline and aquatic plant beds (Chelan PUD 1991c).

Table 4-1. Fish species known to occur, or believed to occur, in Rock Island Reservoir.

Family	Common Name	Scientific Name
Acipenseridae	White sturgeon	*Acipenser transmontanus*
Salmonidae	Chinook salmon	*Oncorhynchus tshawytscha*
	Sockeye salmon	*Oncorhynchus nerka*
	Kokanee	*Oncorhynchus nerka*
	Rainbow trout	*Oncorhynchus mykiss*
	Steelhead	*Oncorhynchus mykiss*
	Cutthroat trout	*Oncorhynchus clarki*
	Brown trout	*Salmo trutta*
	Bull trout	*Salvelinus confluentus*
	Mountain whitefish	*Prosopium williamsoni*
Percidae	Walleye	*Stizostedion vitreum*
	Yellow perch	*Perca flavescens*
Centrarcidae	Largemouth bass	*Micropterus salmoides*
	Smallmouth bass	*Micropterus dolomieui*
	Black crappie	*Pomoxis nigromaculatus*
	Bluegill	*Lepomis macrochirus*
	Pumpkinseed	*Lepomis gibbosus*
Gadidae	Burbot	*Lota lota*
Ictaluridae	Channel catfish	*Ictalurus punctatus*
	Black bullhead	*Ictalurus melas*
Catostomidae	Largescale sucker	*Catostomus macrocheilus*
	Bridgelip sucker	*Catostomus columbianus*
	Longnose sucker	*Catostomus catostomus*
	Mountain sucker	*Catostsomus platyrhynchus*
Cyprinidae	Carp	*Cyprinus carpio*
	Northern pikeminnow	*Ptychocheilus oregonensis*
	Redside shiner	*Richardsonius balteatus*
	Chiselmouth	*Acrocheilus alutaceus*
	Peamouth	*Mylocheilus caurinus*
	Tench	*Tinca tinca*
	Longose dace	*Rhinichthys cataractae*
	Speckled dace	*Rhinichthys osculus*
Percopsidae	Sand roller	*Percopsis transmontana*
Cottidae	Prickly sculpin	*Cottus asper*
	Torrent sculpin	*Cottus rhotheus*
Gasterosteidae	Threespine stickleback	*Gasterosteus aculeatus*
Petromyzontidae	Pacific lamprey	*Entosphenus tridentatus*

4.3. Tributary Watersheds

Fish species inhabiting tributaries in the action area include chinook salmon, sockeye salmon, steelhead, resident rainbow trout, cutthroat trout (*O. clarki*), bull trout, mountain whitefish largescale sucker, bridgelip sucker, speckled dace (*Rhinichthys osculus*), longnose dace (*R. Cataractae*), redside shiner, northern squawfish, pemouth chub, three-spine stickleback sculpin, and Pacific Lamprey (*Entosphenus tridentatata*) (Hillman and Chapman 1989).

4.3.1. Wenatchee River

The Wenatchee River is located within Chelan County and is the first major tributary upstream of Rock Island Dam. The watershed drains a land area of approximately 2,136 square miles. The river originates from Lake Wenatchee and flows 87 km south to southeast where it enters the Columbia River at RM 486.2. The upper portion of the watershed is mountainous and heavily forested. The lower Wenatchee watershed opens to a broader valley where it is primarily used for fruit growing and other agriculture purposes. Mean annual flow in the Wenatchee River is 1,071 cfs.

The USFWS (2002b) identified six migratory bull trout populations in the Wenatchee River. These include: the Chiwawa River (including Chikamin, Phelps, Rock, Alpine, Buck and James creeks), White River (including Canyon and Panther creeks), Little Wenatchee River (below the falls), Nason Creek (including Mill Creek), Chiwaukum Creek, and Peshastin Creek (including Ingalls Creek). Adfluvial, fluvial, and resident forms of bull trout currently exist in the Wenatchee River Core Area (WDFW 1998). Most of the spawning and fry rearing habitat are within U.S. Forest Service lands, including the Glacier Peak and Alpine Lake Wilderness areas (USFWS 2002b). Resident bull trout occur in Icicle Creek above the barrier falls, and migratory bull trout are known to frequent the area below the falls, most likely while foraging (USFWS 2002b). It is unclear at this time whether migratory bull trout can pass these falls.

4.3.2. Entiat River

The Entiat River watershed originates in the Cascade Mountains and flows southeast approximately 51.5 miles before emptying into the Columbia River at RM 483.7. The two major tributaries are the North Fork Entiat River and the Mad River. Drainage area of the watershed is approximately 419 square miles. The river valley is generally mountainous, steep, and heavily forested. Summer thunderstorms in the drainage have produced flash floods in the narrow tributary channels. This, combined with steep topography, a pinnate drainage pattern, and low drainage density and length, can result in a "flashy" flow regime (USFWS 2002b). Mean annual flow of the Entiat is about 232 cfs with a mean flow gradient of 1.1%. Alluvial fans are present at the mouths of most tributaries. A natural water fall forms a fish barrier at RM 27.9 on the mainstem Entiat; the presence of resident bull trout above this waterfall is apparently unknown. The USFWS bull trout recovery plan (2002b) does not discuss fish distribution above this barrier.

Dominant resident species in the Entiat River watershed include bull trout, westslope cutthroat trout, and rainbow trout. Other resident species found in the Entiat subbasin include mountain whitefish, eastern brook trout, and redband trout, (Andonaegui 1999, CCCD 1999). Anadromous species include chinook salmon, steelhead, and Pacific lamprey. The upper Entiat (above Entiat Falls) supports indigenous populations of rainbow and cutthroat trout. The WDFW supplemented these populations with annual stockings through 1996. The eastern brook trout was introduced upstream of Entiat falls, but is no longer stocked; a self-sustaining population still exists.

The USFWS (2002) has identified two local populations of bull trout in the Entiat River, one fluvial population in the mainstem Entiat and one population in the Mad River, a tributary to the Entiat. The status of the mainstem population is listed as "unknown", while the Mad River bull trout population is classified as "healthy" (WDFW 1998). Primary bull trout spawning and rearing areas are in the Mad River and the mainstem Entiat River from the Entiat Falls downstream to the National Forest boundary (USFWS 2002b). The USFWS has expressed concern for the long-term persistence of Entiat

River bull trout due to low numbers of spawning adults, and an apparently restricted spawning distribution (USFWS 2002b).

4.3.3. Chelan River

The Chelan River is 4.1 miles in length, beginning at the outlet to Lake Chelan and ending at the Columbia River. The Lake Chelan Hydroelectric Project has a dam and diversion structure at river mile 3.9. The Lake Chelan Hydroelectric Project is the only FERC-licensed hydropower project on the Chelan River. The Project drains into the Columbia River about 20 miles upstream of Chelan PUD's Rocky Reach Hydroelectric Project.

Downstream of the Chelan Dam, the remaining 3.9-mile-long stretch of the Chelan River constitutes the bypassed reach of the project. The bypassed reach passes through the glacial moraine and outwash deposits and then a segment of bedrock, dropping about 360.5 feet between the dam and its confluence with the Columbia River. Currently there is no minimum flow released into the bypassed reach. The bypassed reach is generally dry from mid-July through mid-May of the following year. Inflow in excess of powerhouse capacity is spilled into the bypassed reach. Occasionally, storms in fall or winter cause refill of the reservoir which results in spill into the bypassed reach. The powerhouse tailrace is a 1,700-foot-long channel adjacent to the lower end of the bypassed reach. The tailrace (0.32 mile) has a variable, near-zero gradient due to the backwater from the downstream Rocky Reach Project on the Columbia River. At the time of construction of the Lake Chelan Hydroelectric Project, the tailrace was excavated from the powerhouse to the Columbia River, and an earthen dike (now vegetated) was established between the tailrace and the bypassed reach. The tailrace discharges into the Columbia River near the community of Chelan Falls.

Since the tailrace area is contiguous with the Columbia River, the same assemblage of fish species that inhabit the Rocky Reach Reservoir may use the tailrace habitat for rearing or other purposes. When the lower section of the Chelan River has flowing water from spill operations, various species of suckers, cyprinids and other reservoir fish species have been observed in the Chelan River. The accessible habitat in the lower

Chelan River is limited to 0.49 miles of low to moderate gradient channel, then a short section of the Chelan River gorge, where there are five natural falls that are impassible barriers to upstream fish passage (R2 and IA 2000)

Redirection of bypass flows into the lower tailrace has resulted in the deposition of gravels and sediment into the lower 400 feet of the tailrace. The high quality of gravel and consistent flow regime from the powerhouse discharge provide conditions that support spawning by summer chinook salmon. The tailrace contains populations of fish that enter from the Columbia River. Chelan PUD biologists have observed several native fish species congregating on the alluvial fan where the tailrace and the bypassed reach of the Chelan River and the Columbia River converge. Summer chinook salmon spawn on gravel in this area in October and November. Upper Columbia Steelhead have also been observed to spawn on these alluvial deposits in the tailrace. The gravel and flow conditions are also appropriate for native cyprinid fishes, such as chiselmouth chub, peamouth chub, and northern pikeminnow. Suckers have been observed spawning in the spring in the same locations used by salmon and steelhead.

The Lake Chelan basin is historic bull trout habitat, but their presence has not been documented since the early 1950's, and they may have been extirpated from the basin (WDFW 1992). Washington State's Salmonid Stock Inventory for bull trout/dolly varden (WDFW 1997) has no stock listing for bull trout in the entire Chelan basin.

Bull trout have not been observed in the Chelan River itself. Two adult bull trout were observed in the tailrace channel during a chinook spawning survey in November of 1999 (R2 and IA 2000). These bull trout were observed milling with actively spawning chinook, presumably to forage on displaced eggs.

4.3.4. Methow River

The Methow River is located along the northeastern slopes of the Cascades in Okanogan County in north central Washington. The Methow drainage is bounded by Sawtooth Ridge on the south, the Cascade Crest to the west and originates in the Pasayten Wilderness located to the west and north. The Methow drainage is also

located immediately adjacent to the Okanogan River drainage to the east. The Methow River originates high in the Cascade Mountains and flows southeast to its confluence with the Columbia at the town of Pateros, draining approximately 1,772 square miles. Elevations throughout the basin range from a maximum of 8,957 feet at the top of North Mount Gardner to 771 feet at the mouth of the Methow River near the town of Pateros. There are several small reservoirs located within the basin including Pearrygin, Patterson, Twin and Alta. During normal project operations, the lower 1.5 miles of the Methow River are influenced by the backwater effect of Wells Dam. There are two major tributaries to the Methow River, the Twisp and Chewack rivers. Average monthly flows within the lower Methow River range from 424 cfs in January and February to 5,963 cfs in June.

An estimated 32 species of fish, including 7 introduced species, are found in the Methow River Subbasin (Mullan et al. 1992). Anadromous species include spring chinook, summer chinook, coho, summer steelhead, and Pacific lamprey. Resident salmonids known, or believed to occur include Red band trout (*O. mykiss gibbsi*), bull trout, brook trout (S. *fontinalis*), westslope cutthroat, and mountain whitefish.

In the Methow River system, the USFWS (USFWS 2002b) has identified bull trout in Gold Creek, Twisp River, Chewuch River, Wolf Creek, Early Winters Creek, the Upper Methow River, Lost River, and Goat Creek. Populations in the Methow include adfluvial, fluvial, and resident bull trout. Resident bull trout may be found above fish passage barriers in the Methow and some of its tributaries, but distribution and abundance of this life form is not well known. In the Upper Methow River, populations have been identified in the West Fork and Trout Creek; Robinson Creek and Rattlesnake Creek may contain some spawning habitat, but fish have not been documented in these streams (USFWS 2002b).

The WDFW (1998) characterized bull trout populations in the Lost River, a tributary to the Methow, as “Healthy”, but the status of the remaining populations is unknown (USFWS 2002b). Lower reaches of the Methow, below the town of Carlton, are important spawning areas for summer chinook, steelhead, and bull trout (WSCC 2000);

the lower Methow probably also serve as a migratory corridor for bull trout to access the Columbia River.

4.3.5. Okanogan River

The Okanogan River is located along the eastern slopes of the Cascades in Okanogan County in north central Washington. The Okanogan drainage flows in a north to south direction and is bounded on the west by the Methow River and on the east by the Sanpoil River and the Colville Indian Reservation. The Okanogan River originates high in the Canadian Cascade Mountains and flows south to its confluence with the Columbia at RM 533.5. The Okanogan Basin drains an area approximately 8,280 square miles. There is one major tributary to the Okanogan River, the Similkameen River. Elevations throughout the basin range from a maximum of 8,333 feet at the top of Windy Peak to 771 feet at the mouth of the Okanogan River. The primary irrigation storage reservoirs located within the basin include Upper and Lower Conconully Reservoirs and Okanogan, Skaha and Osoyoos Lakes. The lower 12 miles of the river is influenced by the backwater effect of Wells Dam.

Resident species known to occur in the Okanogan River include mountain whitefish, rainbow trout, cutthroat trout, and eastern brook trout. Bull trout are known to occur in the Okanogan River in British Columbia (USFWS 2002b). Anecdotal reports purport the occurrence of bull trout in the Okanogan within the United States, but so far, fish have not been positively confirmed (USFWS 2002b).

4.4. Hatchery Facilities

The Rock Island Hatchery Program (RIHP) is designed to mitigate for the construction and continuing impacts to anadromous fish by the operation of the Rock Island Hydroelectric Project. To meet RIHP production goals, Chelan owns and funds one hatchery facility and six satellite facilities. Table 4-2. summarizes Chelan PUD's adult holding and juvenile rearing capacities for its existing hatchery facilities, including those supporting both Rock Island and Rocky Reach hatchery programs. In addition to these facilities, Chelan also provides funding to hatcheries owned by Douglas County PUD (DCPUD) to help meet RIHP production goals. DCPUD facilities will not be addressed

in this document. Both Chelan and DCPUD hatchery facilities are operated by the Washington Department of Fish and Wildlife (WDFW).

Table 4-2. Summary of Chelan PUD Existing Hatchery Facilities and Capacity (* Denotes Rock Island Mitigation facilities)

Facility	Water Supply Capacity	Adult Holding Tanks	Incubation	Rearing Raceways	Rearing Ponds	Acclimation Ponds
* East Bank Hatchery	23,800 gpm	2 Concrete Ponds @ 7500cf	104 8-tray stacks (double stacks)	8 "Standards @ 3700 cf each	2 ponds @ 36,000 cf	
	(53 cfs)	1 Concrete Pond @ 2120 cf	4 fiberglass troughs @ 30 cf	5 "super-raceways" @ 22,200		
Turtle Rock Annex	3,000 gpm		40 8-tray stacks (double stacks)	8 vinyl raceways @ 1920 cf each		
Turtle Rock Rearing Ponds	12,000 gpm				2 ponds @ 40,000; 46800 cf	
					2 ponds @ 46,800 ; 55,000cf	
Chelan	3,400 gpm		80 fiberglass troughs @ 7 cf each	8 concrete raceways @ 214 cf each		
				16 concrete raceways @ 2308 cf each; 2 vinyl raceways	1 adult holding pond @ 3,600 cf	
*Chiwawa Satellite	Nov.- Mar: 5,400 gpm					
	Remaining: 9450 gpm					2 ponds @ 37,500 cf each
*Lake Wenatchee Net Pens	NA					8 net pens @ 925 cf each
*Similkameen Satellite	4,800 gpm					1 pond @ 72,870 cf
*Dryden Pond Satellite	12,000 gpm					1 pond @ 115,200 cf
*Carlton Pond Satellite	3,345 gpm					1 pond @ 53,400 cf

Table 4-3. Production Levels and Rearing Facilities by Stock for Chelan PUD Mitigation.

Species	Stock	Mitigation Program	Rearing Facilities Under Current Program	Current Production Levels
Spring Chinook	Chiwawa	RI	Eastbank Hatchery & Chiwawa Satellite	672,000
	Methow	RI/RR	Douglas County PUD Methow Hatchery	288,000
Summer Chinook	Wenatchee	RI	Eastbank Hatchery & Dryden Pond Satellite	864,000
	MEOK-Okanogan	RI	Wells Dam H., Eastbank H. and the Similkameen Satellite	576,000
	MEOK-Methow	RI	Wells Dam H., Eastbank H. and the Carlton Satellite	400,000
	Turtle Rock Island Yearlings	RR	Wells Dam H, Eastbank H., Turtle Rock Annex & Turtle Rock Island Rearing Ponds	200,000
	Turtle Rock Island Subyearlings	RR	Wells Dam H, Eastbank H., Turtle Rock Annex & Turtle Rock Island Rearing Ponds	660,000
	Turtle Rock Island Accelerated Subyearlings	RR	Wells Dam H, Eastbank H., Turtle Rock Annex & Turtle Rock Island Rearing Ponds	440,000
Sockeye	Lake Wenatchee	RI	Eastbank H. and Lake Wenatchee Net Pens	200,000
Steelhead	Wenatchee	RI	Eastbank H., Wells H. and Turtle Rock Island Rearing Ponds	200,000
	Wenatchee	RR	Chelan H., Eastbank H., Wells H., and Turtle Rock Island Rearing Ponds	200,000

4.4.1. Holding, Incubation, Rearing, and Release Facilities

4.4.1.1. Eastbank Hatchery Facility

The Eastbank Hatchery Facility is located on the east side of the Columbia River adjacent to Rocky Reach Dam (RM 473.7). The facility was constructed in 1989 and provides support for the RIHP. Specific information concerning capacity and flow is provided in Table 4-2. Water for the hatchery is supplied by a nearby well field that is located adjacent to the Rocky Reach Reservoir. The water is pumped via four 200 hp pumps that provide 5,750 gpm of water flow each. Eastbank hatchery contains adult holding facilities, incubation facilities (with chilled water capabilities), rearing raceways, and rearing ponds. Trapping and juvenile releases do not take place at this facility. Adults are trapped at other sites and are transported to Eastbank for maturation and spawning. Incubation and early rearing are done on site while final rearing/acclimation and releases occur at other facilities. With regards to the RIHP, the facility is used in the production of Wenatchee River spring chinook, various stocks of summer chinook, Lake Wenatchee Sockeye, and Wenatchee River summer steelhead (Table 4-3).

4.4.1.2. Turtle Rock Island Satellite Facility

Turtle Rock Island is located in the Columbia River approximately 3 km upstream of Rocky Reach Dam. The facility was built in 1962 and contains 4 large concrete ponds (Table 4-2). Water for the facility is pumped from the Columbia River by five pumps that are each capable of providing 2,500-3,000 gpm of flow. All intake pipes that draw water from the Columbia are screened. With respect to the RIHP, the Turtle Rock satellite facility is used for the final rearing of summer steelhead before they are transported to various locations on the Wenatchee River, and subsequently released (Table 4-3).

4.4.1.3. Chiwawa Satellite Facility

The Chiwawa satellite facility is located on the Chiwawa River which is a tributary to the Wenatchee River. The facility was built in 1990 and contains 2 hypalon- lined acclimation ponds. The water supply is pumped from both the Wenatchee and Chiwawa rivers via three 3,150 gpm pumps (Chiwawa) and one 2,700 gpm pump

(Wenatchee). The facility provides a location to trap adult spring chinook as well as provide an acclimation and release point for Chiwawa River spring chinook juveniles.

4.4.1.4. Dryden Satellite Facility

The Dryden satellite facility is located on the Wenatchee River approximately 1.5 miles downstream of Dryden Dam (RM 17.3). The facility was constructed in 1990 and consists of one hypalon-lined rearing pond (Table 4-2). Water is supplied via gravity flow at a maximum of 12,000 gpm from the Dryden Canal; water for the Canal is supplied by the Wenatchee River. All water intake pipes are screened. The purpose of this facility is to provide an acclimation and release point for Wenatchee stock summer chinook.

4.4.1.5. Similkameen Satellite Facility

The Similkameen Satellite facility is located on the Similkameen River near its confluence with the Okanogan River. The facility was constructed in 1990 and consists of one hypalon-lined rearing pond. The water supply is pumped from the Similkameen River by two 4,800 gpm pumps. All water intake pipes are screened. The purpose of the facility is to provide an acclimation and release location for Okanogan River summer chinook.

4.4.1.6. Carlton Satellite Facility

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. All water intake pipes are screened. The facility provides an acclimation and release location for Methow summer chinook.

4.4.1.7. Lake Wenatchee Net Pens

The Lake Wenatchee net pens are located at the west end of Lake Wenatchee. There are six net pens in the arrangement and they encompass 925 cubic feet each. The

pens are used for holding adults prior to spawning as well as acting as a final rearing and release location for juvenile Lake Wenatchee sockeye.

4.4.1.8. Trapping Facilities

There are three adult trapping facilities utilized to collect adult salmonids to meet the RIHP production goals. These sites are Wells Dam, Dryden Dam, and Tumwater Dam. There are also two smolt traps (screw-traps) associated with Rock Island Dam mitigation, one on the Chiwawa River and one on the upper Wenatchee River.

4.4.1.9. Wells Dam

The Methow and Okanogan stock of summer chinook are collected at Wells Dam. Wells Dam is located at RM 515.1 approximately 42 miles upstream of Rocky Reach Dam and is owned and operated by DCPUD. The adult trapping facilities are located in each of the two ladders located on the right and left bank of the Columbia River.

4.4.1.10. Dryden Dam

Dryden Dam is located on the Wenatchee River approximately 28 km upstream of the confluence of the Wenatchee and Columbia Rivers. The dam has been used since the early 1900's for the purpose of supplying irrigation water to the Wenatchee Reclamation District. In the late 1980's, the dam underwent extensive renovation. Fish ladders were constructed on both the right and left bank. Originally only the right bank ladder had trapping facilities installed. However, in 1996 trapping and holding facilities were also installed in the left bank ladder. The species trapped at the facility specifically for the RIHP are the Wenatchee River summer chinook and the Wenatchee River summer steelhead.

4.4.1.11. Tumwater Dam

Tumwater Dam is located on the Wenatchee River at RM 30.9. A dam has been at the site since the early 1900's and originally provided power to the various railroads that operated within the Stevens Pass corridor. A new ladder and trapping facility was constructed on the left bank in the late 1980's. In 2002, this facility was again updated

allowing for simultaneous trapping of RIHP fish and non-RIHP without interfering in the normal collection and monitoring programs. The species collected under the RIHP are Lake Wenatchee sockeye and Wenatchee River summer steelhead.

4.4.1.12. Chiwawa River Smolt Trap

The Chiwawa River trap is located approximately 0.5 miles upstream from the confluence of the Wenatchee and Chiwawa rivers with construction completed in 1990. The structure consists of a hydraulic picket weir and a trap box. The original trap box has been improved upon with the installation of a finger weir between the trapping and holding chamber and the construction of a surface spray system to reduce jumping by fish being held. This structure is only used to trap Chiwawa River spring chinook and typically operates between March 8 and December 11 each year. Bull trout have been captured in this trap in the past. WDFW operates this trap under a Section permit from the USFWS.

4.4.1.13. Upper Wenatchee River Smolt Trap

The upper Wenatchee River smolt trap is located approximately 0.3 mile downstream from the outlet of Lake Wenatchee. The trap typically operates from April 3 to May 28 each year to estimate the post release survival of hatchery sockeye salmon released from Lake Wenatchee. Juvenile bull trout have been incidentally captured in this trap in the past. WDFW operates this trap under a Section 6 permit from the USFWS.

5. ANALYSIS OF EFFECTS TO LISTED SPECIES

5.1. Pygmy Rabbit (*Brachylagus idahoensis*)

5.1.1. Geographic Boundaries and Life History

The pygmy rabbit (*Brachylagus idahoensis*) is the smallest native rabbit in North America. Its distribution is scattered in the sagebrush-dominated shrub steppe areas of the Great Basin. This includes portions of Oregon, California, Nevada, Utah, Idaho, Montana, Wyoming, and Washington states. Washington populations are discontinuous from the rest of the species' range. Genetic testing shows that Washington pygmy

rabbits are genetically distinct from pygmy rabbits in the rest of the species range (Washington Department of Fish and Wildlife, 2001). Habitat changes since the last ice age disconnected the Washington population from rabbits in Oregon and Idaho. The known range of the Washington pygmy rabbit formerly occupied sagebrush habitat in five counties: Benton, Adams, Grant, Lincoln, and Douglas (Washington Department of Fish and Wildlife, 1995). Currently, pygmy rabbits are known to survive only at Sagebrush Flat in south-central Douglas County (Washington Department of Fish and Wildlife, 2001).

Pygmy rabbits are usually found in areas of dense sagebrush cover with relatively deep, loose soils. Pygmy rabbits dig their burrows underneath sagebrush bushes. They depend almost exclusively on sagebrush for food during the winter. From spring through fall, native bunch grasses and forbs are also eaten by pygmy rabbits along with sagebrush. Because their numbers have been declining so drastically in the wild, pygmy rabbits have been collected for a captive breeding program in the hopes of increasing the number of individuals and reintroducing them. For a successful reintroduction, suitable habitat areas need to be identified, connected, and protected, and grazing and off-road vehicle use should be curtailed.

5.1.2. Presence in Action Area

Pygmy rabbits are not found in the Rock Island Project HCP action area. The only population of pygmy rabbits is in Douglas County at Sagebrush Flat on land owned by Washington Department of Fish and Wildlife (Washington Department of Fish and Wildlife, 2001). Sagebrush Flat is in the south-central part of Douglas County, approximately 22 air miles East-Northeast of Rock Island Dam, which is the nearest portion of the Rock Island Project.

5.1.3. Analysis of Effects

Operation of the Rock Island Project, hatcheries, acclimation ponds, and fish traps will not occur in the vicinity of the pygmy rabbits or pygmy rabbit habitat. As a result, the proposed actions will not benefit or negatively impact the survival of pygmy rabbits.

Specifically, the avian hazing program and northern pikeminnow control program will not benefit or negatively impact pygmy rabbits. No project funded under the tributary conservation plan will benefit or negatively impact pygmy rabbits.

5.1.4. Impact Minimization Measures

No measures are needed to minimize impacts to pygmy rabbits from the actions listed in the HCP.

5.1.5. Compliance with Recovery or Management Plans

On March 5, 2003, the US Fish and Wildlife Service listed the Columbia Basin pygmy rabbit as endangered under the Endangered Species Act (ESA). Because of the extreme risk of extinction, this population was given emergency protection under the Act on November 30, 2001. Washington Department of Fish and Wildlife developed the *Washington State Recovery Plan for the Pygmy Rabbit* in July 1995 (Washington Department of Fish and Wildlife, 1995). The plan was modified in August 2001 (Washington Department of Fish and Wildlife, 2001) and May 2003 (Washington Department of Fish and Wildlife, 2003).

The HCP for the Rock Island Project, associated hatcheries, acclimation ponds, and fish traps, predator control program and tributary conservation plan complies with and does not conflict with the recovery plan for pygmy rabbits in Washington State.

5.1.6. Determination of Effect

The Rock Island Project HCP actions will have no effect on pygmy rabbits or result in destruction or adverse modification to pygmy rabbit habitat.

5.2. Showy stickseed (*Hackelia venusta)*

5.2.1. Geographic Boundaries and Life History

Showy Stickseed is locally endemic in the Wenatchee Mountains in the Eastern Cascades physiographic province of Chelan County, Washington. There is currently

only one known population of this plant and the number of individuals in that population has been in decline (WA Natural Heritage Program Website 2003). That population of plants exists on less than 2.5 acres of land on the lower slopes of Tumwater Canyon entirely on federal land (USFWS 2002).

5.2.2. Presence in Action Area

Showy stickseed occurs within the overall action area of tributaries of the Wenatchee and Entiat Rivers, but is an upland plant and does not occur along the tributaries. This plant occurs in dry, loose soils and crevices on granite or talus slopes that range from 25-70 degrees. It generally occurs at elevations of 1500 -2500 feet. Associated species include opportunists that grow in disturbed areas where competition is low. Showy stickseed does not occur along the shorelines of Rock Island Reservoir (Caplow 1989).

5.2.3. Analysis of Effects

Operation of the Rock Island Reservoir, Eastbank hatchery complex, Chelan Falls hatchery, associated acclimation ponds, and fish traps will not occur within the vicinity of the Showy stickseed population. The piscivorous bird hazing program and the northern pike minnow control programs will not benefit or negatively impact Showy stickseed because these actions occur along the Columbia River and not in the vicinity of the Showy stickseed population. Actions funded under the tributary conservation plan along the Wenatchee or Entiat rivers or their tributary streams will not benefit or negatively impact the Showy stickseed population because that plant population occurs on higher elevation slopes away from stream shorelines.

5.2.4. Impact Minimization Measures

No mitigating measures are needed to minimize impacts to Showy stickseed from the actions listed in the HCP.

5.2.5. Compliance with Recovery or Management Plans

Showy stickseed is listed as Endangered by the state of Washington and is listed as Endangered by the USFWS (WA Natural Heritage Program Website 2003). There is not a federal recovery or management plan for Showy stickseed. Several threats and management concerns are associated with Showy stickseed. Collection, physical disturbance of the plants and habitat by humans, competition, shading by native plants, highway maintenance such as spreading of sand and salt and use of de-icers during winter, the combination of fire suppression and fire itself pose a threat to this population USFWS 2002). Highway maintenance and reconstruction activities need to be coordinated with the US Forest Service and USFWS. Noxious weeds (Dalmatian toadflax and diffuse knapweed) occur within the species' range and control of these weeds should be considered a high priority. Recreation and mineral exploration are additional threats to this population (WA Natural Heritage Program Website 2003).

The HCP for the Rock Island Project, associated hatchery complex and acclimation ponds, and fish traps, predator control program and tributary conservation plan would not affect the location where Showy stickseed grows and are not in conflict with the management plans and concerns for Showy stickseed.

5.2.6. Determination of Effects

The actions identified in the Rock Island Project HCP would have no effect on Showy stickseed populations or result in destruction or adverse modification to its habitat.

5.3. Wenatchee Mountains checker-mallow (*Sidalcea oregano*)

5.3.1. Geographic Boundaries and Life History

The historical range of Wenatchee Mountains checker-mallow covered an area of approximately 11 by 3 miles, extending south to southeast from Leavenworth in Chelan County, Washington (WA Natural Heritage Program Website 2003). The general area where this plant now exists is in the vicinity of the Camas Meadows and Camas Creek, east of Peshastin Creek.

5.3.2. Presence in Action Area

Wenatchee Mountains checker-mallow occurs within the overall action area of tributaries of the Wenatchee River at elevations ranging from 1900 to 3200 feet. This plant is most abundant in moist meadows that have surface water or saturated upper soil profiles extending into early summer. Suitable meadows vary in size from 0.5 acres to greater than 100 acres in size. This plant is also found in somewhat open coniferous stands dominated by Douglas fir and Ponderosa pine and along edges of shrub and hardwood thickets. Sixty percent of Wenatchee Mountains checker-mallow populations are in associations with Wenatchee larkspur. Wenatchee Mountains checker-mallow does not grow along the shorelines of Rock Island Reservoir (WA Natural Heritage Program Website 2003).

5.3.3. Analysis of Effects

The USFWS has proposed critical habitat for Wenatchee Mountains checker-mallow on approximately 6,135 acres of land under private, state, and federal ownership in Chelan County. A draft Recovery Plan was published in the Federal Register on October 16, 2003. This habitat includes Camas Creek and a small tributary within Pendleton Canyon before its confluence with Peshastin Creek. Both of these areas are in the Wenatchee River sub-basin.

Operation of the Rock Island Reservoir, Eastbank hatchery complex, Chelan Falls hatchery, associated acclimation ponds, and fish traps will not occur within the vicinity of Wenatchee Mountains checker-mallow populations. The piscivorous bird hazing program and the northern pike minnow control programs will not benefit or negatively impact this plant because those actions occur along the Columbia River and not in the vicinity of Wenatchee Mountains checker-mallow populations (Calypso Consulting 2002, Caplow, 1989, Caplow 1990). Actions funded under the tributary conservation plan along the Wenatchee River or its tributary streams will not benefit or negatively impact Wenatchee Mountains checker-mallow populations because those plant populations and proposed critical habitat occur on higher elevation slopes, well away from stream shorelines.

5.3.4. Impact Minimization Measures

No measures are necessary to minimize impacts to Wenatchee Mountains checker-mallow or proposed critical habitat from the actions listed in the HCP.

5.3.5. Compliance with Recovery or Management Plans

Wenatchee Mountains checker-mallow is listed as Endangered by the state of Washington and is listed as Endangered by the USFWS (WA Natural Heritage Program Website 2003). The USFWS issued a federal recovery plan for Wenatchee Mountains checker-mallow on October 16, 2003. Threats and management concerns associated with Wenatchee Mountains checker-mallow include habitat fragmentation and destruction, rural residential development, alterations to hydrology, grazing, timber harvest, and many recreational activities (USFWS 1999, WA Natural Heritage Program Website 2003). Fire was likely important in maintaining suitable habitat for the species by improving light and soil moisture conditions and keeping succession in check. Fire suppression has likely influenced patterns of plant succession where this species occurred.

The HCP for the Rock Island Project, associated hatchery complex and acclimation ponds, and fish traps, predator control program and tributary conservation plan are not in conflict with the recovery plans and management concerns for Wenatchee Mountains checker-mallow.

5.3.6. Determination of Effects

The actions identified in the Rock Island Project HCP will have no effect on Wenatchee Mountains checker-mallow populations and will have no effect on designated critical habitat for this plant species.

5.4. Columbia River Bull Trout (*Salvelinus confluentus*)

The Action Area associated with the Rock Island HCP encompasses habitat within geographic boundaries of the Columbia River Distinct Population Segment (DPS) of bull trout. The Columbia River Bull Trout DPS includes all naturally spawning populations in

the Columbia River Basin and its tributaries within the United States. Bull trout in the Columbia River DPS were listed as a federal threatened species on June 10, 1998 (64 FR 58911). The USFWS published a proposed rule to designate critical habitat for the Klamath River and Columbia River distinct population segments on November 29, 2002 (USDI 2002). Critical habitat for this DPS is proposed for 18,175.7 miles of streams and 498,780 acres of lakes and reservoirs in Washington, Idaho, Oregon and Montana combined. Draft recovery plans are completed for 24 recovery units within the Columbia River DPS and are currently available for public comment (USFWS 2002a).

5.4.1. Geographic Boundaries and Life History

Bull trout are native to northwestern North America, historically occupying a large geographic range extending from California north into the Yukon and Northwest Territories of Canada and east to western Montana and Alberta (Cavender 1978). They are generally found in interior drainages, but also occur on the Pacific Coast in Puget Sound and in the large drainages of British Columbia.

Bull trout currently occur in rivers and tributaries in Montana, Idaho, Washington, Oregon (including the Klamath River basin), Nevada, two Canadian Provinces (British Columbia and Alberta), and several cross-boundary drainages in extreme southeast Alaska. East of the Continental Divide, bull trout are found in the headwaters of the Saskatchewan River in Alberta, and the McKenzie River system in Alberta and British Columbia (Cavender 1978; McPhail and Baxter 1996; Brewin and Brewin 1997). The remaining distribution of bull trout is highly fragmented.

Bull trout are members of the char group within the family Salmonidae. Bull trout closely resemble Dolly Varden (*Salvelinus malma*), a related species. Genetic analyses indicate, however, that bull trout are more closely related to an Asian char (*Salvelinus leucomaenis*) than to Dolly Varden (Pleyte et al. 1992). Over part of their range, bull trout are sympatric with Dolly Varden, most notably in British Columbia and the Coastal-Puget Sound region of Washington State.

Bull trout populations exhibit four distinct life history types: resident, fluvial, adfluvial,

and anadromous. Fluvial, adfluvial, and resident forms exist throughout the range of the bull trout (Rieman and McIntyre 1993) and spend their entire life in freshwater. The anadromous life history form is currently only known to occur in the Coastal-Puget Sound region within the coterminous United States (Volk, 2000; Kraemer 1994; Mongillo 1993). Multiple life history types may be expressed in the same population, and this diversity of life history types are considered important to the stability and viability of bull trout populations (Rieman and McIntyre 1993).

The majority of the growth and maturation of anadromous bull trout occurs in estuarine and marine waters; for adfluvial bull trout, the major growth and maturation occurs in lakes or reservoirs; and for fluvial bull trout, the major growth and maturation occurs in large river systems. Resident bull trout populations are generally found in small headwater streams where the fish remain their entire lives.

For migratory life history types, juveniles tend to rear in tributary streams for 1 to 3 years before migrating downstream into a larger river, lake, or estuary and/or nearshore marine area to mature (Rieman and McIntyre 1993). In some lake systems, age 0+ fish may migrate directly to lakes (Riehle et al. 1997). Juvenile and adult bull trout frequently inhabit side channels, stream margins and pools with suitable cover (Sexauer and James 1993) and areas with cold hyporheic zones or groundwater upwelling (Baxter and Hauer 2000).

Bull trout have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Growth, survival, and long-term persistence are dependent upon the following habitat characteristics: cold water, complex instream habitat, a stable substrate with a low percentage of fine sediments, high channel stability, and stream/population connectivity. Stream temperature and substrate type, in particular, are critical factors for the sustained long-term persistence of bull trout. Spawning is often associated with the coldest, cleanest, and most complex stream reaches within basins. However, bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1995), and should not be expected to occupy all available habitats at the same time (Rieman et al. 1997).

5.4.2. Presence in the Action Area

Bull trout are present in the action area of both Rock Island and Rocky Reach reservoirs, and in the Wenatchee, Entiat, and Methow Rivers and some of their tributaries. Three life history forms, adfluvial, fluvial, and resident, are believed to occur in the action area. Adult bull trout are observed in the adult fish ladder facilities each year, affirming their presence and use of the mainstem. Juveniles are occasionally seen in smolt passage facilities of mid-Columbia River dams. The best information to date indicates that bull trout use the mainstem Columbia to enhance feeding opportunities and overwinter (USFWS 2002). The mainstem also serves as a migration corridor to access tributary streams for spawning (USFWS 2002).

Chelan PUD began to enumerate bull trout using the adult passage facilities in 1998. Both adult and juvenile bull trout are routinely observed (and counted) by Chelan PUD employees while passing through the fish ladder at Rock Island and Rocky Reach dams. Prior to 1992, salmon and steelhead were observed by direct observation at fish ladder windows. Since 1992, fish have been counted utilizing round-the-clock computer video recordings during adult salmon passage periods. Fish counts prior to 1998 did not differentiate bull trout from other resident trout. In 1998 and 1999, bull trout were only counted for a portion of the season, resulting in a lower total season count.

Fewer bull trout were counted at Rock Island Dam than at Rocky Reach Dam in all years from 1998 through 2002. The counts at Rock Island for these years were 48, 56, 88, 82, and 87 fish, respectively, compared with 83, 128, 216, 204, and 201 fish for the same years at Rocky Reach (Chelan PUD, 2003c unpublished data). This trend is observed every year, probably because all three key spawning tributaries enter the mainstem upstream of Rocky Reach Dam and most of these fish likely overwinter in Rock Island Reservoir rather than in Wanapum Reservoir. In 2002, 87 bull trout passed Rock Island Dam from April 14 to November 14; most of these fish passed in May and June (75 percent). In 2003, from April 14 to September 3, 77 bull trout passed Rock Island Dam, 55 during May and June.

Bull trout appear to pass Rock Island Dam with the greatest frequency in May and June (55 to 70 percent of fish), as do fish at Rocky Reach Dam. Generally, upstream passage counts drop noticeably after July, and drop to very few or no fish from October through November. Although bull trout are known to pass Rock Island Dam from April through November, the numbers of fish and the timing of passage outside of the salmon counting period have not been evaluated.

5.4.3. Analysis of Effects

To gather additional information on adult bull trout migratory behavior in the mid-Columbia River region, a 3-year radio telemetry study was initiated in 2001 (BioAnalysts, 2002, 2003 Draft). A total of 79 bull trout were tagged in 2001 and 2002 (15 fish at Rock Island Hydroelectric Project, 45 fish at Rocky Reach Hydroelectric Project, and 19 fish at Wells Hydroelectric Project). Approximately half of the fish were released upstream of the dam where they were captured, and the other half were released downstream of the respective project. All of the tagged fish, despite their release location, migrated into the Wenatchee, Entiat, or Methow rivers, presumably to spawn. Only one fish entered the Okanogan River; it stayed only briefly, then swam back downstream and entered the Methow River. One bull trout passed downstream through turbines at both Rocky Reach and Rock Island Dams after exiting the Entiat River in November 2001. This fish overwintered downstream of Rock Island Dam, then migrated back up through adult ladders at Rock Island and Rocky Reach in May of 2002. Again, it entered the Entiat River in mid-June of 2002, three days later than it did in 2001. No tagged fish entered Wanapum Reservoir.

None of the tagged adult bull trout were killed during upstream or downstream passage through Rock Island, Rocky Reach, or Wells Dams. The radio telemetry study identified no adverse effects on movement or survival of tagged bull trout. Detailed results are available in the 2002 final report (BioAnalysts 2002), and the draft report completed in 2003 (BioAnalysts 2003 Draft).

Baseline studies completed for relicensing have not demonstrated that the project has reduced suitable habitat or the density of forage species that bull trout rely upon to

overwinter and grow in Rock Island Reservoir. The mainstem Columbia River does not contain all of the necessary habitat elements necessary to sustain the entire life cycle of adfluvial or fluvial bull trout. There is no documentation or indication that the mainstem action area contains spawning habitat for bull trout. However, Rock Island Reservoir does provide other important habitat features for migratory bull trout, such as forage, a migration corridor, and a more stable winter environment (as opposed to tributaries). Therefore, it is important that these habitat elements be maintained through the license term.

Rock Island Dam may affect upstream and downstream movements of adult and juvenile bull trout. Downstream passage routes available to bull trout include passage over spillways during spill periods (generally April 17 to August 15); the juvenile fish bypass system integrated into the second powerhouse (operated April 1 to August 31), and passage through turbine units. Upstream passage is provided by three fish ladders with separate entrances in the tailrace and separate exits in the forebay.

The frequency, timing, and route of downstream passage by bull trout through Rock Island Dam are not known. Juvenile downstream passage may occur any time, and the downstream routes available to juvenile fish is dependent on the time of year. From results of telemetry studies, adult bull trout in the action area exit the tributaries and re-enter the mainstem Columbia River in mid to late fall after spawning; some fish moved downstream of Rocky Reach Dam, and fewer moved downstream of Rock Island Dam. Because Columbia River migratory bull trout are resident fish, and are present in very low densities and have relatively unpredictable migration behavior (especially juveniles), effective study methods to evaluate downstream passage may not be available.

5.4.3.1. Adult Fishway Operation

The adult fish passage facilities at Rock Island Dam consist of a left and right bank ladder, and a center ladder located mid-river between spillbays 14 and 16. Each ladder has a single entrance at the tailrace and exit in the forebay. Bull trout use the fish ladders at Rock Island to move upstream past the project. In 2003, 77 bull trout passed using the adult fish ladder facilities. Most of these fish passed the dam in May and

June, which is consistent with past observations of bull trout passing Rock Island. Mainstem migrations in May and June by adult bull trout would be consistent with an adaptive behavior shown by other bull trout populations in the DPS to gain access to spawning tributaries that may have reduced flows and less than optimal temperatures following the peak of the hydrograph in the spring (USFWS 2002c; Pratt and Houston 1993; Baxter 2002).

Four bull trout that were radio tagged and released below Rock Island Dam (May 23, June 4, June 7, and June 12, 2002), all passed Rock Island Dam via fish ladders; two entered the Wenatchee River during the last week of June and two migrated past Rocky Reach Dam and entered the Entiat River during the last week of June and first week of July, respectively (BioAnalysts 2003 DRAFT). These passage observations are consistent with historical observations, with most fish passing in May and June, presumably to access tributaries upstream of the dam to prepare for spawning in September and October. Of 42 radio tagged bull trout tracked in 2002, 31 fish left the mainstem and entered a tributary stream by the end of June and 39 had entered tributaries by the end of the first week in July (BioAnalysts 2003 DRAFT).

The three year radio telemetry study conducted by Chelan PUD (BioAnalysts 2003 DRAFT) evaluated passage durations associated with bull trout movement past Rock Island Dam and through Rock Island Reservoir. In general, actively migrating fish (fish that had not been immediately tagged and released in the tailrace) required more time (mean = 1.56 days) to pass the dam and reach a fixed detection point inside the Wenatchee River, than it did for the same fish to reach the same fixed site once they exited the fish ladder in the Rock Island forebay (BioAnalysts, 2003 DRAFT). Although some additional time may be required for actively migrating bull trout to pass Rock Island Dam (BioAnalysts 2003), the short delay may or may not be bioenergetically or temporally significant to spawning migrations or spawning success. The temporal distribution of bull trout spawning in the Wenatchee and Entiat Rivers is within the ranges reported for other fluvial and adfluvial populations in the Colombia River Basin (USFWS 2002c; Pratt and Huston 1993; Fraley and Shepard 1989; Goetz 1989).

It is not clear whether bull trout monitored in the radio telemetry studies required more time to find fishway entrances or whether these fish voluntarily spent time below the dam to take advantage of potential foraging opportunities in the tailrace. There is no indication that passage delay, if it occurs, results in late arrival at tributary spawning locations, decreased spawning success, or increased adult mortality. No mortality occurred for radio tagged bull trout while they passed Rock Island Dam in 2002 or 2003 (BioAnalysts 2002, BioAnalysts 2003 DRAFT).

The potential exists for adult bull trout migrating upstream through the fishladder to "fallback" through the dam, resulting in increased contact with structural features of the dam (spillways, turbines or fish ladders) and potential injury. "Fallback" is a term used to describe an undesirable effect on salmon and steelhead as they migrate past hydro dams, and is generally defined as voluntary or involuntary movement of a fish downstream past a dam once upstream passage has been achieved. Involuntary fallback takes place when an upstream migrating fish becomes involuntarily entrained into a turbine, spillway or juvenile bypass system. Voluntary fallback takes place when a downstream migrating fish voluntarily passes the dam via the turbines, spillways, juvenile bypass system or adult fishway facilities. Adult "fall back", and the associated effects documented for Pacific salmon and steelhead, may or may not affect bull trout in the same manner. No studies have been designed to specifically assess bull trout "fall back" at Rock Island Dam or other hydro facilities on the Columbia River.

In 2003, NOAA concluded (NOAA 2003) that small delays at Rock Island Dam and Rocky Reach Dam for listed steelhead and spring chinook are more than compensated for by faster travel through the slower flowing reservoirs. In addition they also concluded that 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). Lastly, NOAA wrote "….the effect of delays passing the fishway on Permit Species is likely non-existent for currently ESA-listed Permit Species and non-existent to very small for currently unlisted Permit Species. Thus the proposed action [continued operation of fishways] should have no

effect, or a slight beneficial effect, on upstream migrating adults compared to the migration observed under unimpounded conditions."

Continued operation of the adult fishway facilities at Rock Island Dam may affect, but is not likely to adversely affect the ability of listed Columbia River bull trout populations to survive and recover in the mainstem or tributary action areas.

5.4.3.2. Juvenile Bypass Operations

Downstream passage facilities for juvenile fish are incorporated into the second powerhouse and right bank fishway. The downstream migrant facilities consist of two separate bypass systems that fish enter volitionally. Both systems combine to utilize a common 36-inch discharge pipeline. The intake gatewell system (GWS) consists of a series of ports at a second powerhouse intake gate slots and a bypass channel that extends along the upstream face of the powerhouse structure. One system, the traveling water screen bypass, consists of ports and vertical riser pipes that are provided at the traveling water screen system, located at the exit of the right bank fishway. Incorporated in the discharge pipeline is a fish trapping facility for the collection and examination of downstream migrating smolts. The second bypass system, called the gatewell collection system, consists of two 8-inch diameter ports in the upstream wall at each of the intake gate slots for powerhouse 2. Each of the eight units in powerhouse 2 has two intake gate slots for a total of 32 ports. The ports discharge into a bypass channel that extends for the full length of the powerhouse; the bypass channel then delivers fish to the 36-inch bypass pipe.

Numbers of bull trout captured in the Rock Island Bypass smolt trap facility from 1997 through 2002 were 2, 7, 31, 1, 8, and 8, respectively. No juvenile bull trout were captured in the Rock Island Juvenile Bypass trap in 2003 (L. Praye, WDFW, pers. comm., 2003). Most the bull trout captured at the bypass are small bull trout. Bypass attendants very infrequently observe an adult bull trout in the trap (L. Praye, WDFW, pers. comm., 2003). Some mortality of juvenile salmon and steelhead occurs with the operation of the Rock Island bypass. Although the mortality rate is incidental and low,

the same mortality rate could apply to bull trout that coincidentally enter the bypass system. No injuries or mortalities have been reported for bull trout at this facility.

5.4.3.3. Turbine Operations

Rock Island is considered a run-of-river hydro facility, with the average 24 hour discharge approximately equal to the average 24 hour inflow. Discharges from Rock Island Dam vary on a 24 hour basis as the Project generates energy with water from shaped releases at Chief Joseph Dam. Discharges from Chief Joseph typically fluctuate as much as 100,000 cfs in a 24 hour period, and follow fluctuating load demand on a daily and season basis.

Rock Island Dam has two powerhouses containing 19 turbine units. Powerhouse 1 consists of four Nagler turbines (units 1-4) and seven Kaplan turbines (units 5-11), and Powerhouse 2 consists of eight bulb turbines. The total combined hydraulic capacity of Powerhouses 1 and 2 is 218 kcfs, producing a maximum of 624 MW of electricity.

Powerhouse 2 (410 Mw capacity) receives most of the water flow for generation at Rock Island Dam. Powerhouse 2 generates approximately 80% of the total annual average energy that Rock Island produces. Powerhouse 2 turbines have a hydraulic capacity of 136,000 cfs. All eight bulb turbines in Powerhouse 2 are newer, and very efficient. These units have minimum gap turbine runners with only a 3 mm gap between the runner blade and the hub.

The 250 Mw Powerhouse 1 is generally operated with only two units on-line to provide electricity for Rock Island station service and to maintain overall plant electrical stability. Additional units at Powerhouse 1 are brought on-line when total available river flow exceeds the capacity of Powerhouse 2. Powerhouse 1 generates only about 20% of annual average energy that Rock Island Dam produces. Powerhouse 1 does not have minimum gap turbine units and may not provide the higher level of protection for downstream migrating salmonids that Powerhouse 1 does.

Studies to assess turbine Impacts on juvenile and adult bull trout have not been conducted at any hydropower facility. Related turbine studies, (Eicher et al. 1987) found that in general, smaller fish survive at a higher rate than do larger fish in turbine passage. There is no evidence to suggest that juvenile bull trout would survive at higher rates than juvenile anadromous species; however, important differences in physiological and behavioral stress tolerances may or may not exist between resident and anadromous salmonids during turbine passage (Miller and Hillman 1994).

The potential exists for adult bull trout migrating upstream to move back downstream through turbines, resulting in a chance for contact with structural features of the turbine (wicket gates, turbine runner blades, spiral case) to occur. Direct or indirect effects on adult and juvenile bull trout may occur as a result of downstream movement through turbines. 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.

The extent to which juvenile bull trout move downstream past Rock Island Dam through turbines is unknown. A total of eight adult radio tagged bull trout moved downstream past Rock Island Dam during telemetry studies in from 2001 through 2003. No mortalities were observed. No studies have been designed to assess downstream movement of juvenile bull trout through turbines at Rock Island Dam.

Given the known effects of turbine passage on juvenile anadromous salmonids, ongoing turbine operations at Rock Island Dam are likely to adversely affect bull trout during the term of the Rock Island HCP.

5.4.3.4. Installation and Operation of Proposed Small Turbine Unit

Construction of this 0.8 megawatt turbine unit would occur during the first week of January to the end of February, for a two or three year period. The left bank fishway is normally shutdown for inspection/maintenance during a portion of this time. The fishway ladder itself and the volume of water delivered to ladder will not be modified. Biodegradable, non-toxic vegetable based oil will be used to lubricate the turbine to

minimize hazards from oil spills. The intakes to the attraction flow conduit originating in the forebay will be screened to prevent juvenile salmonids, including bull trout, from entering the attraction flow system. Installation and operation of this turbine unit and associated screens and structures will have no effect on bull trout or proposed critical habitat.

5.4.3.5. Spillway Operations

In 2004, 2005, and 2006, Chelan PUD will voluntarily spill 20% of the daily estimated river flow to cover 95% of the spring and summer juvenile migration periods for anadromous Plan Species. The Rock Island Dam spillway consists of 31 spillway gates with a combined hydraulic capacity of 943 kcfs. Spill is the primary means of passing juvenile fish at the Project. The spring spill period at Rock Island Dam will generally begin no later than April 17 and end no later than June 15 each year. Summer spill will generally begin no later than July 1 and end no later than August 15 of each year. However, the HCP Coordinating Committee, based upon in-season migration information, may adjust the beginning and ending dates of the spring and summer spill periods. In 2003, Rock Island spilled continuously from April 17 through August 16, with no break between spring and summer fish migration periods.

Chapman et al. (1994a;1994b) concluded that spillways are currently the most benign routes for juvenile salmonids to pass the Mid-Columbia River dams. However, spill may result in supersaturated levels of total dissolved gas (TDG). Supersaturated gases (primarily nitrogen) in fish tissues tend to pass from the dissolved state to the gaseous phase as internal bubbles or blisters. This condition is called gas bubble trauma (GBT) or gas bubble disease (GBD) and can be debilitating or even fatal to aquatic species and to all life-history stages of salmon and steelhead. For these reasons, the Mid-Columbia PUDs limit voluntary spillway discharge levels during the fish passage season to ensure that TDG does not exceed 120% of saturation in Project tailraces or 115% of saturation in Project forebays for more than 12 hours over a 24-hour period, or as otherwise ordered by TDG waivers issued by the Washington Department of Ecology. Due to these operational constraints, spill can be limited under normal operating

conditions. Although limited spill can avoid high TDG levels that may be harmful to the Permit Species, spill limitations may also result in higher proportions of migrating juveniles passing through turbine units (rather than juvenile bypass systems or spillways).

In a regulated river environment, the ability of a fish to survive high TDG levels may depend on its ability to avoid supersaturated conditions (Weitkamp and Katz 1980 Weitkamp et al. 2003a; Weitkamp et al. 2003b). Stevens et al. (1980) found that in laboratory conditions, coho, sockeye and chinook salmon smolts, and rainbow trout avoided water saturated at 125% to 145%. Avoidance behavior of saturated water was not as strongly correlated at levels of 115%. Other laboratory and field experiments suggest that juvenile and salmonids will remain in deeper water, if it is available, to compensate for total gas pressure of 120% - 125% (Weitkamp and Katz 1980). Hydrostatic pressure at depth compensates for gas saturation for each meter of depth. The hydrostatic pressure resulting from depth reduces the effective TDG level by about 10% of saturation per meter. For example, a fish holding at 2 meter depth in water saturated at 120% at the surface would not experience the effects of supersaturation (Weitkamp et a. 2002a).

In a review of hydropower effects on bull trout, Miller and Hillman (1994) found no information on TDG effects on bull trout. Ryan et al. (2000) reported that only 3.9% of all resident non-salmonid fish sampled in the lower Snake and mid-Columbia rivers, Washington, showed signs of gas bubble disease, and at continuous levels of 120 to 125 percent, approximately 5% showed GBD signs.

More recently, Weitkamp et al. (2003a; 2003b) studied fish behavior during high TDG periods in the Lower Clark Fork River, Idaho, and the effects of supersaturation and incidence of GBD on bull trout and other resident freshwater fish. During spill periods in 1999, TDG levels in the Clark Fork River ranged between 120 and 130 percent of saturation continuously for nearly two months in May and June. Only 5.9 percent of all fish sampled (2,709) showed any signs of GBD. Eight bull trout captured by electrofishing (sampling is efficient to only 6-7 feet of depth) during this period showed

no signs of GBD; the highest incidence of GBD was observed in largescale suckers (14.3%) and yellow bullhead (11.4%) in 1999. During the 2000 spill season in the Clark Fork, TDG commonly spiked from 115 to 130 percent of saturation for a few hours on a daily basis; three bull trout captured during these periods in 2000 showed no signs of GBD. Very few (0.1%) of the fish sampled during the 2000 spill season showed any signs of GBD (Weitkamp 2003a).

Fish released in the Clark Fork River equipped with depth sensing radio tags (including 6 bull trout from 1998-2000) revealed that most fish held at depths of several meters or more and spent sufficient time at these depths to avoid exposure to TDG supersaturation (Weitkamp 2003b). The average median depth occupied by bull trout residing in the river was 2.2 meters which would compensate for a supersaturation of 120% or less as measured at the surface. The authors concluded that depth is a critical consideration in evaluating the potential effects of gas supersaturation on fish, and that in deeper streams such as the Clark Fork River (many areas with depth of 9-76 feet) fish may be able to avoid the effects of high TDG (Weitkamp et al. 2003a).

The mainstem Columbia River in the vicinity of the mid-Columbia Projects contains considerable habitat with depths exceeding 30 feet, which may provide adequate hydrostatic compensation for fish during the short periods when TDG levels exceed 120 percent of saturation.

There is no scientific information relating to how bull trout react to, or interact with, spill as a means of movement through hydropower projects. As such, any direct effects from Rock Island spillway operations and any indirect effects associated with elevated TDG levels on bull trout are unknown. Spill has been shown to benefit survival of juvenile salmon and steelhead while passing hydropower projects. It is reasonable to assume that bull trout would experience survival rates similar to anadromous salmonids for spillway passage.

5.4.3.6. Predator Control Program

The HCP proposes to continue the ongoing northern pikeminnow (*Ptychocheilus oregonensis*) and avian predator (primarily California and ring-billed gulls, double crested cormorants, Caspian terns, and common mergansers) control programs to reduce predation on juvenile salmon.

Northern Pikeminnow Control Program

Direct effects to individual bull trout from the Chelan PUD pikeminnow predator control program could occur through immediate or delayed hooking mortality. Terminal gear in the rod and reel fishery typically consists of a large beaded spinner with a #4 single barbed hook. Live bait (worms) and artificial plastics are added to the hook. Terminal gear in the long-line fishery typically consists of size #6 hooks baited with worms. From 1996 through 2003, only 7 bull trout have been caught in the combined project (both Rock Island and Rocky Reach) rod and reel fishery in more than 55,000 hours of rod effort. These fish were all released alive. All of these bull trout were caught in the first three years of rod and reel fishing; none have been caught since 1998. No bull trout have ever been caught on long line gear.

NOAA (NMFS 1998) determined that the pikeminnow removal program resulted in a net benefit to listed anadromous Columbia River salmonids. Continue implementation of the pikeminnow removal program may have a net positive effect on bull trout populations in the action areas as well by increasing survival of juvenile salmon and thereby increasing a potential prey base for bull trout in the mainstem Columbia and tributaries in the action area. Removal of pikeminnow may also reduce predation on juvenile adfluvial bull trout as they finish rearing periods in tributaries and enter mainstem Columbia River habitats.

The pikeminnow removal program may have negative direct and indirect effects on individual bull trout in the Columbia River population. This program will not destroy or cause adverse modification to proposed critical habitat for bull trout.

Avian Predator Control Program

Avian control methods consist largely of land based activities that include gull wires installed across the project tailrace and pyrotechnics discharges to discourage predation on juvenile salmonid smolts. The avian control program may include killing some bird predators each year. The marginal increase in human activity associated with control measures on the reservoirs is not likely to adversely affect bull trout. The avian control program will not destroy or cause adverse modification to proposed bull trout critical habitat.

5.4.3.7. Tributary Conservation Plan

A detailed description of the Tributary Conservation Plan, the Plan Species Account, and its allowable uses by the Tributary Committee can be found in section 7 of the HCP and in sections 2.3.4.7 and 2.3.4.8 of the FEIS. Some direct and indirect effects on bull trout may occur resulting from implementation of actions funded by the Tributary Conservation Plan. A separate Section 7 consultation will be initiated for actions associated with the Tributary Conservation Plan.

The Tributary Coordinating Committee, comprised of various fisheries agencies and the Tribes, will be guided by the general strategy outlined in supporting documents (see Tributary Conservation Plan) to the HCP. The premise of Tributary Conservation plan 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 will ensure that any take resulting from these activities is minimized to the extent practical.

The Tributary Conservation Plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, and Methow, and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easement or land in fee will be submitted to the tributary conservation plan committee. Examples of projects to be funded by the Tributary Conservation Plan 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 Coordinating Committee will decide if the projects meet criteria for funding. Projects will have to be reviewed by state and federal agencies to receive permits for construction projects. Habitat preservation projects will likely benefit bull trout through the protection of proposed critical habitat found within Wenatchee and Methow River bull trout Core Areas (USFWS 2002b). Projects that may increase in-stream 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 positive benefits for bull trout if additional aquatic habitat is created by the project or if upstream migration barriers are removed allowing bull trout access back into historically utilized watersheds. Passage barrier removal could potentially introduce brook trout to isolated stream reaches where only resident bull trout exist. Any passage barrier which controls the upstream distribution of migratory bull trout, salmon or steelhead would likely act as a barrier to brook trout. Resident bull trout have been identified in the Chiwawa River, the Icicle River above the Leavenworth Fish Hatchery, and the Little Wenatchee River in the Wenatchee River Subbasin; and in the upper Twisp River, Buttermilk, Goat, and Early Winters Creeks in the Twisp Subbasin (USFWS 2002b). No streams within the action area have been specifically identified to contain only resident bull trout above a fish passage barrier (USFWS 2002b). Habitat restoration projects that involve removing fish barriers should verify the presence or absence of resident bull trout and brook trout before any barrier is removed.

Some potential activities (e.g., removal 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 increases sediment loads and turbidity, etc.) could be expected as a result of funding restoration projects in the Wenatchee, Entiat, or Methow rivers. In-stream restoration projects have 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 out way small short term impacts and result in beneficial effects for resident, fluvial, and adfluvial Columbia River bull trout.

5.4.3.8. Hatchery Compensation Plan

Actions associated with the Rock Island HCP Hatchery Compensation Plan are expected overall to be positive for bull trout. Hatchery activities designed to benefit listed and unlisted anadromous salmon and steelhead populations in the mainstem Columbia River and action area tributaries, primarily the Wenatchee, Entiat, and Methow rivers. Columbia River bull trout co-evolved with Columbia River salmon and steelhead. The Rock Island HCP hatchery program will likely benefit bull trout populations by increasing densities of a historically important prey items (smolts) in both the tributaries and mainstem habitats.

An additional benefit 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; Johnson et al. 1997). By providing a vector for nutrient transfer from ocean environments, salmon make significant nutrient contributions to the aquatic and terrestrial ecosystems of streams where they spawn (Johnston 1997; 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.

Rock Island hatchery facilities include some that are supplied with ground water and some with surface water, including the Lake Wenatchee net pen facility. The facilities with surface water diversions are the Dryden Acclimation Pond (water supplied from Wenatchee Reclamation District Canal on Wenatchee River), the Chiwawa Rearing Ponds (pump stations and return flow discharges on both the Chiwawa and Wenatchee rivers), the Carlton Acclimation Pond (pump station on Methow River) and Similkameen Rearing Pond (pump station on Similkameen River). All pump stations include fish exclusion screens on withdrawal pipes, primarily wedge-wire (Johnson) screens. All surface water supplying Rock Island facilities are non-consumptive withdrawals.

The fish hatcheries and fish rearing facilities supporting the Hatchery Compensation Plan are all operated in accordance with state and federal water pollution regulations. Each facility operates under a National Pollutant Discharge Elimination System (NPDES) permit which specifies discharge requirements, in accordance with finfish culture specifications. The EPA has delegated responsibility to administer the NPDES permit program to the state of Washington on the basis of RCW 90.48, which defines the Department of 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 2005. No effects on bull trout are anticipated from water withdrawal or aquaculture practices associated with the Rock Island hatchery and rearing facilities.

Some short term undesirable effects including noise and human presence in tributary habitats may be observed during the construction of additional hatchery facilities, including acclimation ponds, hatchery water diversion structures, or brook stock collection facilities. Effects on tributary water flow and water chemistry are expected to be negligible as a result of hatchery operations.

5.4.4. Impact Minimization Measures

Juvenile passage through the project has not been addressed during the relicensing study process. Due to low densities of individuals observed in the mainstem and a very limited number of effective sampling methods, capture of juveniles for valid population studies is currently unfeasible. However, Chelan PUD will document age-group, year-class, length-weight information, and degree and frequency of descaling for all juvenile bull trout that are observed in the juvenile bypass system sampling facility. Chelan PUD will continue to collect and evaluate passage events for adult and juvenile bull trout in order to monitor monthly passage trends through adult fishways.

Chelan PUD will implement a bull trout monitoring and evaluation program as part the Protection, Mitigation and Enhancement measures of the Rocky Reach relicensing settlement agreement, upon signing and execution of such agreement. The goal of the Rocky Reach Comprehensive Bull Trout Management Plan is to: Protect and enhance, to the extent feasible, bull trout populations in both the Rocky Reach and Rock Island project areas according to the guiding principles of the USFWS recovery plan and/or by mitigating any specific adverse impacts shown to be caused by continued operation of the Rocky Reach Project.

Chelan PUD will continue to capture digital pictures of bull trout passing thought fishways at Rock Island Dam. These photographs will provide qualitative information on the size, age, and condition of bull trout that move upstream via the adult fishways.

5.4.4.1. Bull Trout Monitoring and Evaluation Program

Upon completion of a singed and executed Settlement Agreement for relicensing of Rocky Reach Project, Chelan PUD will implement a bull trout Monitoring and Evaluation Program. If a project affect is identified through the Monitoring & Evaluation Program, Chelan PUD will consult with the USFWS to address a solution. Funding may be applied off-site where appropriate. Implementation of the Monitoring and Evaluation Program will begin within one year after the new license is accepted.

5.4.4.2. Adult Passage Monitoring

Chelan PUD shall conduct the following to monitor adult bull trout passage at Rock Island Dam: (1) continue ladder counts; (2) maintain adult fishways in accordance with anadromous fish criteria; and (3) expand video counts to off-season for an experimental period of 1 year. Off-season video counting shall be continued throughout the remainder of the new license term if need for the data is biologically justifiable.

5.4.4.3. USFWS Recovery Plan

Chelan PUD shall participate in the USFWS bull trout recovery plan for areas affected by project operations.

5.4.4.4. Tributary Habitat Enhancement

Chelan PUD shall consider hauling and placing large woody material collected at Rocky Reach Dam into tributaries as part of the HCP tributary enhancement fund.

5.4.5. Compliance with Recovery or Management Plans

The USFWS has completed a draft federal recovery plan (USFWS 2002) to guide recovery for listed (threatened) Upper Columbia River bull trout. The Rock Island HCP action area in the mainstem Columbia and associated tributaries (Wenatchee, Entiat, and Methow) are within the geographic recovery boundary of the Upper Columbia Bull Trout Recovery Plan. Expected duration for full recovery leading to delisting of bull trout Upper Columbia River Recovery Unit is 25 to 50 years.

Chelan PUD is currently a technical member of the USFWS Bull trout Recovery Team for the Upper Columbia River Bull Trout Recovery Unit. Chelan PUD will continue to participate in ongoing recovery plan meetings and assist with recovery tasks to address uncertainties on project effects on bull trout that are outlined in the recovery plan. Rock Island HCP actions will not interfere with implementation of recovery tasks called for in the USFWS bull trout recovery plan.

5.4.6. Effects on Proposed Critical Habitat

Critical habitat is defined in section 3 of the ESA as (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Critical habitat receives protection under section 7(a)(2) of the ESA through the requirement that Federal agencies shall, in consultation with the USFWS, ensure that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. "Destruction or adverse modification" is defined at 50 CFR 402.02 as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of listed species.

Bull trout use the Columbia River as a migration corridor to move between feeding areas and tributaries where they spawn. Ongoing Project operations, particularly turbine and spillway operations may adversely affect individual bull trout during movements through turbines or over spillways, but will not affect Primary Constituent Elements (PCEs) of bull trout critical habitat in the mainstem Columbia River.

5.4.7. Determination of Effects

Chelan PUD, according to actions associated with the Rocky Island HCP, is not proposing to change operating protocol for producing energy at the Project. Chelan PUD will maintain current turbine and reservoir operations under the mid-Columbia hourly coordination agreement, and maintain spillway operations at Rock Island Dam as a measure to pass anadromous fish as well as maintain hydraulic control of reservoir elevations during high flows. Operations of the generating units and spillway at Rock Island Dam are likely to adversely affect juvenile and adult bull trout during downstream passage. Turbine and spillway operations will not destroy or adversely modify proposed critical habitat.

Adult and juvenile bull trout routinely move past Rock Island Dam through the three adult fishways. The direct and indirect effects on upstream passage of bull trout as a result of the Project are unknown, but are likely minimal. Although passage delay may occur, no information suggests that spawning migrations or spawning success is affected. Fishway facilities will not destroy or adversely modify proposed critical habitat.

Occurrences of injury or mortality of bull trout from operations of the Rock Island smolt trap are expected to be very low to none. No bull trout were observed in the bypass in 2003. In addition to spill and turbines, the traveling water bypass system provides a downstream migration route for bull trout move downstream past Rock Island Dam. The smolt trap will not destroy or adversely modify proposed critical habitat.

The Predator Control Program, specifically the Pikeminnow Program, could result in direct and or indirect adverse effects on bull trout from Rock Island Reservoir. Very few bull trout have been caught during the hook and line fishery, and no bull trout have been caught during the long line fishery. No bull trout mortalities were reported. Impacts to individual bull trout from this program are expected to be very minimal. The program will not destroy or adversely modify proposed critical habitat.

Installation and operation of a small fixed-blade propeller turbine generator in the attraction water conduit that provides supplemental flow to the center spillway entrance of the adult fishway will not affect Columbia River bull trout. Installation and operation of this turbine will not destroy adversely or modify proposed critical habitat.

Actions associated with the Avian Control Program will not affect Columbia River Bull trout or destroy or modify proposed critical habitat.

The Tributary Conservation Plan may result in short term unavoidable effects associated with in-stream habitat restoration or improvement work. Tributary projects are expected to result in overall positive benefits for migratory bull trout which utilize quality habitat tributary streams to spawn and rear. The Tributary Conservation Plan will not destroy or adversely modify proposed critical habitat.

Actions associated with the Hatchery Compensation Plan may result in short term unavoidable effects on bull trout from noise and human presence in tributaries from construction of additional hatchery facilities. Bull trout are incidentally captured in the Chiwawa and upper Wenatchee River smolt traps. Operation of these smolt traps may aversely affect bull trout during trapping and handling procedures. The Hatchery Compensation Plan may have accruable long term benefits for bull trout by increasing smolt densities in tributaries and in the mainstem Columbia River. The Hatchery Compensation Plan will not destroy or adversely modify proposed critical habitat.

5.5. Bald Eagle (*Haliaeetus leueocephalus*)

5.5.1. Geographic Boundaries and Life History

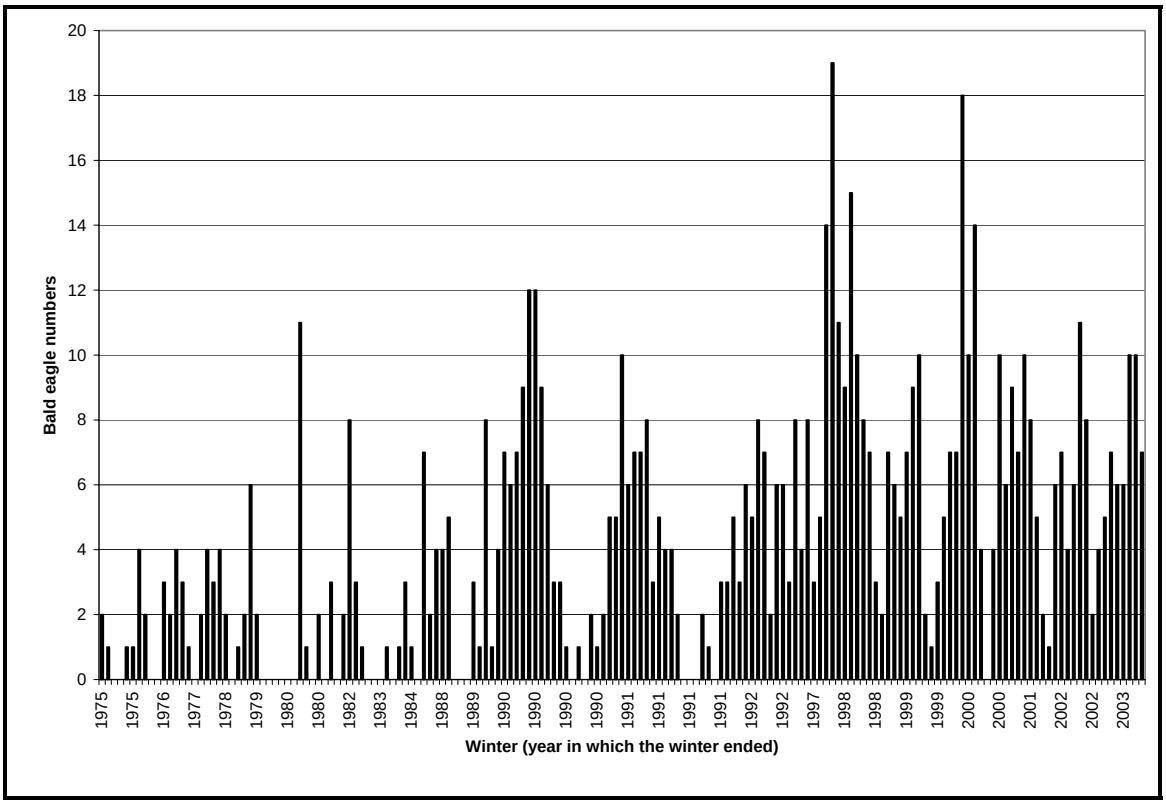
The bald eagle is found throughout North America. It breeds primarily in Alaska, Canada, the Pacific Northwest states, the Rocky Mountain states, the Great Lake states, and Chesapeake Bay (USFWS 1986). The bald eagle winters over most of the breeding range, but is most concentrated from southern Alaska and southern Canada southward.

In Washington, bald eagles are most common along saltwater, lakes, and rivers in the western portion of the state and along the Columbia River east of the Cascade Mountains (Stinson et al., 2001). Resident breeding eagles are found throughout the state near large bodies of water. Most nesting habitat in Washington is located in the San Juan Islands and on the Olympic Peninsula coastline (Stinson et al., 2001).

5.5.2. Presence in Action Area

Bald eagles are primarily winter migrants to the Rock Island Reservoir shorelines. These migrants tend to arrive on wintering grounds in late October, increase to peak numbers in December, January, or February (depending on the winter) and most leave the wintering grounds by April (Fielder 1987, 1992, 2000). Since 1975, there has been an increasing trend in wintering eagles along Rock Island Reservoir (Fig. 5-1).

Figure 5-1. Rock Island Reservoir bald eagle numbers, 1975 – 2003 (n = 731).



Since 1989, the annual maximum number of bald eagles observed during boat surveys along Rock Island Reservoir has fluctuated from 8 to 19 (Fig. 5.5.1). Cold temperatures and deep snows tend to result in high counts of eagles during surveys. Aerial surveys were conducted for bald eagles from 1975-84.

Most of the bald eagles that winter along Rock Island Reservoir nest in Alaska and northwestern Canada (Stinson et al., 2001). Waterfowl, especially American coots, provide most of the winter diet of bald eagles along the mid-Columbia River (Fielder, 1982). To a lesser extent, wintering bald eagles also feed on resident fish in the Rock Island Reservoir and tributary streams during winter. During severe winters, eagles supplement their diet with winter-killed deer carrion on the hillsides overlooking the Columbia River in the Wenatchee area (Fielder 2000).

Bald eagles tend to select perch sites that offer an open-limbed structure that allows good visibility and unobstructed flight (Stalmaster and Newman 1979, Fielder and Starkey 1986). Diurnal perches along Rock Island Reservoir preferred by bald eagles

include cottonwood trees (57%), man-made raptor perch poles (14%), and rock cliffs and elm/Siberian elm (7% each) based upon 350 perching eagle observations.

Bald eagle distribution along the Chelan and Douglas county shorelines are shown in Figs. 5-2 and 5-3 (Rock Island Dam is at RM 453.5; Rocky Reach Dam is at RM 473.7).

Figure 5-2. Bald eagle distribution by rivermile along the Chelan County shore of the Rock Island Reservoir, winters of 1996-2003 (n = 398 observations).

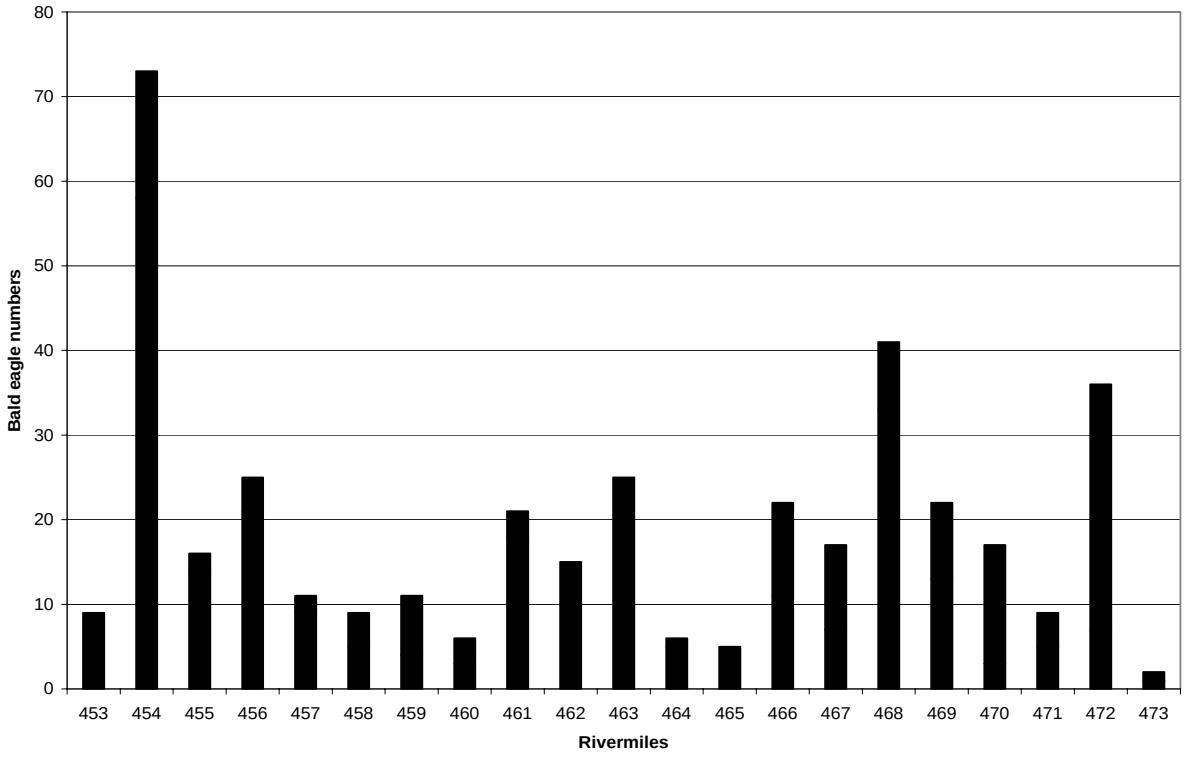
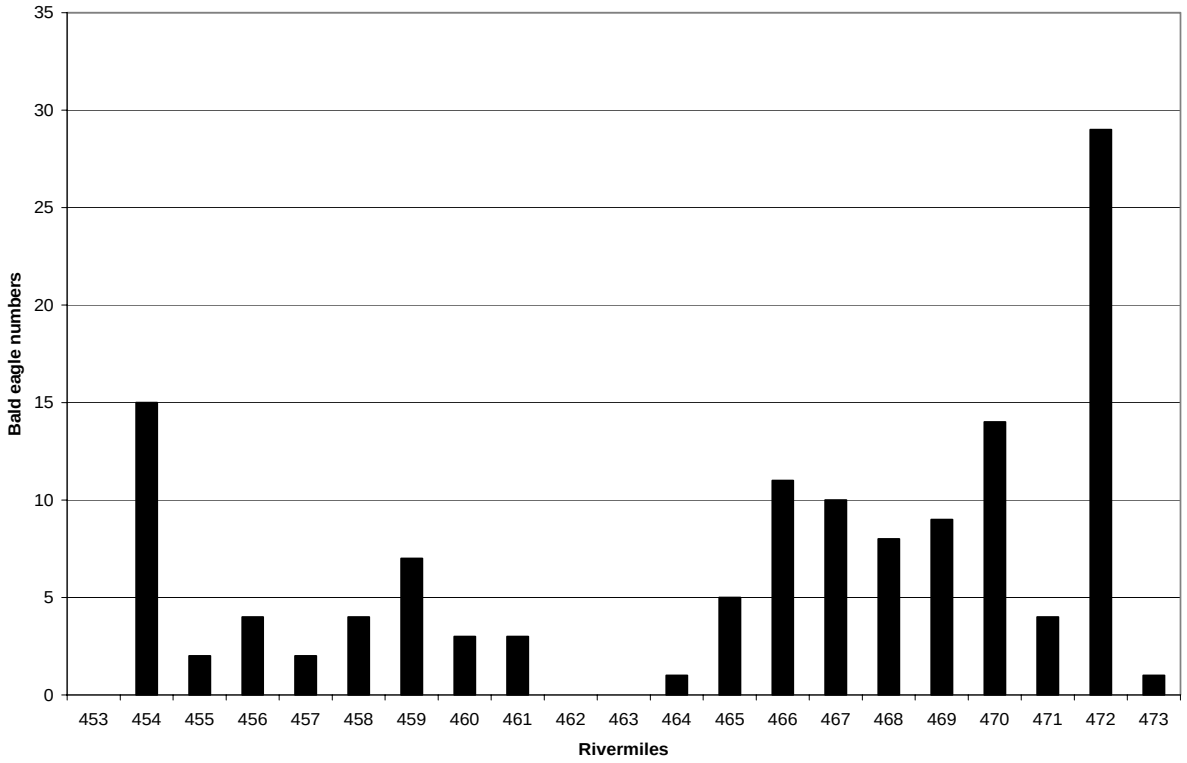


Figure 5-3. Bald eagle distribution by rivermile along the Douglas County shore of the Rock Island Reservoir, winters of 1996-2003 (n = 132 observations).



Bald eagle distribution along Rock Island Reservoir (and the Columbia River) seems to be influenced by several factors including available perch sites, food availability, and various levels of human disturbance (Fielder and Starkey 1986, 1987, Fielder 1992). Eagles tend to use shorelines along Rock Island Reservoir that support abundant wintering waterfowl populations, have abundant open-limbed shoreline perches, and lower levels of human activity.

There are no known communal night roosts along Rock Island Reservoir. One small communal night roost has been listed in WDFW files in large cottonwood trees on the Douglas County shore at rivermile 465.6. This site has been used by 1-2 eagles as a perch site during daylight hours but eagles have not been seen using the site as a communal night roost during evening hours. It is not a communal night roost used by bald eagles.

There are no bald eagle nests along Rock Island Reservoir. There are four known bald eagle nests in Chelan County, two of which are in proximity to the HCP Action Area. One nest is at the northwest end of Lake Wenatchee. A second, new, nest site has been reported along the Icicle River approximately ½ mile upstream from its confluence with the Wenatchee River. A third nest site is located along the middle section of Rocky Reach Reservoir, upstream from Rock Island Reservoir. The forth bald eagle nest in Chelan County is located at the head of Lake Chelan, which is out of the Rock Island Dam HCP Action Area. There are no known bald eagle nests in Douglas County in the proximity of the Rock Island Project Action Area.

Taylor (1989) reported that 1-7 bald eagles wintered along the Wenatchee River between 1982 and 1989. Although it may be unreported, several bald eagles use the lower portion of the Entiat River, which flows into Rocky Reach Reservoir. These eagles likely feed on resident fish in the rivers and deer carrion on surrounding hills. Salmon and steelhead are relatively unimportant in the diets of bald eagles wintering along Rock Island Reservoir or the Wenatchee and Entiat rivers because most of the eagles do not arrive before November and by then, spawned out carcasses are no longer available to the eagles.

5.5.3. Analysis of Effects

The HCP for the Rock Island Project requires Chelan County PUD to meet performance standards for the operation of the fish ladders for adult salmon passage and juvenile salmonid bypass facilities. Chelan County PUD is also required to meet Washington State water quality standards for water released at the dam. The HCP also has standards for turbine and spillway operations. Normal operation of Rock Island Dam will not have an effect on either nesting or wintering bald eagles.

Reservoir draw downs could expose and reduce aquatic vegetation beds that are fed on by several species of waterfowl, including American coots. A reduction in wintering waterfowl would like reduce the number of bald eagles that would winter along Rocky Reach Reservoir because those eagles may relocate to areas of high food availability.

Rock Island Reservoir does not generally experience reservoir draw downs extensive enough to reduce aquatic vegetation beds.

Predator control provisions of the HCP include long line fishing for northern pike minnow in the Rock Island Reservoir and tailwater and avian hazing at Rocky Reach Dam and tailwater. The Pike minnow long-lining will not affect bald eagles or bald eagle habitat. Long-lines are fished on the bottom of the river in water deeper than a bald eagle can successfully fish; hence eagles can not become entangled in the lines. Any reduction in pike minnow populations that would provide food for bald eagles would be off-set by increases in fish populations that would have been preyed upon by those pike minnows.

The avian hazing program is conducted by the US Department of Agriculture (USDA) Wildlife Services. This program occurs from mid-April through the end of August, when bald eagles are not generally present along Rock Island Reservoir. The USDA Wildlife Services employees use various aerial firecrackers, propane cannons and shotgun blasts to haze gulls, terns and double-crested cormorants to reduce predation of salmon and steelhead smolts at the Rock Island Dam. The avian hazing program would not affect bald eagles because they are not generally along Rock Island Reservoir during that program's operation.

The hazing program also uses a web of high tension wire with mylar streamers over the tail water immediately downstream of Rock Island Dam to discourage avian predators (gulls, terns, and cormorants) from fishing for salmon and steelhead smolts. The wires prevent predation by causing the birds to avoid the wires when trying to fish over the tailwater. The mylar streams on the wires allow bald eagles to see and avoid the wires when the eagles fly over the Rock Island tailwater.

Existing hatchery operations are addressed by the HCP. The HCP discusses the operation of the hatchery complex, acclimation ponds, fish traps. It is unlikely that the operation of the hatcheries, fish traps or acclimation ponds would have any affect on bald eagles.

The tributary conservation plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, Methow, and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee will be submitted to the tributary conservation plan committee. The committee, made up of various fisheries agencies and the tribes, will decide if the projects meet criteria for funding. Projects will have to be reviewed by state and federal agencies to receive permits for any construction projects. Habitat preservation projects will have a benefit to bald eagles. Habitat restoration projects will require a period of construction that may disturb bald eagles using the surrounding area for a relatively short duration. In the long-term, these projects will have a positive benefit for eagles if additional shoreline riparian habitat is created by the project.

Present and future resident bald eagles that use the tributary steams will benefit from the increased number of spawned out carcasses as salmonid runs increase due to natural production, hatchery supplementation, and increased downstream smolt survival.

5.5.4. Impact Minimization Measures

Chelan County PUD will continue the practice of minimal reservoir draw downs in summer which could reduce beds of natural aquatic vegetation that provide a food source for waterfowl.

Chelan County PUD, and its contractors will not conduct any avian predator hazing if a bald eagle is observed in the vicinity of the hazing activity, either at Rock Island Dam or elsewhere along the reservoir. In the unlikely event that an eagle is injured by the high tension wires installed in the Rock Island Dam tailwater, the appropriate personnel from the US Fish and Wildlife Service and Washington Department of Fish and Wildlife will be notified and assisted in the capture of the injured bird. Chelan County PUD will arrange for care of such injured birds at a licensed raptor rehabilitation facility designated by the USFWS at Chelan County PUD expense.

The USFWS, WDFW and US Forest Service will be contacted to determine if there are any bald eagle nesting territories or communal night roosts within a mile of any proposed habitat restoration project. Through the permitting process, the appropriate times to construct or avoid construction for habitat restoration projects will be determined. Chelan County PUD will ensure that the contractor complies with all permit requirements pertaining to bald eagle activity in the area of construction projects.

5.5.5. Compliance with Recovery or Management Plans

Bald eagles are protected under federal and Washington State law. Eagles are protected by the federal Endangered Species Act, Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Eagles are also protected by the Washington State RCW 77.12.655 which establishes habitat buffer zones for bald eagles and WAC 232-12-292 the Bald Eagle Habitat Protection Rule.

The *Recovery Plan for the Pacific Bald Eagle* (USFWS 1986) lists goals for occupied nesting territories. Those goals include 2 occupied nesting territories for the Wenatchee River, 1 occupied nesting territory on the Methow River, 2 occupied nesting territories on the Okanogan River, and does not include as a goal any occupied nesting territories along Rock Island Reservoir.

5.5.6. Determination of Effects

Bald eagles may be affected by actions associated with implementation of the Rock Island Project HCP. These actions are likely to be beneficial, and the effects on Bald Eagles positive, as a result of increased numbers of salmon and steelhead returning to the HCP action area. There are not likely to be adverse effects to bald eagles as a result of HCP actions.

5.6. Lynx (*Lynx canadensis*)

5.6.1. Geographic Boundaries and Life History

Lynx inhabit boreal forests and wet bogs from the artic tree line of Alaska and northern Canada, south to the northern United States border. Lynx are found from

Newfoundland west to Alaska and British Columbia (Stinson, 2001). Lynx are found in the northern United States where the boreal forest extends south of the border. Lynx are found in northern New England, the Great Lake States, the Rocky Mountains south to Utah and in the mountains of eastern Washington (Stinson, 2001).

Lynx are found in high-elevation forests of north central and northeast Washington, including Chelan, Okanogan, Ferry, Stevens and Pend Oreille counties (Stinson, 2001). Lynx may be extirpated from the southern Cascades (Stinson, 2001). Transient lynx may occasionally be found west of the Cascade crest, probably during years of low prey availability east of the Cascades.

The largest numbers of lynx in Washington State are found in the Okanogan Lynx Management Zone (LMZ) (Stinson, 2001). The Okanogan LMZ includes the Okanogan and Wenatchee National Forest, part of the Mt. Baker-Snoqualmie National Forest, part of the Pasayten, Glacier Peak and Lake Chelan Sawtooth Wilderness areas, Loomis Sate forest and parts of the Lake Chelan National Recreation Area and National Park. The LMZ also encompasses some private land.

Lynx were considered a predatory animal and hunted for a $5 bounty in Washington state before 1947 (Stinson, 2001). Lynx were trapped or hunted for fur until 1991. The US Fish and Wildlife Service declared the lynx a threatened species in 1993. Fragmented boreal forest habitat, forest management, low snowshoe hare numbers, and human exploitation of the lynx all contributed to the decline of lynx in Washington State. It is estimated that there are fewer that 100 Lynx in Washington State.

In the Cascade Mountains, lynx live in the lodgepole pine (*Pinus contorta*) and Engelmann spruce-subalpine fir (*Picea engelmann-Abies lasiocarpa*) forests of the high mountains (Stinson, 2001). Older, mature forests with downed trees and windfalls provide cover for denning sites, escape, and protection from severe weather. Lynx use the more heavily timbered north facing slopes between 1,400 and 2,150 meters in elevation during summer months. In the winter, lynx move below 1,520 meters in elevation and use flatter areas (Stinson, 2001).

Lynx feed primarily on snowshoe hare *(Lepus americanus).* Lynx also will eat mice, red squirrels (*Tamiasciurus hudsonicus*), voles, and birds when snowshoe hare are not available. Recently burned lodgepole pine forest provides the best habitat for snowshoe hares on the Okanogan National Forest (Stinson, 2001).

Female lynx produce 2 to 5 young per year born in late May through June (Stinson, 2001). Young lynx stay with their mother for 10 to 11 months and disperse in the spring. Male and female lynx maintain solitary lives though their territories may overlap (Stinson, 2001).

5.6.2. Presence in Action Area

Operation of the Rock Island Project hatcheries, acclimation ponds, and fish traps will not occur in the vicinity of any of the Lynx Management Zones established in Washington State. The Tributary Conservation Plan will provide money for stream preservation and fish habitat restoration projects along the Methow and Okanogan rivers that may be within the boundaries of several of the Okanogan County Lynx Management Zones described by Stinson (2001).

5.6.3. Analysis of Effects

Operation of Rock Island Dam fish ladders and juvenile salmonid bypass system, turbines and spillways will not affect lynx or lynx habitat. Operation of the Rock Island Dam fish hatchery complex, acclimation ponds, Chiwawa River and Wenatchee River smolt traps, and the predator control provisions of the HCP will also not affect the lynx or lynx habitat because those facilities or activities do not occur within areas occupied by lynx or within Lynx Management Zones.

The Tributary Conservation Plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, Methow, and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee will be submitted to The Tributary Conservation Plan Committee. The committee is comprised of state and federal fish and wildlife agencies and the tribes. That committee will decide if the projects meet criteria for funding. Projects will have to be reviewed by state and

federal agencies to receive permits for construction projects. Habitat preservation projects will be in riparian areas along streams and will not impact and probably will not benefit lynx. Habitat restoration projects will also be in riparian areas. Restoration projects constructed in the winter could possibly disturb lynx if the cats journey to lower elevations looking for food. Lynx are sensitive to the compaction of snow by snowmobiles and other snow vehicles that allow coyotes and other predators access to lynx habitat (Stinson, 2001). Road building activities should be coordinated with land management agencies to restrict snow mobile use.

5.6.4. Impact Minimization Measures

Any road built to facilitate a habitat restoration project should be restored after the project is completed to minimize potential impacts to lynx using the river valleys during spring.

Habitat restoration projects will restore riparian habitat or rebuild instream habitat. No construction should be done during the winter when lynx migrate to lower elevations.

Individuals planning the habitat restoration project will be required to contact the US Fish and Wildlife Service to determine if lynx habitat is in the area of the project. They will also be required to follow all state and federal permit requirements for the habitat restoration project.

5.6.5. Compliance with Recovery or Management Plans

Lynx are protected by the United States Endangered Species Act and the Washington State Endangered Species Act. The Washington Department of Fish and Wildlife developed the Washington State Plan for Lynx Recovery in 2001. All habitat restoration projects proposed will be reviewed by the state and federal members of the HCP Tributary Conservation Plan Committee and state and federal regulatory staff before a project is implemented. All activities associated with the Rock Island Project HCP are compatible with the Washington State Plan for Lynx Recovery.

5.6.6. Determination of Effects

The Rock Island Project HCP actions will have no effect on lynx or lynx habitat.

5.7. Gray Wolf (*Canis lupus*)

5.7.1. Geographic Boundaries and Life History

The gray wolf originally occupied most of the continent from the Artic to the mountains of Mexico. The gray wolf was not found on the costal plains of southeast United States and Mexico (Paradiso and Nowak, 1982). Wolves were well distributed throughout Washington State before European settlers arrived. Evidence of wolves can be found in the cultural and archeological record of local Native Americans (Palmquist, 2002).

Hunting wolves for fur during the 1800s and a bounty on wolves in the early 1900s extirpated wolves from Washington State (Palmquist, 2002). Wolf control in southern British Columbia has eased over the past few decades. The population in British Columbia in the Cascades just north of the border is increasing (National Park Service, 1998). Since 1984 wolves have been seen roaming in the vicinity of Ross Lake and the Skagit Valley Recreation area in British Columbia (National Park Service, 1998). In 1990, adult wolves with pups were seen near Hozomeen on Ross Lake. Since 1990, biologists have seen 3 separate groups of adults and pups in the North Cascades (National Park Service, 1998). Since the 1990's, reliable sightings of single wolves have been made at McAlester Pass, Pasayten Wilderness and the Twisp River in the Okanogan National Forest, in the Glacier Peak and Alpine Lakes Wildernesses (National Park Service, 1998, Gaines et al, 2000).

Wolves live in family groups or packs. Wolf packs can contain 2 to 12 or more related individual wolves. Usually only the Alpha male and female wolves in the pack mate and have puppies. Wolves mate in February or March and give birth to puppies 63 days later. Puppies are raised by all the pack members.

Wolves in the North Cascades most likely eat mostly large mammals such as elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), beaver (*Castor canadensis*) and

marmot (Marmota *spp*.) and small mammals such as voles (Microtis *spp*.). Wolves hunt prey that is easy and safe to kill, including but not limited to, sick, weak, injured and very young and very old animals. Wolves might possibly follow the deer migrations to lower elevation during the winter.

5.7.2. Presence in Action Area

Wolves are not present in the lower elevations near the Rock Island Dam, its associated hatcheries, acclimation ponds, or fish traps. Wolves may occasionally be present in the mountains of the Wenatchee-Okanogan National Forest that includes the drainages of the Wenatchee, Entiat, Methow, and Okanogan rivers where tributary enhancement projects might be funded.

5.7.3. Analysis of Effects

Operation of Rock Island Dam fish ladders and juvenile fish bypass system, turbines and spillways will not have an effect on gray wolves. Operation of the hatcheries associated with Rock Island Dam and the predator control provisions of the HCP will also not affect the gray wolves. Operation of the Chiwawa River and Wenatchee River rearing ponds and smolt traps, and the Lake Wenatchee net pens will also have no effect on gray wolves.

The Tributary Conservation Plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, Methow, and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee will be submitted to The Tributary Conservation Plan Committee. The committee, made up of state and federal fish and wildlife agencies and the tribes, will decide if the projects meet criteria for funding. Projects will need to be reviewed by state and federal agencies to receive permits for construction projects. Habitat preservation projects will be in riparian areas along streams and will not impact and probably will not benefit gray wolves. Habitat restoration projects will also be in riparian areas. Restoration projects constructed in the winter could possibly disturb gray wolves if they journey to lower elevations in search of food. Any road building activities required to construct habitat

restoration projects should be rehabilitated after construction. These projects should have no net impact on gray wolves or gray wolf habitat.

5.7.4. Impact Minimization Measures

Any road built to facilitate a habitat restoration project should be rehabilitated after the project is completed to minimize potential impacts to gray wolves that may be using the Wenatchee, Entiat, Methow, or Okanogan river valleys during the winter.

Habitat restoration projects will restore riparian habitat or rebuild in-stream habitat. No construction should be done during the winter if wildlife agencies believe that gray wolves may migrate to the lower elevations of that area.

Individuals that plan habitat restoration projects will be required to contact the US Fish and Wildlife Service to determine if gray wolf habitat is in the area of the project. They will also be required to follow all state and federal permit requirements for the habitat restoration project.

5.7.5. Compliance with Recovery or Management Plans

There is no recovery or management plan for gray wolf recovery in the Washington State. Gray wolves are listed as threatened under provisions of the United States Endangered Species Act and listed as endangered under provisions of the Washington State Endangered Species Act. All habitat restoration projects proposed will be reviewed by the state and federal members of the HCP Tributary Conservation Plan Committee and state and federal regulatory staff before a project is implemented. All activities covered by the Rock Island Project HCP are compatible with the gray wolves living in the North Cascade Mountains.

5.7.6. Determination of Effects

The Rock Island Project HCP actions will have no effect on gray wolves or gray wolf habitat.

5.8. Grizzly Bear (*Ursus arctos horribilis*)

5.8.1. Geographic Boundaries and Life History

The historic range of grizzly bears once covered over a third of what is now the continental United States. It is listed as threatened in the lower 48 states, where it survives only in parts of the Rocky Mountains and northern Cascades. The Recovery Plan focuses on the six remaining areas in Idaho, Montana, Washington, and Wyoming that have habitat suitable for self-sustaining grizzly populations; only five of these are currently inhabited by grizzlies. Grizzly bears recovery areas include: Yellowstone, Northern Rocky Mountains, Selkirk Mountains, Cabinet-Yaak Mountains, Bitterroot Mountains, and North Cascade Mountains. No evidence of grizzly bears has been found in the Bitterroot Mountains but U.S. Fish and Wildlife Service planned to reintroduce grizzlies into the ecosystem until recently.

The North Cascade Grizzly Bear Recovery Area includes all of the North Cascade National Park, and most of the Mount Baker-Snoqualmie and all of the Wenatchee and Okanogan National Forests. The recovery area extends roughly from Interstate Highway 90 to the Canadian Border and east to the Columbia and Okanogan rivers on the east side of the Cascade Mountains. The North Cascade recovery area is adjacent to the grizzly bear recovery area in British Columbia (North Cascades Grizzly Bear Recovery Team, 2001).

Grizzly bears once occurred throughout the North Cascade recovery area. The decline of the grizzly bear population in the recovery area was likely caused by intensive hunting during the fur trade in the 1800's and rapid human settlement of the area in the late 1800's (Servheen, 1997). Grizzly bears were killed indiscriminately during the early 1900s to avoid potential human – grizzly bear conflicts. The grizzly bear population in the North Cascades never recovered from the indiscriminate hunting.

The U.S. Fish and Wildlife Service estimate that 5-20 grizzly bears still roam the North Cascade recovery area. There have been 21 confirmed observations of grizzly bears or grizzly bear sign from 1983 thru 1991 (Servheen, 1997). A grizzly bear, probably from

Canada, was sighted near Chesaw east of the North Cascade recovery area on May 14, 2003 (Washington Department of Fish and Wildlife, 2003). The British Columbia Ministry of Water, Land and Air Protection estimate that less than 25 grizzly bears occupy the North Cascade Population Unit (recovery area) north of the Canada – United States border (North Cascades Grizzly Bear Recovery Team, 2001). U S Fish and Wildlife Service estimate that 200 – 400 grizzly bears could be supported by the North Cascades recovery area and British Columbia Ministry of Water, Land and Air Protection estimate that 150 grizzly bears could be supported by the North Cascade Population Unit.

Grizzly bears are omnivores with a typical diet of less than 10% fish or meat. Most of the meat consumed by grizzlies is carrion from winter killed deer and elk found on winter range. Grizzly bears may also kill big game and occasionally livestock (Craighead and Mitchell, 1982). More than 100 plants in the North Cascades Ecosystem have been identified as grizzly bear foods. Grizzly bears visit wetlands in the spring for succulent plants that are easy to digest and high in nutrients. Summer foods include thistle, cow parsnip, mushrooms, roots, spawning fish, wild berries, and insects. Many of these foods are found in avalanche shoots and at high elevations. Fall foods include berries, plants, and ants (Grizzly Bear Outreach Project, 2002).

Grizzly bears have a low reproductive rate. A female grizzly does not have her first litter until she is five to seven years old, and she breeds at three to four year intervals. Grizzly bears mate from mid-May to mid-July. Young grizzlies are born in a winter den, usually during January and February. The common litter size is two, but it can range from one to four. The young grow rapidly, and leave the den with the mother in April or May. Usually they remain with the mother until June of their third year. The female grizzly bear will not mate until her young are raised (Craighead and Mitchell, 1982).

After the breeding season grizzlies grow fatter on the abundant summer foods, which help it to survive the winter in its den. Grizzly bear dens are usually above 5000 feet mean sea level. The females usually den first, entering around mid-November, depending on the weather and their condition. The males are likely to stay outside the

den until late November or early December and emerge from it as early as March. The females, especially those with offspring, tend to stay in the dens until the young are fairly well grown in late April or early May (Craighead and Mitchell, 1982).

5.8.2. Presence in the action area

The North Cascades Grizzly Bear Recovery Area includes portions of Chelan and Okanogan counties but does not border the Columbia River or the Rock Island Reservoir shoreline. The Wenatchee, Entiat, and Methow rivers and tributaries of the Okanogan River extend into the North Cascades Grizzly Bear Recovery Area. The Eastbank hatchery, Rocky Reach hatchery, Upper Wenatchee smolt trap, and Dryden rearing pond are outside the recovery area. The Chiwawa River fish facility and the Lake Wenatchee net pens are within the North Cascades Grizzly Bear Recovery Area. The Tributary Conservation Plan will provide money for preservation and habitat restoration projects along the Wenatchee, Entiat, and Methow Okanogan rivers that may be within the boundaries of the North Cascade Grizzly Bear Recovery Area. Most grizzly bear habitat and use would be expected to be at high elevations within the recovery area, while most fish facilities and tributary projects would be at low elevations.

5.8.3. Analysis of Effects

Normal operation of Rock Island Dam fish ladders and juvenile fish bypass, turbines and spillways will not affect grizzly bears. Operation of the Rock Island Hatchery and the predator control provisions of the HCP will also not affect grizzly bears.

Operation of the Wenatchee River and Chiwawa River rearing ponds and smolt traps, and the Lake Wenatchee net pens should not attract or affect grizzly bears. Normal sanitary activities require hatchery personnel to bury any large loss of fish at the hatchery. Fish food is kept in locked storage at the Chiwawa facility. The Wenatchee net pens are anchored in the lake and accessible only by boat. Access to the Chiwawa fish facility is restricted by a chain link fence with a locked gate and other locked structures and would not be accessible to grizzly bears.

The Tributary Conservation Plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, Methow and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easements or land in fee will be submitted to the tributary conservation plan committee. The committee, made up of various fisheries agencies and the tribes, will decide if the projects meet criteria for funding. Projects will have to be reviewed by state and federal agencies to receive permits for construction projects. Habitat preservation projects will not impact and probably will not benefit grizzly bears. Habitat restoration projects will require a period of construction that could possibly disturb grizzly bears if grizzly bears foraged in low elevations. Grizzly bears are sensitive to roads and can be displaced up to 500 meters by any road (Grizzly Bear Outreach Project, 2002). Any road building activities required to construct habitat restoration projects could impact grizzly bears if the road blocks access to habitat. Generally, these projects will have no net impact.

5.8.4. Impact Minimization Measures

To minimize any human – grizzly bear conflicts at tributary fish rearing projects, sanitary practices will include use of bear proof trash receptacles, cleaning up spilled fish food, hauling dead fish to garbage transfer stations, and not feeding pets outside at employee housing. Gates and fences surrounding these facilities will be kept in good repair and locked to restrict potential grizzly bear access.

Any road built to facilitate a habitat restoration project should be restored after the project is completed to minimize potential impacts to grizzly bears using the Wenatchee, Entiat, Methow, or Okanogan river valleys during spring.

Individuals planning habitat restoration project will be required to contact the US Fish and Wildlife Service to determine if grizzly bear habitat is in the area of the project. They will also be required to follow all state and federal permit requirements for the habitat restoration project.

5.8.5. Compliance with Recovery or Management Plans

Grizzly bears are protected by the United States Endangered Species Act and the Washington State Endangered Species Act. The U.S. Fish and Wildlife Service developed the North Cascades Ecosystem Recovery Plan in 1997 as a supplement to the 1993 Grizzly Bear Recovery Plan. All habitat restoration projects proposed will be reviewed by the state and federal members of the HCP Tributary Conservation Plan Committee and state and federal regulatory staff before project is implemented. All activities covered by the Rock Island Project HCP are compatible with the Grizzly Bear Recovery Plan.

5.8.6. Determination of Effects

The Rock Island Project HCP actions will have no effect on grizzly bears or grizzly bear habitat.

5.9. Marbled Murrelet (*Brachyramphus marmoratus marmoratus*)

5.9.1. Geographic Boundaries and Life History

The marbled murrelet is a small seabird. The species range in North America extends from the outer Aleutian Islands across southern Alaska to central California. Currently, marbled murrelets are only found in limited numbers during breeding season in the Puget Sound and the northern part of the outer coast of Washington. The southern portion of the coast still provides sparse nesting habitat. Historically, this species inhabited most of the coastal regions of Washington. The Washington Gap Analysis report on breeding birds in Washington lists no confirmed, probable, or possible breeding evidence in either of Chelan, Okanogan, or Douglas counties of Washington State (Smith et al. 1997). A Marbled murrelet nest has been observed near the west boundary of the North Cascades National Park Service Complex (National Park Service, 1998). That nest is reportedly in Chelan County in the Stehekin River drainage which flows into the northwest end of Lake Chelan.

Marbled murrelets come onto dry land during the breeding season. Breeding begins in mid-April and may extend as late as September. Marbled murrelets will fly as far as 70 km from salt water to find suitable nesting habitat (Burger, 2002). Marbled murrelets nests at the crowns of tall trees in old-growth forest. Tall Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), Western hemlock (*Tsuga heterophylla)* and larch (*Larix spp.*) are used by marbled murrelet for nesting sites.

Marbled murrelet feed on small schooling fish including Pacific Sand lance (*Ammodytes hexapterus*), Northern anchovy (*Mallotus villosus*), Pacific herring (*Clupea harengus*) and immature Pacific salmon (*Onchorhynchus spp*.). Murrelets also feed on squid (*Loligo spp*.) and large pelagic crustaceans such as amphipods, and mysids (Burger, 2002). Murrelets usually carry prey items to the nest one at a time.

Low fecundity is a threat to marbled murrelet survival. Female marbled murrelets lay and incubate a single egg (Burger, 2002). Some females may re-nest if they lose the first chick. The sex ratio of chicks surviving to reach the ocean can be as high as 8 males to 1 female chick.

Other threats to the murrelet include the loss of nesting sites as old-growth forest habitat is harvested, and the loss of birds to oil spills or from drowning in fish nets. Young murrelets also face the risk of predation by other birds including Stellar's jays, common ravens, crows, and gray jays.

5.9.2. Presence in Action Area

The marbled murrelets nesting in Chelan County are located near the crest of the Cascade Mountains in the Stehekin River drainage on land owned by the North Cascades National Park. Operation of the Rock Island Project, hatcheries, acclimation ponds, fish traps, avian hazing and northern pikeminnow control programs will not occur in the vicinity of the marbled murrelet nesting habitat. Conservation easements or habitat restoration projects, along the Wenatchee, Entiat, Methow or Okanogan rivers, funded under the Tributary Conservation Plan will not disturb, protect, or restore marbled murrelet nesting habitat.

5.9.3. Analysis of Effects

No actions identified in the Rock Island Project HCP will impact marbled murrelets. No measures are necessary to protect marbled murrelets.

5.9.4. Impact Minimization Measures

No measures are needed to minimize impacts since no actions associated with the Rock Island Project HCP will have an impact on the marbled murrelets or marbled murrelet nesting habitat.

5.9.5. Compliance with Recovery or Management Plans

All actions under the Rock Island HCP comply with the US Fish and Wildlife Services marbled murrelet recovery plan and the Northwest Forest Plan. The Rock Island HCP also complies with the Washington Forest Practices Act and Endangered Species Act.

5.9.6. Determination of Effects

The Rock Island Project HCP will have no effect on marbled murrelets or marbled murrelet habitat.

5.10. Ute' Ladies Tresses (*Spiranthes diluvialis* Sheviak)

5.10.1. Geographic Boundaries and Life History

Ute ladies'-tresses are known from eight states. This plant occurred in eastern Nevada (historically) and currently only occurs in Utah, Colorado, Idaho, Nebraska, Wyoming, Montana, and Washington (USFWS 1992). In Washington, it occurs in north central Okanogan County (WA Natural Heritage Program 1999, WA Natural Heritage Program Website 2003) and along the Columbia River in the northeastern corner of Chelan County (Beck 2003, Calypso Consulting 2002).

This member of the orchid family is relatively short (8-20 inches tall). It has a tuberous root and narrow leaves. Its inflorescence consists of 7-32 small white to ivory flowers

positioned in a spiral arrangement near the tip of the stem. This plant flowers primarily from mid July through mid August, depending on moisture and temperature. Along Rocky Reach Reservoir, this plant grows on stabilized gravel bars that are moist as a result of natural sub-irrigation throughout the growing season and often inundated early in the growing season. The plant grows at elevations of 720 feet along the Columbia River and 1500 feet in Okanogan County. Common associates include redtop (*Agrostis stolonifera*), western mountain aster (*Aster atkinsoniana*), white sagebrush (*Artemisia ludoviciana*), Canada bluegrass (*Poa compressa*), and narrowleaf plantain (*Plantago lanceolata*).

5.10.2. Presence in Action Area

Ute ladies'-tresses occurs in three locations in Chelan County along the Rocky Reach Reservoir shoreline between Columbia River rivermiles 505 and 510. These sites are on stabilized gravel bars that are moist throughout the growing season and inundated early in the growing season. (WA Natural Heritage Program Website 2003). All three populations are within the Rocky Reach Project boundary. Individual plants within these populations grow directly along the shoreline within the high-water inundation zone. Ute ladies'-tresses is endemic to mesic or wet meadows and riparian/wetland habitats near, springs, seeps, lakes, and perennial streams. It occurs where the over-story vegetation is relatively open and not dense or overgrown (WA Natural Heritage Program 1999, WA Natural Heritage Program Website 2003). Potential habitat for Ute ladies'-tresses in the upstream 5 miles of Rock Island Reservoir was searched in 2002 but no Ute ladies'-tresses plants have been found along the Rock Island Reservoir shorelines (Beck 2003).

5.10.3. Analysis of Effects

Operation of the Rock Island Reservoir, Eastbank hatchery complex, Chelan Falls hatchery, associated acclimation ponds, and fish traps will not occur within the vicinity of Ute ladies'-tresses in Chelan County or elsewhere. The piscivorous bird hazing program and the northern pike minnow control programs will not benefit or negatively impact this plant because those actions occur along Rock Island Reservoir and Ute

ladies'-tresses has not been found along Rock Island Reservoir (Beck 2003, Caplow1989). Actions funded under the tributary conservation plan will not benefit or negatively impact Ute ladies'-tresses because those plant populations have not been found along the Columbia River tributary streams. Any surface disturbance actions planned for tributary streams would include a site survey to identify presence of Ute ladies'-tresses.

Operation of the Eastbank hatchery complex, Chelan Falls hatchery, associated acclimation ponds, and fish traps will not occur within the vicinity of or affect populations of Ute ladies'- tresses. The piscivorous bird hazing program and the northern pike minnow control programs will not benefit or negatively impact Ute ladies'-tresses populations because these actions do not occur along the Columbia River in the vicinity of the Ute ladies'-tresses populations. Actions funded under the tributary conservation plan will not benefit or negatively impact the Ute ladies'-tresses populations because those populations do not occur along the tributary streams.

5.10.4. Impact Minimization Measures

No mitigating measures are needed to minimize impacts to Ute ladies'-tresses from the actions listed in the HCP.

5.10.5. Compliance with Recovery or Management Plans

Ute ladies'-tresses is listed as Endangered by the state of Washington and is listed as Threatened by the USFWS (WA Natural Heritage Program Website 2003). There is not a federal recovery or management plan for Ute ladies'-tresses. Several threats and management concerns that are associated with Ute ladies'-tresses include watershed and stream alterations that degrade natural stream stability and diversity, conversion of riparian/floodplain land to agricultural uses, and competition from noxious weeds (WA Natural Heritage Program 1999). Pollinators and pollen-producing plants must be maintained in the vicinity of Ute ladies'-tresses populations to preserve this orchid (WA Natural Heritage Program 1999). The HCP for the Rock Island Project, associated hatchery complex and acclimation ponds, and fish traps, predator control program and

tributary conservation plan are not in conflict with the management plans and concerns for Ute ladies'-tresses.

5.10.6. Determination of Effects

The actions identified in the Rock Island Project HCP may affect, but are not likely to adversely affect on Ute ladies'-tresses populations.

5.11. Northern Spotted owl (*Strix occidentalis caurina*)

5.11.1. Geographic Boundaries and Life History

The Northern spotted owl is found in old growth forests and occasionally in younger conifer forest of the Cascade, Sierra Nevada, and costal mountains of British Columbia, Washington, Oregon, and northern California. The range of the spotted owl habitat on the Wenatchee and Okanogan National Forests has been described as being in old growth and late succession conifer forest below 5,000 feet elevation. Critical Habitat has been designated for the Northern spotted owl.

Northern spotted owls generally have large home ranges and use large tracts of land containing significant acreage of older forest (Thomas, et al. 1990). Nesting pairs require 2,000 – 5,000 acres of conifer forest habitat, usually Douglas' fir stands (Smith et al. 1997). Northern spotted owl nesting and roosting habitat typically include a moderate to high canopy closure of 60 to 80 percent. Multi-layered trees with various deformities provide cavities for spotted owl nesting (Thomas, et al. 1990). Spotted owls use a wider variety of forest types for hunting, including more open and fragmented habitat (Thomas, et al. 1990).

Although spotted owls hunt a wide variety of prey including small mammals, and particularly nocturnal arboreal or semi-arboreal species. Major prey species include: northern flying squirrels, dusky-footed or bushy-tailed woodrats, and various hares and rabbits (Thomas, et al. 1990). Also, pocket gophers, red tree voles, and deer mice are regionally important (Thomas, et al. 1990). Flying squirrels are especially important in the diet of spotted owls in mesic forests of the Western Hemlock/Douglas-Fir Zones.

Woodrats are important prey in the drier conifer forests east of the Cascades (Thomas, et al. 1990).

5.11.2. Presence in Action Area

The Rock Island Project and its associated hatcheries are not within known Northern Spotted owl habitat. The avian hazing and Northern pikeminnow control projects are conducted on the Columbia River are also not within known Northern spotted owl habitat.

Northern spotted owls nest in the Wenatchee and Okanogan National Forests (Smith et al. 1997). The Chiwawa fish facility and the Lake Wenatchee net pens are located within the habitat range of Northern spotted owls. A Northern spotted owl activity center is documented on the northwest side of the Wenatchee River opposite of the Chiwawa fish facility. The core of that activity center is approximately one mile from the Chiwawa fish facility (Bill Gaines, USFS, pers. comm.). The Tributary Conservation Plan will provide money for preservation and habitat restoration projects along the Wenatchee, Entiat, Methow, and Okanogan rivers that may be within the boundaries of the Northern spotted owl habitat.

5.11.3. Analysis of Effects

Operation of the Rock Island Project fish ladders and juvenile fish bypass system, turbines and spillways, and the predator control program will not occur in any location inhabited by the Northern spotted owl. Operations of hatcheries associated with Rock Island Dam and the predator control provisions will not occur in or near Northern spotted owl habitat. Operation of the Wenatchee net pens, and the Wenatchee and Chiwawa river acclimation ponds, rearing ponds, and smolt traps associated with the Rock Island Project will not affect Northern spotted owls or their habitat.

The Tributary Conservation Plan will provide money to fund third party conservation efforts in the Wenatchee, Entiat, Methow, and Okanogan river basins. Habitat restoration projects and plans to purchase conservation easement or land in fee will be submitted to The Tributary Conservation Plan Committee. The committee, made up of

state and federal fish and wildlife agencies and the tribes, will decide if the projects meet criteria for funding. Projects will have to be reviewed by state and federal agencies to receive permits for construction projects. Habitat preservation projects will be in riparian areas along streams and will not impact and probably will not benefit the Northern spotted owl. Habitat restoration projects will also be in riparian areas. Stream restoration activities in spotted owl habitat will occur outside of the nesting season for the owls. Contractors working on stream restoration projects will be required to follow all permit requirements.

5.11.4. Impact Minimization Measures

All stream habitat restoration projects proposed will be reviewed by the state and federal members of the HCP Tributary Conservation Plan Committee and state and federal regulatory staff before a project is implemented. Contactors planning a stream habitat restoration project will be required to contact the US Fish and Wildlife Service and US Forest Service to determine if spotted owls are nesting in the area of the project. Contractors working on stream restoration projects will be required to follow all permit requirements.

Any road build to facilitate stream habitat restoration will be re-vegetated after the restoration work is completed.

5.11.5. Compliance with Recovery or Management Plans

Northern spotted owls are protected by the United States Endangered Species Act and the Washington State Endangered Species Act. Actions identified in the Rock Island HCP will not conflict with federal or state recovery plans.

All activities covered by the Rock Island Project HCP are compatible with the US Forest Service and US Bureau of Land Management guidelines for management of Northern spotted owl habitat in late-successional and old-growth forest (US Forest Service and US Bureau of Land Management, 1994).

5.11.6. Effects on Designated Critical Habitat

The Endangered Species Act of 1973 (P.L. 93-205, 28 Dec 1973) describes critical habitat as 1) the specific areas within the geographic area occupied by a species, on which are found the physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and 2) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species. Critical habitat identifies specific areas essential to the conservation of a species. The physical and biological habitat features that support nesting, roosting, foraging, and dispersal are essential to the conservation of the northern spotted owl (USFWS 1992).

The US Fish and Wildlife Service used habitat maps to identify which parcels of land contained the attributes that would be included in critical habitat. The major focus was on habitat that provides nesting, roosting, and some foraging attributes. Primary consideration was given to habitat currently occupied by pairs or resident single Northern spotted owls (USFWS 1992).

The Endangered Species Act of 1973 requires the Service to specifically identify and describe areas designated as critical habitat. The Service designated 53 units totaling 2.2 million acres in Washington as critical habitat for Northern spotted owls, some of which are included with the Wenatchee, Entiat, and Methow river drainages (Bill Gaines, U.S. Forest Service, Wenatchee, pers. comm., 2003).

Operations and activities associate with the Rock Island Project, hatcheries, acclimation and rearing ponds, smolt traps, and the avian hazing and northern pike minnow control programs, will not occur in the vicinity of Northern spotted owl critical habitat and will have no effect on that habitat. The Chiwawa and Wenatchee River rearing ponds and smolt traps, and the Wenatchee net pens do occur in proximity to parcels designated as Northern spotted owl critical habitat but will not affect that habitat. The U.S. Forest Service (USFS) maps of Northern spotted owl activity centers and personal communication with USFS biologists (B. Gaines, USFS, pers. comm., 2003) indicate

that these fish facilities are one mile or more from the Northern spotted owl critical habitat parcels.

Habitat restoration projects that may be funded by tributary improvement funds could potentially be planned along waters within Northern spotted owl critical habitat. The individuals planning the habitat restoration projects will be required to contact the Service to determine if Northern spotted owl critical habitat occurs in the vicinity of the planned project and if necessary to seek guidance from the Service to avoid or lessen project impacts on that critical habitat. State and federal permit requirements for the habitat restoration project would be followed.

The Rock Island Project HCP actions will not degrade or cause any adverse modification to Northern spotted owl habitat.

5.11.7. Determination of Effects

The Rock Island Project HCP actions will have no effect on Northern spotted owls or Northern spotted owl critical habitat.

6. ANALYSIS OF EFFECTS TO CANDIDATE SPECIES

6.1. Yellow-billed Cuckoo (*Coccyzus americanus)*

6.1.1. Geographic Boundaries and Life History

Yellow-billed cuckoos occur in all of the eastern, southeastern and mid-western United States and the southern regions of Quebec and Ontario. The Yellow-billed cuckoo is rapidly approaching extinction in the western states. It was last known to breed in British Columbia in the 1920's, in Washington in the 1930's and in Oregon in the 1940's (Center for Biological Diversity 1998). The Yellow-billed cuckoo has also been extirpated from Idaho, Nevada, and Utah (Center for Biological Diversity 1998).

In the Pacific Northwest, the species was formerly fairly common locally in willow bottoms along the Willamette and Columbia rivers in Oregon, and in the Puget Sound

lowlands and along the lower Columbia River in Washington (U.S. Fish and Wildlife Service, 2001). The Yellow-billed cuckoo was rare east of the Cascade Mountains in Oregon and Washington (USFWS 2001a). The Yellow-billed cuckoo has been extirpated as a breeder in Washington and only one possible breeding site is referenced in the Chelan, Douglas, Okanogan county area (Smith et al. 1997).

6.1.2. Presence in Action Area

Yellow-billed cuckoos arrive at their breeding territories in early to mid-June and begin nesting in late June to early July. In the western United States Yellow-billed cuckoos nest in large riparian cottonwood/willow forest with dense under story (Center for Biological Diversity, 1998). Suitable riparian habitat used for nesting is greater than 20 ha with a minimum width of 100-200 m (Center for Biological Diversity 1998). Up to 5 large eggs are laid. The total length of incubation and rearing to fledging of young Yellow-billed cuckoo combined is 17-18 days. Brown-headed cowbirds frequently parasitize the nests of Yellow-billed cuckoos. The Yellow-billed cuckoo is likely absent from Washington because it has retreated from the periphery of its former range. A lack of stop-over habitat in California may prevent cuckoos from migrating further north (Center for Biological Diversity, 1998).

The Yellow-billed cuckoo is not found in the Rock Island Project HCP action area. Suitable nesting habitat is not available along the Rock Island Reservoir and is limited along the tributary streams that would be included in the Rock Island Project HCP action area. In recent years, 1999 – 2003, two Yellow-billed cuckoos have been observed in western Washington and a Yellow-billed cuckoo was seen east of the Cascade Mountains in 1992 (Center for Biological Diversity, 1998).

6.1.3. Analysis of Effects

Operation of the Rock Island Project, its hatcheries, acclimation ponds, and fish traps will not occur in the vicinity of Yellow-billed cuckoos or Yellow-billed cuckoo habitat. The proposed actions of the Rock Island Project HCP will not benefit or negatively impact the survival of Yellow-billed cuckoos. Specifically, the avian hazing program and

northern pikeminnow control program will not benefit or negatively impact Yellow-billed cuckoos. Conservation easements or habitat restoration projects funded under the tributary conservation plan could preserve or restore Yellow-billed cuckoo nesting habitat if the project results in a large stand of riparian forest (greater than 20 ha with a minimum width of 100-200 m).

6.1.4. Impact Minimization Measures

No measures are needed to minimize impacts to Yellow-billed cuckoo from the actions listed in the Rock Island Project HCP.

6.1.5. Compliance with Recovery or Management Plans

The Yellow-billed cuckoo is a candidate species on the federal Endangered Species listing rules. No critical habitat or recovery plan exists. Projects funded by the conservation fund will need to be reviewed by state and federal agencies to receive permits for construction projects. Habitat preservation projects may protect suitable yellow-billed cuckoo habitat.

6.1.6. Determination of Effects

The Rock Island Project HCP will have no effect on Yellow-billed cuckoos.

6.2. Western Sage Grouse (*Centrocercus urophasianus* phaios)

6.2.1. Geographic Boundaries and Life History

Western sage grouse historically were distributed from southern British Columbia south through central and eastern Washington and southeastern Oregon. In California and Nevada the sage grouse are an intermediate form between western sage grouse and eastern sage grouse (*C. u. urophasisnus)* (USFWS 2003). Their historic range followed the distribution of sagebrush in the climax sagebrush and prairie ecosystems (Hays et al. 1998). Populations of western sage grouse have declined from their historic range to present numbers due to degradation and loss of sagebrush habitat.

Historically, in Washington State, western sage grouse ranged from the southeastern reach of the Columbia River north to Oroville west to the Yakima River and east to the Spokane River (Hays et al. 1998). By the early 1900s, sage grouse had been extirpated from Spokane, Columbia and Walla Walla Counties (Hays et al. 1998). At present two sage grouse populations remain: the largest population is found in Douglas County and northern Grant County, and the smaller population occurs in Yakima and southern Kittitas counties. These populations are small and isolated, occurring in partially intact areas of sagebrush habitat (Hays et al. 1998).

Flowers and leaves of various plants, including sagebrush, along with insects make up a large portion of the sage grouse diet during the spring through the fall. Sagebrush leaves are the only food item eaten by sage grouse during the winter. Sage Grouse in Washington reproduce slowly. Mortality is high in the summer. Survival from egg to adult is very low with less than one replacement produced per female per year (Foster Creek Conservation District 2001*).*

6.2.2. Presence in Action Area

Sage grouse breed in open areas called leks. Leks are usually located in wheat fields and on ridge tops. Females nest on the ground in habitat dominated by grass/forbs cover and thick over story of shrubs, usually sagebrush (Foster Creek Conservation District 2001). Nesting habitat includes remnants of unconverted shrub-steppe habitat, conservation reserve program fields dominated by wheat grass, or range land that is currently grazed. Nesting vegetation must provide both vertical and horizontal visual protections from potential nest predators (Foster Creek Conservation District 2001*).* Sage Grouse migrate 10 to 40 miles to wintering areas in October and November and return to breading areas in April and May *(*Foster Creek Conservation District 2001).

Sage grouse are presently found scattered through out central Douglas County from the Waterville Plateau north to Del Rio and east to the land above Grand Coulee and lower Grand Coulee. Sage Grouse are found as far south as the Beezely Hills in northern Grant County.

Sage Grouse are not found in the Rock Island Project HCP action area. Sage grouse are no longer found in the portions of Chelan or Douglas counties that border the Rock Island Reservoir or tributary streams that would be addressed in the HCP for the Rock Island Project. Habitat loss caused by agricultural development and home building has extirpated sage grouse from the Rock Island Project HCP action area.

6.2.3. Analysis of Effects

Operation of the Rock Island Project, its associated hatcheries, acclimation ponds, fish traps, avian hazing and northern pikeminnow control will not occur in the vicinity of the western sage grouse or western sage grouse habitat. Conservation easements or habitat restoration projects funded under the tributary conservation plan will not protect or restore western sage grouse nesting habitat.

6.2.4. Impact Minimization Measures

No activities addressed by the Rock Island Project HCP will impact western sage grouse. No measures are necessary to protect western sage grouse.

6.2.5. Compliance with Recovery or Management Plans

No federal recovery plan has been written or critical habitat has been designated because the western sage grouse is a candidate species under the federal Endangered Species Act. Washington Department of Fish and Wildlife has developed a recovery plan for western sage grouse. Two recovery areas are designated in the recovery plan. One recovery area is in the Del Rio area adjacent to the Chief Joseph Reservoir (Hays et al 1998). The second area is in the southwestern portion of Douglas County. Neither the Rock Island Reservoir nor its tailwater border the two western sage grouse recovery areas designated by Washington Department of Fish and Wildlife.

6.2.6. Determination of Effects

The Rock Island Project HCP actions will have no effect on western sage grouse.

6.3. Washington ground squirrel *(Spermophilus washingtoni)*

6.3.1. Geographic Boundaries and Life History

The Washington ground squirrel inhabits the sagebrush and grassland regions of the Oregon and Washington Columbia Plateau. Their range is restricted to the sandy soil regions of the Columbia Basin south and east of the Columbia River and in northeastern Oregon between the John Day River and the Blue Mountains.

Historically there were 56 sites with Washington ground squirrel colonies in the Columbia Basin (Betts 1990). Betts (1999) surveyed known Washington ground squirrel colony sites in 1998 and found only 37 sites occupied. Data collected in 1999 thru 2001 indicates a significant decline in Washington ground squirrels at the Columbia National Wildlife Refuge and the Seep Lakes Wildlife Area (Foster Creek Conservation District 2001).

In the late 1980s only one colony of Washington ground squirrels was know to exist on Badger Mountain in Douglas County (Foster Creek Conservation District 2001). In the 1990s a second colony was found near Jameson Lake. There was a range fire at the Jameson Lake colony site in 1999. Ground squirrel numbers have increased since the fire (Foster Creek Conservation District 2001*).* An additional colony was found on Badger Mountain in 2001 (Foster Creek Conservation District 2001).

Biologists from the US Bureau of Land Management surveyed 70,550.8 acres of BLM land in 2002 and found 83 colonies of Washington ground squirrels in central Washington. Colonies found by the BLM study were small and individual burrows were widely dispersed (John Musser, Bureau of Land Management, pers. comm., 2003)

Washington ground squirrels inhabit arid open shrub steppe and grasslands. Colonies may also be found in ravines and on hillsides. Colonies tend to be located in areas of deep silty soils with low percentages of clay. Tilling or other mechanical turning of the soil destroys the food source for Washington ground squirrels and makes the soil unusable as a burrow site (Foster Creek Conservation District 2001).

The Washington ground squirrel spends most of its life under ground in its burrow. Adults emerge from their burrows between January and early March each year depending on weather and elevation. Males emerge before the females. Females have one litter a year and usually produce 8 young. Young of the year are born early in the season and emerge in mid-march (Foster Creek Conservation District 2001). Washington ground squirrels feed on succulent grass and forbs, roots, seeds and insects. As the grass dries out in late May or June, depending on elevation, the ground squirrels will enter their burrows and hibernate for 7 to 8 months (Foster Creek Conservation District 2001).

Washington ground squirrels are susceptible to a number of predators. Badgers, coyotes, weasels and raptors all prey on the squirrels. The ground squirrel colonies are carriers of and susceptible to a bacterial infection of *Yersinia pestis* bacterium commonly called sylvatic plague.

6.3.2. Presence in Action Area

Washington ground squirrels in Douglas County are located on the Waterville Plateau and on Badger Mountain. Operation of the Rock Island Project, and its associated hatcheries, acclimation ponds, fish traps, avian hazing and northern pikeminnow control programs will not occur in the vicinity of the Washington ground squirrels or Washington ground squirrel habitat. Conservation easements or habitat restoration projects funded under the tributary conservation plan will not protect or restore Washington ground squirrel habitat in the Rock Island Project HCP action area.

6.3.3. Analysis of Effects

No activities implemented under the Rock Island Project HCP will impact Washington ground squirrels. No measures are necessary to protect Washington ground squirrels.

6.3.4. Impact Minimization Measures

No measures are needed to minimize impacts to Washington ground squirrels or Washington ground squirrel habitat because actions conducted under the Rock Island project HCP will have no impact on the squirrels.

6.3.5. Compliance with Recovery or Management Plans

No federal recovery plan has been written or critical habitat has been designated because the Washington ground squirrel is still a candidate species under the federal Endangered Species Act. Washington Department of Fish and Wildlife has listed the Washington ground squirrel as a candidate species under the state ESA. No recovery plan for Washington ground squirrel has been written by Washington Department of Fish and Wildlife.

6.3.6. Determination of Effects

The Rock Island Project HCP actions will have no effect on Washington ground squirrels.

7. SUMMARY OF EFFECTS DETERMINATION

Table 7-1 and 7-2 summarize the effect determination for the 14 listed or candidate species that occur, or potentially occur, in the Rock Island HCP action area.

Table 7-1. Summary of effects determination for Listed Species

Listed Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Fish Species			
Columbia River bull trout (*Salvelinus confluentus*) Threatened	Likely to adversely affect	May result in adverse modification of proposed critical habitat	Migratory and resident populations present in mainstem and tributary; resident fish in tributaries
Wildlife Species			
Pygmy Rabbit (*Brachylagus Idahoensis*) Endangered	No effect	Critical Habitat not designated	No populations in or near Project Area or Action Areas
Bald Eagle (*Haliaeetus leueocephalus*) Threatened	May affect, not likely to adversely affect	Critical Habitat not designated	Nesting location present on Rocky Reach Reservoir
Lynx *(Lynx canadensis*) Threatened	No effect	Critical habitat not designated	Project area not located in Washington State Lynx Management Zones
Gray Wolf (*Canis lupus*) Threatened	No effect	Critical habitat not designated	No documented populations or suitable habitat within or near project area
Grizzly Bear (*Ursus horribilis*) Threatened	No effect	Critical habitat not designated	Some tributary headwater locations included in Grizzly Bear Recovery Area
Marbled Murrelet (*Brachyramphus marmoratus*) Threatened	No effect	Critical habitat not designated	Nesting habitat within North Cascades National Park, not part of Project Area or action areas
Northern Spotted Owl (*Strix occidentalis*) Threatened	No effect	Would not result in destruction or adverse modification of proposed Critical Habitat	Any tributary action in designated critical habitat requires federal oversight and review to ensure no effect
Plant Species			
Showy Stickseed (*Hackelia venusta*) Endangered	No effect	Critical habitat not designated	Population occurs on 2.5 acres of federal land on Wenatchee River at elevation above stream channel
Wenatchee Mountains Checker-mallow (*Sidalcea oregana*) Endangered	No effect	Would not result in destruction or adverse modification of proposed Critical Habitat	Populations occur in meadow habitat at elevations high above Wenatchee River
Ute ladies'-tresses (*Spiranthes diluvialis*) Threatened	May affect, not likely to adversely affect	Critical habitat not designated	Populations located along Rocky Reach Reservoir shoreline only; plants likely established and maintained by reservoir influence

Table 7-2. Summary of effects determination for Candidate Species

Candidate Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
Wildlife Species			
Yellow-billed Cuckoo (*Coccyzus americanus)*	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population or suitable nesting habitat within action area
Western Sage Grouse (*Centrocercus urophasianus* phaios)	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population or suitable nesting habitat within action area
Washington ground squirrel (*Spermophilus washingtoni*)	Not likely to jeopardize continued existence of species	Critical habitat not designated	No documented population within Project or action area

8. TERMS AND ACRONYMS

Additional Tools	Tools in addition to those initially proposed – meaning any action, structure, facility, or program (on-site only) at the Project, except those listed in HCP section 9.7, that are intended to improve the survival of Plan Species migrating through the Project.
Adfluvial	Term describing fish that migrate from tributary stream to a lake or reservoir to mature, and return to a tributary as adults to spawn (one of the three life histories exhibited by bull trout)
Alluvial fan	Sedimentary materials composed of silt, sand, and gravel carried by a stream and deposited at the mouth of the stream in the shape of a fan.
BA	Biological Assessment
BAMP	Biological Assessment and Management Plan
Bypass	Structure in a dam that provides a route for fish to move through or around a dam without going through turbines
cfs	cubic feet per second
Chelan PUD	Public Utility District No. 1 of Chelan County
Colville Tribe	Confederated Tribes of the Colville Reservation
Coordinating Committee (HCP)	The primary decision making body overseeing implementation of HCP actions and consists of one representative from each party signing the HCP agreement, and a neutral facilitator.
Dam	The concrete structure impounding the Columbia River (as defined in the HCP
Distinct Population Segment	An ESA term for a population segment of a species which meets tests of discreteness and significance under joint policy of the U.S. Fish and Wildlife Service and the National Oceanographic and Atmospheric Service.
Chelan PUD	Public Utility District No. 1 of Douglas County
EA	Environmental assessment

Effective Date	Effective Date of the HCP agreement is the later of 1) FERC's License order approving the HCP and modifying the Project license, 2) NMFS' issuance of an incidental take statement, or 3) USFWS completion of the necessary consultations under the ESA.
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FEIS	Final Environmental Impact Statement -Anadromous Fish Agreements and Habitat Conservation Plans for the Wells, Rocky Reach, and Rock Island Hydroelectric Projects, December, 2002.
FERC	Federal Energy Regulatory Commission
Fluvial	Term used to describe fish that migrate from tributary streams to larger rivers to mature then migrate to back to a tributary stream to spawn (one of three life histories exhibited by bull trout)
forebay	The body of water from the dam upstream approximately 500 feet (as defined in the HCP)
GBD	Gas bubble disease
GBT	Gas bubble trauma
GCFMP	Grand Coulee Fish Maintenance Project
HCP	Habitat Conservation Plan and Anadromous Fish Agreement for the Rock Island Hydroelectric Project and supporting documents
JBS	Juvenile Bypass System
JDPS	Juvenile Dam Passage Survival (forebay, dam, and tailrace)
JPS	Juvenile Project Survival (reservoir, forebay, dam, and tailrace)
ITP	Incidental Take Permit
kcfs	1,000 cubic feet per second

msl	Mean Sea Level.
NEPA	National Environmental Policy Act
NMFS or NOAA Fisheries	National Marine Fisheries Service
NNI	No Net Impact
Parties	The agencies and tribes which have, to date, conditionally signed the HCP Agreement.
Permit Species	UCR steelhead, UCR spring-run chinook salmon, UCR summer/fall-run chinook salmon, and Okanogan River sockeye salmon
Plan Species	Permit Species and reintroduced coho salmon
Project	Rock Island Hydroelectric Project (FERC No. 943) - the geographical boundaries of the Project include the reservoir, forebay, dam, and tailrace (as defined in the HCP).
PUD	Public Utility District
radio-tag	Tag composed of a small transmitter, battery, and whip antenna, commonly used in juvenile and adult fish behavior and survival studies.
reservoir	The body of water impounded by the dam extending to the tailrace of the next upstream dam.
resident	Term that describes fish that do not migrate, but reside in tributary streams or lakes their entire lives (one of three life histories exhibited by bull trout).
RIHP	Rock Island Hatchery Program
RM	river mile
salmonid	Fish belonging to the family Salmonidae, including trout, salmon, chars, grayling, and whitefish.
smolt	A juvenile salmon or steelhead migrating to the ocean and undergoing physiological changes to adapt its body from a freshwater environment to saltwater environment.

tailrace	The body of water from the base of the dam to a point approximately 1,000 feet downstream (as defined in the HCP).
TDG	Total dissolved gas
UCR	Upper Columbia River
Umatilla Tribe	Confederated Tribes of the Umatilla Indian Reservation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
Yakama Tribe	Confederated Tribes

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10. LIST OF TABLES

11. LIST OF FIGURES